Volume 6, Issue 2 (I)
April - June 2019

ISSN 2394 - 7780

ज्ञान-विज्ञान विमुक्तये
UGC
University Grants Commission
Journal No.: 63571

International Journal of
Advance and Innovative Research

Indian Academicians and Researchers Association
www.iaraedu.com

International Journal of Advance and Innovative Research

Volume 6, Issue 2 (I): April - June 2019

Journal - 63571

UGC Journal Details

Name of the Journal :	International Journal of Advance & Innovative Research
ISSN Number :	
e-ISSN Number :	23947780
Source:	UNIV
Subject:	Multidisciplinary
Publisher:	Indian Academicians and Researchers Association
Country of Publication:	India
Broad Subject Category:	Multidisciplinary

International Journal of Advance and Innovative Research

Volume 6, Issue 2 (I) : April - June 2019

CONTENTS

Research Papers

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019

ISSN 2394 - 7780

A STUDY ON BEACH TOURISM AND ITS OVERALL DEVELOPMENT – A SPECIAL REFERENCE TO BEACHES IN TRIVANDRUM DISTRICT

Dr. A. Nishad
Assistant Professor (Guest), Department of Commerce, Mannaniya College of Arts and Science, Trivandrum

ABSTRACT
The travel industry seems, by all accounts, to be an industry that anybody can get it. The travel industry in Kerala is being advanced as a monetary improvement procedure for country networks dependent on contentions of its immediate and backhanded advantages. The travel industry advertisers, in any case, don't promptly recognize the ecological effects and the subsequent social costs that the neighbourhood networks will endure when they bring the travel industry into their zone. There is no uncertainty that travel industry, alluded to as 'the world's biggest industry', is a major business. Amid the recent decades, numerous nations in this world have left in the travel industry situated strategies. The travel industry is the movement of people making a trip to and remaining in spots outside their typical condition for recreation and different purposes. In the modem days, the travel industry is additionally a monetary movement. It lands position openings and win outside trade. The travel industry is a procedure including visitors, places they visit and exercises they include into. Beach the travel industry, subsequently, is the travel industry offered as a powerful influence for the beach front condition and its common and social assets. It happens along the beach and in the water quickly contiguous the beach lines. In this investigation, the term beach front district includes not just the locale situated near the ocean, yet additionally its expansions through the substantial arrangement of estuaries and backwaters far into the inland of Kerala. Attributable to the convicts of interests of the partners of this business, the contention for and against the travel industry improvement in immature and least creating countries is probably going to proceed. It is viewed as proper in this setting to assess the status of India's travel industry. Tourists involve a critical position in the travel industry since they are the customers of the travel industry items. Thusly, the perspectives on the visitors are expected to improve the travel industry. It will likewise support the monetary improvement. A huge number of sightseers visit India since it unimaginably has the most various assortments of beaches anyplace on the planet. Peaceful backwaters and tidal ponds, bayous and unpleasant magma shook oceans, marine estuaries with fish, slamming surf, fine brilliant sand or palm bordered beaches profound India has them all.

Keywords: Beach, Travel, Tourism.

1. INTRODUCTION

The beach is the limit among land and ocean. The advancement of the travel industry has been personally connected with the sea beach. Individuals needed to escape from the drudgery of day by day life and appreciate the incredible marvels of nature along the beach. India is lucky in having a long beach line of 6100 km from West Bengal to Gujarat limited by the Arabian Sea, the Bay of Bengal, and the Indian Ocean. The beaches, sea beaches, estuaries and deltas of the streams all through the beach district offer chances to create the travel industry and financial advancement. The travel industry assumes a noteworthy job in the nations like China, England, Germany, Hong Kong, Thailand, and United States. They are drawing in more visitors and producing tremendous income in regard of remote trade. Before, the travel industry was restricted due to the non-accessibility of frameworks like transport and correspondence, yet in the present time, the general populations are living in the time of Science and Technology. The improvement of air, ocean, street transport and partnered foundations like lodgings, beach, resorts and human services focuses have been in charge of the advancement of the travel industry around the globe. Numerous nations have come to understand that worldwide the travel industry is one of the quickly developing businesses of the world. It has additionally turned into the fundamental area of the economy of any country.

More than the development in the piece of the overall industry which is as yet pitiful in a worldwide setting, the state has been recognized just like a goal with the most astounding potential. This finding has been over and over affirmed by movement middle people both with in India and in the conventional producing markets of Europe. In this manner the broadly acknowledged end is that for Kerala the travel industry could be a most dominant motor that could move the state's economy. Truth be told on the off chance that we are sincerely dissect the restrictions and shortcoming of huge numbers of our other monetary segments, we will understand that we have couple of options, being bio-innovation and data innovation the two of which we presently can't seem to create. India isn't a nation however a landmass to the extent the vacation destinations are concerned. For no nation on the planet can flaunt so differed an atmosphere, so unique wide open spaces thus rich legacy. India

ISSN 2394 - 7780

is dynamically turning into the cynosure of the vacationers inferable from the endeavors of the administration and open to understand the maximum capacity of its huge and changed geographical, social and worldly assets. In rustic India, the town experience gives a characteristic scene which could shift from a tea ranch to an angling town. From the strong peaks in Ladakh to the regular backwaters of Kerala, the conceivable outcomes are huge.

2. IMPORTANCE OF THE STUDY

The travel industry is special since it includes industry without smoke, training without classroom, and reconciliation without enactment and tact without custom. It perceived that travel industry is an essential and alluring human movement meriting the consolation surprisingly and governments. In view of these perspectives the significance of the investigation is given beneath:

- Tourism is a vital movement on account of its immediate impacts on social, social, instructive and financial divisions of social orders.
- Tourism can add to the foundation of new global financial request. It will dispense with the enlarging monetary hole between the created and creating nations.
- Tourism gives a noteworthy commitment to outside trade profit of the creating and created nations.
- Tourism is a noteworthy thing of global exchange.
- Tourism makes generosity for sightseers to take an interest in numerous occasions like gatherings and shows. And furthermore it gives a chance to improve collaboration just as to extend a genuine picture of a nation to the outside world.
- Tourism has an instructive hugeness and it includes social trades. The social components draw in voyagers to goals, for example, models and authentic landmarks.
- Tourism is uniting individuals of various foundations from various nations.
- Tourism is a vital piece of modem life as a power for social change.

3. STATEMENT OF THE PROBLEM

In India, Tourism is considered as second biggest remote trade worker. Since, the foundation offices like power, street just as rail and air transportation, convenience and so forth help to attempt travel and visit to an impressive degree. The travelers, who come to India and particularly Kerala, value the job of the Government especially in the travel industry division. The travel industry is definitely not a solitary industry however it is associated with numerous different businesses. So the present investigation is embraced to evaluate the nature and development of the travel industry and its commitment to the provincial monetary advancement. A sizable measure of studies has been directed over the previous decades on the travel industry, significance of the travel industry, effect of the travel industry, wellbeing the travel industry, and costal the Beach Tourism.

4. KERALA'S BEACH TOURISM

Kerala, the State with the Arabian Sea in the west, the Western Ghats transcending 500-2700 m. in the east and arranged by forty four waterways, Kerala appreciates special topographical highlights that have made it a standout amongst the most looked for after vacationer goal in Asia. Kerala is one of the littlest states having quite recently 1.27 percent of the complete zone of India. The state is isolated into three areas - the beach swamps, the rich midlands and the good countries. The swamps in Kerala are organized by unlimited backwaters and the deltas of forty four waterways. The midlands are rich with cashew, coconut, areca nut, custard, banana, rice, ginger, pepper, sugarcane and vegetable manors. The forested good countries possess large amounts of tea, espresso, elastic and flavor estates and natural life holds. The land along these lines revealed was Kerala – "The God's Own Country". A land liberally honored naturally. A land where conventions unfurl and traditions murmur. Beach line the travel industry establishes one of the biggest sections of present day the travel industry. Beach lines have a peaceful and profound magnificence in themselves. Beaches have dependably been a fascination. The marvel on the distances of the oceans, their substance, the ocean, the wave and the surf, man has constantly gone to beach lines. Slopes and mountains isolate individuals, streams and oceans unite them from time immemorial, people crossed the oceans and achieved beach lines. Beach lines bear the cost of good daylight and sprinkling breeze. It is useful for sunbath and ocean shower that is the reason countless hotels are orchestrated in all pieces of the world. Beach line the travel industry satisfies all parts of the travel industry sun, ocean and sand. Beach line the travel industry uses the tasteful and ecological estimations of the beach line. It likewise joins water and land assets utilization. Water utilization involves swimming, surfing, cruising and other water sports. Land use exercises consolidate development of various kinds of convenience,

ISSN 2394 - 7780

recreational zones, vehicle and transport leaving zones, excitement and shopping regions, streets and transportation systems..

Beaches might be characterized as the aggregation of materials along the beach, generally characterized as lying between the most astounding point come to by the tempest waves and the low water spring tide line. It is one of the results of the waterfront highlights of testimony and is the most predominant type of the valuable work of the ocean. Beaches might be characterized as the amassing of materials along the beach, typically characterized as lying between the most astounding point come to by the tempest waves and the low water spring tide line. It is the results of the beach highlights of statement and is the most prevailing type of the development work of the ocean. The beaches on the beach line of the southern promontory extend more than 7500 km. In this way we discover beaches both along the western and eastern bank of India. Anyway increasingly created beach lines, especially valuable for the travel industry are found along the western beach due to a more grounded wave activity there and a normal beach line. In this manner water sports is a customary element of the beaches on the western beach where as beaches along the eastern beach are progressively noted for their physical magnificence.

Kerala is honored with wonderful beach lines which are the most critical vacation spots. The state has around 550 km. long beach lines, studded with world's best series of beach lines. Very much kept up, conveniently kept and safely monitored, the beach lines of Kerala are transforming into a perfect beach line get-away goal in India. Visiting the beach line locales of Kerala can make any beach line occasion a brilliant one, as Kerala's beach lines are prestigious for the delicate surf and blue waters. Individuals from everywhere throughout the world has recognized, experienced and composed that water affects everyone's psyche and body and discharges the faculties and spirits of the individuals who look for comfort on its beaches.

5. BEACH TOURISM IN THIRUVANANTHAPURAM DISTRICT

Kerala beaches, with a rich blessing of characteristic attractions of changing significance, can definitely guarantee financial advancement as far as salary and work through the reasonable advancement of the travel industry action in the state. Having comprehended the enormous potential for beaches the travel industry improvement, it is essential to make an examination of statistics and appearance of vacationers to comprehend the developing patterns sought after for beaches the travel industry of the state.

5.1. Kovalam

Kovalam is a standout amongst the most wonderful and acclaimed beaches of Kerala. This shoreline encourages holidaying with the sun, sand, ocean and surf. Attributable to its normal excellence, the shoreline resort of Kovalam is regularly alluded to as the 'heaven of the south'. Kovalam implies a forest of coconut trees and really the coconut trees along the beaches gives it a charming look. The sickle formed beaches of Kovalam can be separated in three sections. The three beaches are called Lighthouse shoreline, Hawah shoreline and Samudra. Kovalam is a characteristic inlet on the Arabian ocean shoreline of Kerala and with its blue waters, while sand and green coconut trees resemble an image postcard picture of a tropical heaven. A visitor can appreciate numerous exercises on Kovalam beach line. They can swim in the ocean; go for a sailboat ride, go surfing, kayaking, windsurfing and parasailing. At the point when a traveler is burnt out on aquatics, swimming or sunbathing, they can investigate the painstaking work, goldsmiths and material shops spread along the waterfront. Great ocean sustenance’s are accessible in the shoreline eatery, which was found very vicinity to the beaches. Kovalam shoreline is extremely prevalent with both Indian and universal voyagers. The sun, ocean, sand, cool coconut forests all were and still are an overpowering blend to top of the line voyagers from numerous pieces of the world, particularly Europe. September to May is the best time to visit Kovalam shoreline. We had no lack of business people who were eager to put their time, vitality and cash into upgrading Kovalam's charms as a prime beach line goal. Worked in the customary Kerala design style, the inn turned into a milestone on a scene covered with staid solid structures and set the pattern for the advancement of the region's travel industry foundation. From that point numerous different retreats created, which gives ayurvedic treatment too.

5.2. Shanghumugham

Situated 8 km. from Thiruvananthapuram city, this is a well known city shoreline and most loved frequent for sunset watchers. The beach is neighboring the Thiruvananthapuram Airport and Veli Tourist Village. The other fascination of this shoreline is 'MatsyaKanyaka' - a 35 meters in length model of a mermaid. The significant lot of clean sand is a captivating stunner of this Beach. The water here anyway isn't appropriate for bathing.

ISSN 2394 - 7780

5.3. Somatheram
It is 20 km. far from Trivandrum city. This beach is called as a human's fantasy goal. This is celebrated for ayurvedic treatment focuses. A visitor can accomplish flawless bloom and harmony throughout everyday life and can restore brain and body in the shoreline. There is a 15 sections of land of green land in this beach.

5.4. Poovar
Poovar beach is a standout amongst the most beautiful shorelines in India. This beach is roughly a 45 minutes head out from Kovalam. Poovar shoreline has an alternate appeal as it offers unlimited miles of sand, charming the sunrays by influencing palms. Poovar shoreline is viewed as "a virgin area" where a traveler can encounter the nearby appeal and conventional Kerala's friendliness taking care of business.

5.5. Vizhinjam
This beach is only 15 km. from Trivandrum; which was left unnoticed for quite a while. One of the fundamental attractions of this shoreline is the stone cut sanctuaries that are worked in eighth century. This is an angling town and is a wonderful sight to see the anglers participating in different angling techniques, fixing their nets and so on. There is additionally a characteristic port here. In time long past occasions, this was considered as a business community for the Europeans and other remote nations that desired exchange to India.

5.6. Chowara
This is a virgin shoreline of Kerala and 9 km. south of the famous Kovalam Beach. This shoreline is the problem area for the nature and relaxation explorers. The shoreline is the all around flawless mix of nature where the traveler can appreciate rich the stunning greens, murmuring ocean breeze and the mumbling surf.

5.7. Veli
This beach is situated in Thiruvanathapuram area and close to Kochuveli railroad station. It is a wonderful shoreline with a recreation center close to the Veli vacationer town joins the Veli shoreline by a skimming span. There is a sand bar that different the ocean from the Veli Lake. It is a delight to go for a stroll through these sand bars. There is a skimming eatery that is offered by this shoreline. Individuals can go for watercraft rides and horse rides from this shoreline

5.8. Varkala
Varkala is a standout amongst the latest disclosures of sightseers and is 41 kms north of Thiiuvananthapuram city. The shoreline, in any case, is just around 500 meters in length. Varkala is a beach resort, a spa and a vital Hindu focus of journey. A calm, separated stretch of sand, the Papanasam Beach in Varkala, is known for its mineral springs and rough bluffs. The multi year old Sree Janardhana Swamy Temple and the medicinal services focuses are alternate attractions here.

6. BEACH TOURISM – ECONOMIC CONCEPT
The travel industry arranging and advancement must be imagined with regards to the general improvement of the region, as it includes adjusting the convicting needs of numerous intrigue gatherings. An advancement plan must be incorporated with the nearby economy so its outcomes are unmistakable in the improvement of the material and social states of the general population. Such incorporation is essential in the travel industry improvement to guarantee the dynamic interest of the nearby individuals in the advancement of the travel industry and in the safeguarding of the sensitive nature of the locale so the travel industry isn't seen as a vital insidiousness. The travel industry area not just gives direct work and pays advantages to the significant partners yet in addition makes linkages which give comparable advancements to a large group of different segments and individuals. This is the reason governments incline toward areas with the most astounding inside linkages as the best choice for speculation.

Monetary effect investigation follows the movement and analyze secondary going through related with the travel industry movement in an area to distinguish changes in deals, charge incomes, salary and employments because of the tourism industry action. Monetary effect studies conducted in littler land regions typically focused exclusively on guests, that is, non-occupants entering the zone on an outing far from home Referring to the business and pay multiplier impacts of beaches the travel industry in Kerala, it is been seen that any use by the administration or the business in the part will make new interest for data sources and administrations prompting new factor salaries, and the spending of these wages by beneficiaries will fill in as the spring board for the prime round of multiplier impacts, and this procedure of working of the multiplier will proceed as long as beneficiaries of new pay spend their pay. Notwithstanding this impact of introductory interest in the travel industry by Government and industry, the immediate spending by vacationers amid their stay in the state will likewise make new interest for different products and enterprises, which will lead to another rush of pay/business age and multiplier impacts, as portrayed previously. Far beyond this, travel industry advancement

ISSN 2394 - 7780

can likewise prompt the extension of maker's products industry, which will additionally quicken the procedure of development in the economy. It all, be that as it may, relies upon the dimension and example of traveler spending over the span of their visit and the amount of that spending or circles in the nearby economy.

8. METHODOLOGY

The study is descriptive in nature. The viewpoints of were beach tourism customers in Trivandrum were determined and analyzed using statistical techniques.

(a) Sample Size

The universe of the study was the beach tourism customers in Trivandrum district. The sample consisted of 60 respondents.

(b) Tools for Data Collection

The tool employed for data collection was a questionnaire having three parts: the first part designed to determine the demographic profile of the respondents in relation to the various demographic factors, the second to assess the satisfaction factors of beach tourists and the third, statements to evaluate the future development of Beach Tourism in Trivandrum.

(1) Primary Data

The primary data were collected through questionnaire from 60 respondents. Questionnaires and interview schedules were used for this.

(2) Secondary Data

The study also made use of various types of secondary data including studies, reports and data collected by government and non-governmental organizations.

C. Data Analysis - Tools

Statistical tools such as percentage, Mean score and Garrett Ranking Test were used for analyzing the data.

9. ANALYISIS AND INFERENCE

Table-1: Demographic Profile of the Beach Tourists

Demographic distribution		Number of Respondents	Percentage
Gender	Male	32	53.33%
	Female	28	46.67%
Total		60	100.00%
Age	Less than 25 years	17	28.33%
	26 – 35 years	15	25.00%
	36 – 45 years	11	18.33%
	45 – 60 years	8	13.33%
	Above 60 years	9	15.00%
Total		60	100.00%
Marital status	Single	27	45.00%
	Married	33	55.00%
Total		60	100.00%
Tourist Category	Domestic	21	35.00%
	Foreigner	39	65.00%
Total		60	100.00%
Occupation	Salaried	12	20.00%
	Business	18	30.00%
	Agriculture	16	26.67%
	Others	14	23.33%
Total		60	100.00%
Educational qualification	School	11	18.33%
	Intermediate	10	16.67%
	Higher secondary	11	18.33%
	Graduation	5	8.33%
	Post-graduation	8	13.33%
	Technically qualified	15	25.00%
Total		60	100.00%

ISSN 2394 - 7780

Inference: Out of the 60 respondents about 53 percent of the tourists are men and rest belongs to female, 28 percent of the tourists are coming under the age group of below 25, 55 percent tourists are married, 65 percent of tourists are belongs to domestic and rest of the tourist are foreigners, 30 percent tourists are coming under the occupation of Business, 25 percent of tourists are educational qualification of Technical education.

Table No-2: Factors which Dictate the satisfactory level of Beach Tourism

Sl No.	Particulars	SA	A	N	D	SDA	Total Score	Mean Score
1	Food and Beverages	69	72	57	42	5	245	3.50
2	Accommodation	30	83	24	9	3	149	2.13
3	General Price Level	60	103	79	64	8	314	4.49
4	Boat Race	52	86	32	17	2	189	2.70
5	Safety Features	98	127	51	36	8	320	4.57
6	Natural Beauty	49	104	54	48	2	257	3.67
7	Health Treatment	91	200	21	15	5	332	4.74
8	Attitude of Local People	54	86	76	70	4	290	4.14
9	Leisure and Recreation	42	127	29	23	5	226	3.23
10	Cleanliness	61	69	48	42	4	224	3.20

Inference: The result obtained from 60 respondents had been thoroughly analysed and the output of the result had been clearly analysed in this section with regards to view point of beach tourists in regards to the factors which are directly affects the satisfaction level. As far as view point of tourists in connection with the satisfaction level, 'Health Treatment' and 'Safety Features' are the most considering factors. The least considering factors is 'Accommodation' and 'Boat Race'.

Table No-3: Customer Perception towards Future Development of Beach Tourism

Major Factors	Total Score	Average	Rank
Economy of the State	2450	40.8	XII
Decrease in the Airline Charges	2940	49.0	X
Peaceful Nature of thte State	3290	54.8	VI
Level of Education	3065	51.1	VIII
Better living conditions	3395	56.6	IV
Feasible Tour Packages	3890	64.8	III
Overall Resources	4390	73.2	I
Innovative Policies of KTDC	3340	55.7	V
Advancement in Transportation	2775	46.3	XI
Govt. Policies	2995	49.9	IX
Environment Friendly Approach	4040	67.3	II
Advanced Computer Reservation	3245	54.1	VII

Inference: The scores provided by the respondents are summed using the Garrett method and the average scores for each factor are obtained. The average scores are converted into rank and it is evident from the above table 'Overall Resources' (Rank I) was the major satisfactory factor with the average score of 73.2 followed by 'Environment Friendly Approach' (Rank II) with the average score of 67.3. 'Feasible Tour Packages' (Rank III) which had an average score of 64.8 is the other factor which dictate the customer perception towards future development of Beach Tourism.

FINDINGS

- It is been found that the major issues discussed in them included the general trend in the growth of Indian tourism, the poor infrastructure and accommodation facilities.
- The study of the satisfaction levels exposed that both foreign and domestic tourists attributed their satisfaction to the Health treatment and safety features.
- An assessment of the tourists' opined that overall resources and friendly approach are the basic factors which dictate the future development of beach tourism.
- It is been noted ecological impacts have significance for forecasting for the sustainable development of beach tourism in Kerala.

ISSN 2394 - 7780

- The major sustainability issues of beach tourism in Kerala which were grouped as financial, ecological and socio-cultural.

SUGGESTIONS

- Integration of coastal tourism with coastal zone management is also suggested to minimise the conflicts between various coastal activities by harmonising the interests of the different sectors.
- Government should take necessary actions to attract more female tourists to Kerala.
- Reorganized tourism development is considered as an operative tool to avoid the over-exploitation of indigenous resources and to ensure the participation of resident community in beach tourism development.
- Public-private partnership (PPP) is considered to encourage infrastructure progress including development of accommodation, conveyance, location development, other facilities, etc.

CONCLUSION

Kerala is famous for its rich vegetation, peaceful and lovely beaches, rambling backwaters and staggering slope stations. This makes it an ideal spot to appreciate common magnificence that charms the eye and warms the heart. Maybe no other state in India has been honoured with characteristic assets as rich and enormous as that of Kerala. Kerala is known everywhere throughout the world for its captivating greenery, delightful atmosphere, customary prescriptions, craftsmanship and painstaking work. Kerala being the place where there is flavours is an ideal spot to have a reasonable sound, dietary and scrumptious sustenance notwithstanding for the non Keralites. Whatever a visitor needs the land offers the best. Kerala is one of the vital places of interest with all possibilities to pull in household and outside sightseers, yet it isn't completely investigated and used. In this circumstance the legislature should find a way to build up the foundation offices and make man-made attractions. Govt. should offer need to improve condition on beaches to keep its biological parity and should check ecological decay which can be adverse in drawing in the sightseers.

BIBLIOGRAPHY

- Karma, Krishna. K. (2004). Economics of Tourism – Pricing, Impacts, Forecasting Kanishka Publishers, Distributors. New Delhi.p28.
- Kumar, Ravi Bhushan (1995). Coastal Tourism and Environment. APH Publishing Corporation Darya Gang New Delhi.pp.161-233.
- Malhotra, R.K. (2005). Tourism Planning and Management. Anmol Publications Pvt. Ltd. New Delhi. p333.
- Negi, Jagmohan. (1990). Tourism and Travel, Gitangali Publishing House. New Delhi. p26.
- Sharma, K. (2004). Tourism Planning and Development- A New Perspective.(ed) Kanishka Publishers, Distributors. New Delhi, pp556-558.
- Sheldon, Pauline. J. (2003). Tourism Information Technology CABI Publishing, CAB International , Walling ford UK pp12-14.
- Singh, Shalini. (2008). Profiles of Indian Tourism(ed) A.P.H. Publishing Corporation. New Delhi, p.93.
- Singh, P.C. (2005). Eco Tourism and Mass Tourism. Anmol publications Pvt. Ltd.New Delhi pp.25-43.
- Rajeevan, V. (2007). Culture, Heritage – Rich and Ancient. Kerala Calling April, 2007. pp 14-15.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

A STUDY ON EMOTIONAL INTELLIGENCE AT WORK PLACE

P. Nivetha[1] and Dr. S. Sudhamathi[2]
PhD Scholar[1] and Assistant Professor[2], Alagappa Institute of Management, Alagappa University, Karaikudi

ABSTRACT
Emotional Intelligence (EI) must somehow combine two of the three states of mind cognition and affect, or intelligence and emotion. Emotional intelligence refers to the ability to perceive control, and evaluate emotions. Some researchers suggest that emotional intelligence can be learned and strengthened, while other claim it is an inborn characteristic. A number of testing instruments have been developed to measure emotional intelligence, although the content and approach of each test varies. If a worker has high emotional intelligence, he or she is more likely to be able to express his or her emotions in a healthy way, and understand the emotions of those he or she works with, thus enhancing work relationships and performance. Emotional Intelligence is not about being soft! It is a different way of being smart - having the skill to use his or her emotions to help them make choices in the moment and have more effective control over themselves and their impact on others. Emotional Intelligence allows us to think more creatively and to use our emotions to solve problems. Emotional Intelligence probably overlaps to some extent with general intelligence. The emotionally intelligent person is skilled in four areas: Identifying emotions, using emotions, understanding emotions, and regulating emotions.

Keywords: Emotional intelligence, employees, age, work, experience

INTRODUCTION

Emotions are involved in everything we do: every action , decision, and judgment. Emotionally intelligent people recognize this and use their thinking to manage their emotions rather than being managed by them. Just like the term 'coaching' which will be addressed different theories define Emotional intelligence in different ways. We agree with the definition offered by sparrow and knight in applied Emotional intelligence Emotional intelligence is the habitual practice of:

- Using emotional information from ourselves and other peoples;
- Integrating this with our thinking;
- Using these to inform our decision making to help us get what we want from the immediate situation and from life in general.
- Emotional intelligence is using thinking about feeling (and feeling about thinking) to guide our behavior

This will lead to better management of ourselves and better relationships with others, The employees emotional intelligence at work place and to help in future why some employees are outstanding performers while others are not. Emotional Intelligence calls for recognizing and understanding of the issues in the organizations on the basis of the results organization can choose a strategy and actions to improve the performance of their employees.

EMOTIONAL INTELLIGENCE

To be successful requires effective awareness, control and management of your own emotions, and awareness and understanding of other people. Emotional intelligence therefore embraces two aspects of intelligence. understanding your goals yourself , intentions, response, behavior and all understanding others and other feelings.

In 1980's research into multiple intelligences, Howard gardener describes these two aspects of intelligence as interpersonal intelligence being intelligent in picking up what is going on inside us and doing what we need to do about it; and interpersonal intelligence - being intelligent in picking up what is going on in other people and between other people and doing what we need to about it .Here is a case study demonstrating how a lack of self-management and relationship management can show itself in the workplace.

IMPROVING EMOTIONAL INTELLIGENCE

All attitudes can be changed if we want to change them, so all aspects of emotional intelligence can be developed and improved. There are five basic principles that from the foundation of emotional intelligence;

1. Emotional intelligence is not one single thing, but is made up of a mixture of attitudes, feelings and thoughts and the actions that result from them.

2. Emotional intelligence predicts and performance

ISSN 2394 - 7780

3. Emotional intelligence can be measured, Emotional can be changed.

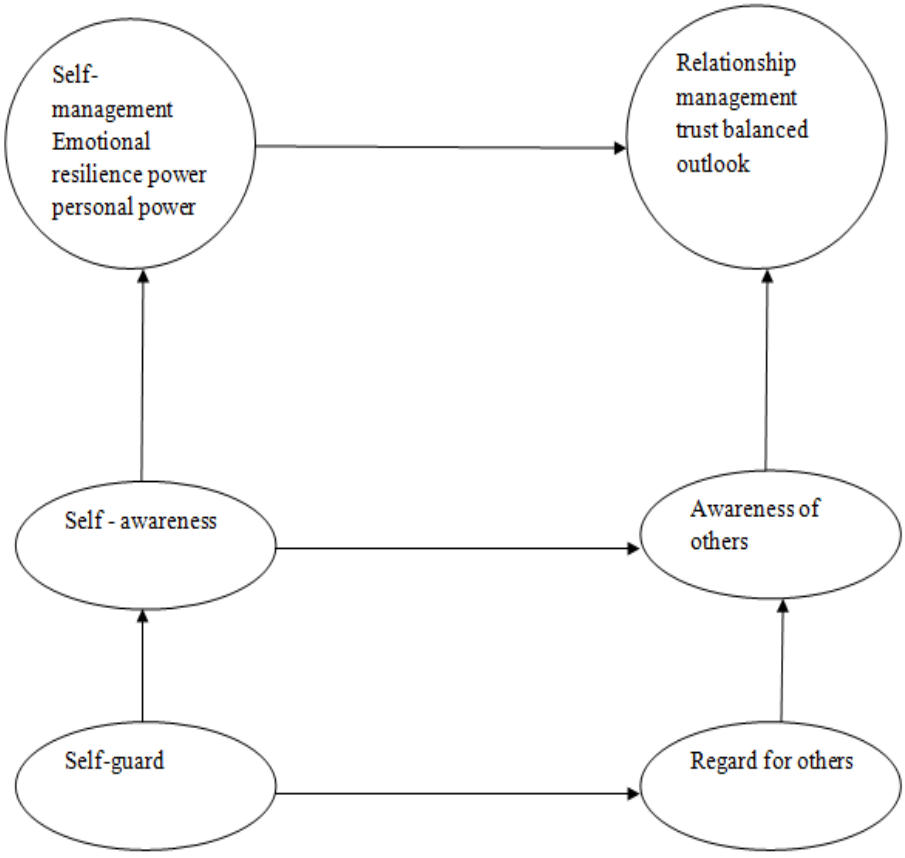
EMOTIONAL INTELLIGENCE AND WORK EXPERIENCE

The level of emotional intelligence was measured using Goleman scale, to find the understanding level of the questionnaire, reliability statistics was done. Deville's (1991) suggested that an acceptable level of reliability for psychometric test starts from .65 in this analysis most of the reliability value is above .65. The Cronbach's alpha value of the study is .884 (88.4%). In this study, the value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.798 (79.8%) which is adequate for proceeding with factor analysis. The total variance explained for the study is 65.539% by the 10 extracted components that are explained in detail to understand the determinants of employees' emotional intelligence at work place.

EMOTIONAL INTELLIGENCE AND ACADEMIC PERFORMANCE

Performance have produced mixed results. A study by Schulte et al. (1998) found that scores one self-report measure of emotional intelligence completed at the beginning of the academic year significantly predicted grade point average at the end of the year. In a study by Rozell, Petition,& Parker (2002), there was a small, but significant relationship between academic success, as measured by grade point average, and three out of the five factors within the utilized emotional intelligence scale utilizing the Goleman (1995, 1998) scale.Petrides, Frederickson, and Furnham (2004) looked at the relationships between trait emotional intelligence, academic performance, and cognitive ability in a sample of 650 British secondary education students (Grade 11). They found that emotional intelligence moderated the relationship between academic performance and cognitive ability. In a study conducted by Parker et al. (2004), various dimensions of emotional intelligence were found to be predictors of academic success. At the beginning of the semester,372 first-year full-time students completed the short form of the Emotional Quotient Inventory(EQ-i:Short) at a small Ontario university. At the end of the academic year, data from this inventory was matched with the students' academic records and two levels of very different academic success were identified: highly successful students who achieved a first-year university grade point average of 80% or better and relatively unsuccessful students who received a first year grade point average of 59% or less. The results showed that the highly successful students scored higher than the unsuccessful group on three out of the four subsets (intrapersonal ability, stress management, and adaptability) of emotional intelligence as defined by the EQ-i:Short. The two groups did not score significantly different on interpersonal ability (Parker et al., 2004).

INTRAPERSONAL & INTERPERSONAL INTELLIGENCE ARE CONNECTED WITH EMOTIONAL INTELLIGENCE



ISSN 2394 - 7780

INTERPERSONAL RELATIONSHIPS

Both participants' and friends' reports on the quality of interpersonal relationships were obtained using an abridged version of the Network of Relationships Inventory (NRI; Furman & Bushmaster, 1985; see also Furman, 1996). The full measure includes 30 items and yields three factor scores: positive interaction (social support), negative interaction (conflict), and power imbalance.

INTRARPERSONAL RELATIONSHIPS

Both self- and peer-reports on two dimensions of interpersonal competence (emotional support and conflict resolution) were obtained using the Adolescent Interpersonal Competence Questionnaire (AICQ; Bushmaster, Furman, Wittenberg, & Reis, 1988).

INITIATIVE OF THE EMPLOYEE

The American Heritage Dictionary defines initiative as "the power, ability, or instinct to begin or to follow through energetically with a plan or task; enterprise and determination". Initiative is the readiness to act and seize opportunities. Many employers look for initiative as a "must have" trait for every position they are attempting to staff. In addition, it is critical to demonstrate initiative to be promoted in an organization. Demonstrating initiative proved to be the most powerful work skills tool for bridging the chasm between the intelligent, average worker and the super productive, star worker. If a employee is starting out in a new workplace, they will quickly be judged on whether they will go beyond their specific responsibilities and take initiative to face the challenges.

EMOTIONAL COMPETENCE

Nowadays companies are facing an increasing stress of competition. They have to cope with shorter product lifecycles, rising customer demands, quicker technological developments and higher cost pressure. In order to create strategic competitive advantages, companies have to concentrate on their core competencies, which are significantly influenced by the skills and the knowledge of their employees. The main goal of business process management is to increase efficiency and effectiveness of companies by improving business processes and thus to increase the company value. For the employees, change implies continuous learning in order to tackle new challenges and tasks by competing with their emotions.

CONCLUSION

Emotional intelligence plays an important role for employees in the organization. This paper has made a better understanding about the various reasons for emotion and better control over the emotion. Handling emotions is an important requirement for a HR for himself and among the employees as well. This will help to increase organizational commitment, improve productivity, efficiency, retain best talent and motivate the employees to give their best. This study confirms that both emotional intelligence and work life balance together create organizational success and develop competitive advantage for organizations. Understanding the potential and the talent that the employees and ensure the difference that employees bring to the work place and value them to make it a part of the organizational success. The work place should be better so that the employees can have a better team work, find solutions for problem, enhanced job responsibility, group mission, challenges, routine work, self confidence among workers. Emotional intelligence will bring in better adaptability, empathy towards employee, leadership qualities, group rapport, participative management, decision making, and understanding among colleagues. Most of the organizations are nowadays taking those employees who are emotionally intelligent, so that they can face the workplace problems easily and they can become more productive for the organization. Emotionally intelligent organization can be made through organizational strategies, leadership skills, development programmers, self awareness and self management tools. The researcher from the study concludes that emotional intelligence is linked at every point of workplace performance and it is of utmost importance nowadays. Hence, to be successful in life Emotional intelligence plays a vital role.

REFERENCES

- Bar-On, R. (1997). The Bar-On Emotional Quotient Inventory (EQ-I): A test of emotional intelligence.
- Carmeli, A., & Josman, Z. E. (2006). The relationship among emotional intelligence, task performance, and organizational citizenship behaviors. Human Performance, 19, 403-419
- Davies, M., Stankov, L., & Roberts, R. D. (1998). Emotional intelligence: In search of an elusive construct. Journal of Personality and Social Psychology, 75, 989-101
- Goleman, D. (1998). Working with emotional intelligence. New York: Bantam Books
- Hopkins, M. M., Bilimoria, D. (2008). Social and Emotional Competencies Predicting Success for Male and Female Executives (1 ed., vol. 27). Journal of Management Development.

ISSN 2394 - 7780

- Koman, E. S., Wolff, S. B., (2008). Emotional intelligence competencies in the team and team leader: A multi-level examination of the impact of emotional intelligence on team performance. Journal of Management Development, 27(1).
- Romanelli, F., Cain, J., & Smith, K., M. (2006). Emotional intelligence as a predictor of academic and/or professional success. American Journal of Pharmaceutical Education, 70(3).
- Sanchez-Ruiz, Jose, Carlos, Prez-Gonzlez and Petride (2010) Trait emotional intelligence profiles of students from different university faculties. Australian Journal of Psychology, Volume 62, Issue 1 March 2010 , pages 51 – 57

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

A STUDY ON PERCEPTION OF CUSTOMERS TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS IN MADURAI

S. Senthilkumar[1] and Dr. R. Kannan[2]
Research Scholar[1] and Professor[2], Centre for Tourism & Hotel Management, Madurai Kamaraj University, Madurai

ABSTRACT
Customer relationship management is progressively enveloping the wide range framework of generating and maintaining relations with customers, sales, satisfaction and profits. The existence and sustainability of business of star hotels are completely depending on the customer relationship management practices. The findings reveal that nearly two fifth of customers have moderate level of perception towards customer relationship management practices in star hotels. Significant difference prevails among perception of customers towards customer relationship management practices in star hotels and their profile. Perception of customers towards customer relationship management practices in star hotels has positive, moderate and significant relation with their satisfaction. To enhance customer relationship management practices in star hotels and satisfaction of customers, star hotel should make efforts to identify needs of customers and employees of star hotel must response to calls of customers immediately.

Keywords: Customer, Customer Relationship Management, Perception, Star Hotel

1. INTRODUCTION

The hotel industry in India is witnessing stiff competition, higher turnover of customers, increasing cost for acquisition of customers and ever growing demands from customers. The success, performance and competitiveness of hotels are highly relying on their capabilities to satisfy customers in the most efficient ways (Kasim and Minai, 2009). Customer relationship management is comprehensive strategy including generation, management and expansion of relationships with customers (Anderson and Kerr, 2001).

Customer relationship management is the proficient business approach to search and hold the most precious relations with customers (Adenbajo, 2003). Customer relationship management is progressively enveloping the wide range framework of generating and maintaining relations with customers, sales, satisfaction and profits (Peppers and Rogers (2004). Hence, to increase profits and satisfaction and loyalty of customers, hotels have to concentrate on adoption of practices of customer relationship management effectively that search, collect and store accurate information, authorize and share it across all functional areas of hotels (Goyal, 2011).

The main purpose of customer relationship management is making very good long term relations that make customers to revisit to hotels in future. Hotels do not have assurance that customers will come back again thus, they have to maintain better relations with customers through providing quality services along with sustainable benefits for them(Malonza and Lucy, 2016).

Out of different categories of hotels, star hotels are big and modern hotels emerged because of big business houses and new entrepreneurial activity in hotel industry. Star ratings are given to hotels on the basis of location, amenities, standards and infrastructural facilities. The existence and sustainability of business of star hotels are completely depending on the customer relationship management practices. Therefore, it is important to study perception of customers towards customer relationship management practices in star hotels in Madurai.

2. REVIEW OF LITERATURE

Wu and Li (2011) concluded that customer relationship management practices were the most efficient means to create and enlarge customer base and in turn it increased satisfaction and loyalty of guests for hotel. Kamau and Waudo (2012) revealed that customer relationship management practices in hotels were affecting satisfaction of customers and performance and profit of hotels.

Banga et al (2013) indicated that all the managers were aware and adopting customer relationship management practices in their hotels and practices of customer relationship management increased satisfaction and rate of retention of customers and it led to higher level of profitability. Mohammed et al (2014) showed that adoption of customer relationship management practices was positively influencing performance of hotels and those practices were highly useful to hotels to provide personalized services and unique experiences to their customers.

Chadha (2015) found that majority of the employees were having positive and favourable attitude towards customer relationship management practices. Maintaining data base for customers and counseling were

ISSN 2394 - 7780

important activities carried out by hotel Taj. The customer relationship management practices were positively related with satisfaction and retention of customers towards hotel.

Al-Azzam (2016) concluded that dimensions of customer relationship management namely organization of customer relationship management, customer orientation, technology based customer relationship management and knowledge management were positively and significantly influencing performance of hotels. Madhovi and Dhliwayo (2017) revealed that customer relationship management practices had positive impact on satisfaction, loyalty of customers and market share and profitability of hotels.

3. OBJECTIVES OF THE STUDY

1. To study perception of customers towards customer relationship management practices in star hotels.

2. To scrutinize difference among profile of customers and their perception towards customer relationship management practices in star hotels.

3. To study relation among perception of customers towards customer relationship management practices in star hotels and their satisfaction.

4. HYPOTHESES OF THE STUDY

1. There is no significant difference among perception of customers towards customer relationship management practices in star hotels and their profile.

2. There is no significant relation among perception of customers towards customer relationship management practices in star hotels and their satisfaction.

5. METHODOLOGY

The present study is carried out in Madurai. The customers of star hotels are chosen by using random sampling method. The data are collected from 300 customers of star hotels through questionnaire method. Percentages are calculated to understand profile of customers and mean and standard deviation are worked out to study perception of customers towards customer relationship management practices in star hotels. The t-test and F-test are used to scrutinize difference among profile of customers and their perception towards customer relationship management practices in star hotels. The correlation analysis is carried out to examine relation among perception of customers towards customer relationship management practices in star hotels and their satisfaction.

6. RESULTS AND DISCUSSION

6.1. PROFILE OF CUSTOMERS OF STAR HOTELS

The profile of customers of star hotels is given in Table-1. The findings elucidate 58.67 per cent of customers of star hotels are males, whilst, 41.33 per cent of them are females and 33.00 per cent of customers of star hotels are falling under age category of 41 – 50 years, whilst, 16.00 per cent of them are falling under age category of 21 – 30 years.

The findings explicate 35.67 per cent of customers of star hotels are holding under graduation, whilst, 13.33 per cent of them are holding secondary education and 42.33 per cent of customers of star hotels are working in private sector, whist, 24.00 per cent of them are working in Government sector. And 32.33 per cent of customers of star hotels are earning monthly income of Rs.40,001 – Rs.50,000, whilst, 17.33 per cent of them are having monthly income of Rs.20,001 – Rs.30,000.

Table-1: Profile of Customers of Star Hotels

Profile	Number of Customers	Percentage
Gender	**300**	
Male	176	58.67
Female	124	41.33
Age Category		
21 – 30 Years	48	16.00
31– 40 Years	93	31.00
41 – 50 Years	99	33.00
Above 50 Years	60	20.00
Education		
Secondary	40	13.33
Higher Secondary	59	19.67
Under Graduation	107	35.67

ISSN 2394 - 7780

Post Graduation	94	31.33
Occupation		
Government Sector	72	24.00
Private Sector	127	42.33
Business	101	33.67
Monthly Income		
Rs.20,001 – Rs.30,000	52	17.33
Rs.30,001 – Rs.40,000	83	27.67
Rs.40,001 – Rs.50,000	97	32.33
Rs.50,001 – Rs.60,000	68	22.67

6.2. PERCEPTION OF CUSTOMERS TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The perception of customers towards customer relationship management practices in star hotels was examined and the results are given in Table-2.

Table-2: Perception of Customers towards Customer Relationship Management Practices in Star Hotels

Customer Relationship Management Practices in Star Hotels	Mean	Standard Deviation
Star hotel provides personalized services to customers	3.92	0.93
Star hotel puts efforts to identify needs of customers	3.30	0.80
Employees of star hotel are very keen to help customers	3.81	0.94
Employees of star hotels offer prompt service to customers	3.87	1.04
Employees of star hotel response very quickly to calls of customers	3.39	0.81
Star hotel maintains comprehensive data base of customers	3.96	0.88
Employees of star hotel behave decently with customers	3.76	0.85
Star hotel has professional approach for customers	3.79	1.05
Star hotel meets the requests of customers timely	3.88	1.01
Employees of star hotel address complaints of customers properly	3.36	1.03

The customers of star hotels are agreed with star hotel provides personalized services to customers, employees of star hotel are very keen to help customers, employees of star hotels offer prompt service to customers, star hotel maintains comprehensive data base of customers, employees of star hotel behave decently with customers, star hotel has professional approach for customers and star hotel meets the requests of customers timely, whilst, they are neutral with star hotel puts efforts to identify needs of customers, employees of star hotel response very quickly to calls of customers and employees of star hotel and employees of star hotel address complaints of customers properly.

6.3. PROFILE OF CUSTOMERS AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The distribution of customers on the basis of their perception towards customer relationship management practices in star hotels is given in Table-3. The perception towards customer relationship management practices in star hotels is segmented into low, moderate and high levels based on Mean ± SD. The mean and SD are 37.02 and 4.66 respectively.

Table-3: Distribution of Customers on the Basis of their Perception towards Customer Relationship Management Practices in Star Hotels

Level of Perception towards Customer Relationship Management Practices in Star Hotels	Number of Customers	Percentage
Low	77	25.67
Moderate	115	38.33
High	108	36.00
Total	**300**	**100.00**

Out of 300 customers of star hotels, 38.33 per cent of customers have moderate level of perception towards customer relationship management practices in star hotels then by high level (36.00 per cent) and low level (25.67 per cent).

ISSN 2394 - 7780

6.3.1. GENDER AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The relation amongst gender of customers and perception towards customer relationship management practices in star hotels was examined and the results are given in Table-4.

Table-4: Gender and Perception towards Customer Relationship Management Practices in Star Hotels

Gender	Level of Perception towards Customer Relationship Management Practices in Star Hotels			Total	t-Value	Sig.
	Low	Moderate	High			
Male	45 (25.57)	59 (33.52)	72 (40.91)	**176 (58.67)**	5.084	.000
Female	32 (25.81)	56 (45.16)	36 (29.03)	**124 (41.33)**		
Total	**77 (25.67)**	**115 (38.33)**	**108 (36.00)**	**300 (100.00)**	-	-

(The figures in the parentheses are per cent to total)

Out of 176 male customers, 40.91 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 25.57 per cent of them have low level of it. Out of 124 female customers, 29.03 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 25.81 per cent of them have low level of it.

The t-value of 5.084 is disclosing significant difference is there in perception towards customer relationship management practices in star hotels among gender of customers at one per cent level. So, the null hypothesis is not accepted.

6.3.2. AGE CATEGORY AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The relation amongst age category of customers and perception towards customer relationship management practices in star hotels was examined and the results are given in Table-5.

Table-5: Age Category and Perception towards Customer Relationship Management Practices in Star Hotels

Age Category	Level of Perception towards Customer Relationship Management Practices in Star Hotels			Total	F-Value	Sig.
	Low	Moderate	High			
21 – 30 Years	19 (39.58)	23 (47.92)	6 (12.50)	**48 (16.00)**	7.688	.000
31– 40 Years	23 (24.73)	25 (26.88)	45 (48.39)	**93 (31.00)**		
41 – 50 Years	23 (23.23)	36 (36.36)	40 (40.41)	**99 (33.00)**		
Above 50 Years	12 (20.00)	31 (51.67)	17 (28.33)	**60 (20.00)**		
Total	**77 (25.67)**	**115 (38.33)**	**108 (36.00)**	**300 (100.00)**	-	-

(The figures in the parentheses are per cent to total)

Out of 48 customers falling under age category of 21 – 30 years, 12.50 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 39.58 per cent of them have low level of it. Out of 93 customers falling under age category of 31 – 40 years, 48.39 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 24.73 per cent of them have low level of it.

Out of 99 customers falling under age category of 41 – 50 years, 40.41 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 23.23 per cent of them have low level of it. Out of 60 customers falling under age category of above 50 years, 28.33 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 20.00 per cent of them have low level of it.

ISSN 2394 - 7780

The F-value of 7.688 is disclosing significant difference is there in perception towards customer relationship management practices in star hotels among age category of customers at one per cent level. So, the null hypothesis is not accepted.

6.3.3. EDUCATION AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The relation amongst education of customers and perception towards customer relationship management practices in star hotels was examined and the results are given in Table-6.

Table-6: Education and Perception towards Customer Relationship Management Practices in Star Hotels

Education	Level of Perception towards Customer Relationship Management Practices in Star Hotels			Total	F-Value	Sig.
	Low	Moderate	High			
Secondary	8 (20.00)	11 (27.50)	21 (52.50)	**40 (13.33)**	6.410	.000
Higher Secondary	14 (23.73)	19 (32.20)	26 (44.07)	**59 (19.67)**		
Under Graduation	25 (23.37)	44 (41.12)	38 (35.51)	**107 (35.67)**		
Post Graduation	30 (31.91)	41 (43.62)	23 (24.47)	**94 (31.33)**		
Total	**77 (25.67)**	**115 (38.33)**	**108 (36.00)**	**300 (100.00)**	-	-

(The figures in the parentheses are per cent to total)

Out of 40 customers holding secondary education, 52.50 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 20.00 per cent of them have low level of it. Out of 59 customers holding higher secondary education, 44.07 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 23.73 per cent of them have low level of it.

Out of 107 customers holding under graduation, 35.51 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 23.37 per cent of them have low level of it. Out of 94 customers holding post graduation, 24.47 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 31.91 per cent of them have low level of it.

The F-value of 6.410 is disclosing significant difference is there in perception towards customer relationship management practices in star hotels among education of customers at one per cent level. So, the null hypothesis is not accepted.

6.3.4. OCCUPATION AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The relation amongst occupation of customers and perception towards customer relationship management practices in star hotels was examined and the results are given in Table-7.

Table-7: Occupation and Perception towards Customer Relationship Management Practices in Star Hotels

Occupation	Level of Perception towards Customer Relationship Management Practices in Star Hotels			Total	F-Value	Sig.
	Low	Moderate	High			
Government Sector	19 (26.39)	23 (31.94)	30 (41.67)	**72 (24.00)**	7.312	.000
Private Sector	29 (22.83)	48 (37.80)	50 (39.37)	**127 (42.33)**		
Business	29 (28.71)	44 (43.57)	28 (27.72)	**101 (33.67)**		
Total	**77 (25.67)**	**115 (38.33)**	**108 (36.00)**	**300 (100.00)**	-	-

(The figures in the parentheses are per cent to total)

ISSN 2394 - 7780

Out of 72 customers working in Government sector, 41.67 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 26.39 per cent of them have low level of it. Out of 127 customers working in private sector, 39.37 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 22.83 per cent of them have low level of it. Out of 101 customers doing business, 27.72 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 28.71 per cent of them have low level of it.

The F-value of 7.312 is disclosing significant difference is there in perception towards customer relationship management practices in star hotels among occupation of customers at one per cent level. So, the null hypothesis is not accepted.

6.3.5. MONTHLY INCOME AND PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS

The relation amongst monthly income of customers and perception towards customer relationship management practices in star hotels was examined and the results are given in Table-8.

Table-8: Monthly Income and Perception towards Customer Relationship Management Practices in Star Hotels

Monthly Income	Level of Perception towards Customer Relationship Management Practices in Star Hotels			Total	F-Value	Sig.
	Low	Moderate	High			
Rs.20,001 – Rs.30,000	16 (30.77)	22 (42.31)	14 (20.92)	**52 (17.33)**	8.758	.000
Rs.30,001 – Rs.40,000	23 (27.71)	32 (38.55)	28 (33.74)	**83 (27.67)**		
Rs.40,001 – Rs.50,000	21 (21.65)	40 (41.24)	36 (37.11)	**97 (32.33)**		
Rs.50,001 – Rs.60,000	17 (25.00)	21 (30.88)	30 (44.12)	**68 (22.67)**		
Total	**77 (25.67)**	**115 (38.33)**	**108 (36.00)**	**300 (100.00)**	-	-

(The figures in the parentheses are per cent to total)

Out of 52 customers earning monthly income of Rs.20,001 – Rs.30,000, 20.92 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 30.77 per cent of them have low level of it. Out of 83 customers earning monthly income of Rs.30,001 – Rs.40,000, 33.74 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 27.71 per cent of them have low level of it.

Out of 97 customers earning monthly income of Rs.40,001 – Rs.50,000, 37.11 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 21.65 per cent of them have low level of it. Out of 68 customers earning monthly income of Rs.50,001 – Rs.60,000, 44.12 per cent of them have high level of perception towards customer relationship management practices in star hotels, whilst, 25.00 per cent of them have low level of it.

The F-value of 8.758 is disclosing significant difference is there in perception towards customer relationship management practices in star hotels among monthly income of customers at one per cent level. So, the null hypothesis is not accepted.

6.4. RELATION AMONG PERCEPTION TOWARDS CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES IN STAR HOTELS AND SATISFACTION OF CUSTOMERS

The relation among perception towards customer relationship management practices in star hotels and satisfaction of customers was examined through correlation analysis and the results are given in Table-9.

Table-9: Relation among Perception towards Customer Relationship Management Practices in Star Hotels and Satisfaction of Customers

Particulars	Correlation Co-efficient
Perception towards Customer Relationship Management Practices in Star Hotels and Satisfaction of Customers	0.57^{**}

(** indicates significant at one per cent level)

ISSN 2394 - 7780

The results demonstrate the correlation coefficient between perception towards customer relationship management practices in star hotels and satisfaction of customers is 0.57, it is positively and moderately related with each other at one per cent level of significance. So, the null hypothesis is not accepted.

7. CONCLUSION

The above findings disclose that nearly two fifth of customers have moderate level of perception towards customer relationship management practices in star hotels. Significant difference prevails among perception of customers towards customer relationship management practices in star hotels and their profile. Perception of customers towards customer relationship management practices in star hotels has positive, moderate and significant relation with their satisfaction. To enhance customer relationship management practices in star hotels and satisfaction of customers, star hotel should make efforts to identify needs of customers and employees of star hotel must response to calls of customers immediately. Moreover, employees of star hotel should address complaints of customers properly and efficiently.

REFERENCES

- Abdel Fattah Mahmoud Al-Azzam. (2016). The impact of customer relationship management on hotels performance in Jordan. *International Journal of Business and Social Science*, 7(4), 200-210.
- Adenbajo, D. (2003). Classifying and selecting e-CRM applications: An analysis-based proposal. *Management Decision*, 41(6), 570-577.
- Anderson, K., & Kerr, C. (2001). *Customer relationship management*. London: McGraw-Hill Education.
- Aradhana Chadha. (2015). Case study of hotel Taj in the context of CRM and customer retention. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 4(7), 1-8.
- Gagandeep Banga, Babita Kumar, & Harshal Goyal. (2013). Customer relationship management in hotel industry. *Pacific Business Review International*, 5(12), 71-81.
- Goyal, H. (2011). *A study of Customer Relationship Management (CRM) practices followed by the hotel Industry in Ludhiana.* M.B.A. Thesis, Punjab Agricultural University, Ludhiana, India.
- Kamau, W. S., & Waudo, J. (2012). Hospitality industry, employers' expectation of employees' competence in Nairobi hotels. *Journal of Hospitality Management and Tourism*, 3 (4), 55-63.
- Kasim, A., & Minai, B. (2009). Linking CRM strategy, customer performance measure and performance in hotel industry. *International Journal of Economics and Management*, 3(2), 297-316.
- Madhovi, P. G., & Dhliwayo, S. (2017). The relationship between Customer Relationship Management (CRM) and performance in the hotel industry. *African Journal of Hospitality, Tourism and Leisure*, 6(1), 1-11.
- Mohammed, A., Rahid, B., & Tahir. (2014). Customer Relationship Management (CRM) technology and organization performance: Is marketing capability a missing link? An empirical study in the Malaysian hotel industry. *Asian Social Science*, 6 (10), 197-221.
- Peppers, D., & Rogers, M. (2004). *Managing customer relationships: A strategic framework*. New York: John Wiley & Sons Inc.
- Rosemary Malonza, & Jumah Lucy. (2016). Effectiveness of customer relationship management in the hotel industry in Eldoret Town, Kenya. *International Journal of Science and Research*, 5(12), 2125-2128.
- Wu, S., & Li, P. (2011). The relationships between CRM, RQ and CLV based on different hotel preferences. *International Journal of Hospitality Management*, 30, 262-271.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

A STUDY ON PERCEPTION OF ENTREPRENEURS ON ENTREPRENEURSHIP DEVELOPMENT AND EMPLOYMENT GENERATION IN MADURAI DISTRICT

Dr. R. Ganapathi
Assistant Professor, Department of Commerce, Directorate of Distance Education, Alagappa University, Karaikudi

ABSTRACT
The development of entrepreneurship and creation of employment are continuously getting high degree of attention among all states and districts in India because it reduces problem of unemployment and poverty and enhances economic growth. Significant difference is prevailing in perception of entrepreneurs on entrepreneurship development among profile of entrepreneurs. Perception of entrepreneurs on entrepreneurship development has positive, high and significant relation with their perception on employment generation. To enhance entrepreneurship development, micro credits should be given adequately to entrepreneurs and Government must enact and execute business friendly rules and regulations for developing entrepreneurship. Besides, Government should ensure rights of labour in developing entrepreneurship and it must give tax benefits to starting all kinds of new entrepreneurial activities. Furthermore, entrepreneurship development should generate adequate number of employment through efficient vertical and horizontal extension of entrepreneurial activities and it must give more concentration on creating employment opportunities in trading business.

Keywords: Entrepreneurs, Entrepreneurship Development, Employment Generation

1. INTRODUCTION
The social and economic development of any nation is highly depending on vibrant and strong development of entrepreneurship capabilities (Onyebueke and Ochongo, 2002). Entrepreneurship development is the continuous procedure to amalgamate all kinds of entrepreneurial qualities namely hard work, flexibility, self-confidence, diligence, self-determination, versatility, initiatives, leadership, innovations, perspectives, commitment, creativity and profit orientation (Amit, 2014). Entrepreneurship development assists in starting new industrial enterprises and simultaneously it also helps to increase industrial production (Carland and Carland, 2004).

Entrepreneurship development also facilitate efficient utilization of scarce and limited resources and trigger the growth of industrial units that are very essential for development of economy, creation of jobs and reduction of poverty. As soon as new entrepreneurial activities are initiated, they increase production capabilities, opportunities for employment and it helps for regional and national development (Jindal and Bhardwaj, 2016). The development of entrepreneurship and creation of employment are continuously getting high degree of attention among all states and districts in India because it reduces problem of unemployment and poverty and enhances economic growth. Hence, it is important to study perception of entrepreneurs on entrepreneurship development and employment generation in Madurai district.

2. REVIEW OF LITERATURE
Adam et al (2011) found that employment development programmes assisted for development of entrepreneurship and it was positively related with generation of employment for youngsters. Sorokhaibam and Thaimei (2012) concluded that entrepreneurship development had increased employment opportunities, but it showed fluctuations in Assam over the time periods and it was very low in Manipur because of poor execution of entrepreneurship development programmes.

Sackey et al (2013) revealed that significant relation was there among entrepreneurship training and use of financial resources and entrepreneurship development and also significant relation exit among entrepreneurship an generation of employment in informal and formal sectors. Baba et al (2014) indicated that programmes for small enterprises helped development of entrepreneurship through enhancing skills and knowledge on entrepreneurship and it generated considerable amount of employment for rural people.

Ugoani and Ibeenwo (2015) showed that programmes for development of entrepreneurial activities generated considerable amount of employment and entrepreneurship development had positive, very high and significant association with generation of employment. Gaudel (2016) found that entrepreneurship development generated considerable quantum of employment and both were significantly and positively related. Number of entrepreneurship activities, amount of capital investment, policy for industrial development and infrastructural facilities were determining generation of employment.

ISSN 2394 - 7780

Sheila and Arinze (2017) revealed that development of entrepreneurship created employment and both were positively related with each other and also it in turn enhanced standard of living of people. Uju and Racheal (2018) concluded that successful development of entrepreneurship decreased issue of unemployment, at the same time, lack of skills, financial assistance, trainings and networking were affecting development of entrepreneurship.

3. OBJECTIVES OF THE STUDY

1. To examine perception of entrepreneurs on entrepreneurship development and employment generation.

2. To scrutinize difference among profile of entrepreneurs and their perception on entrepreneurship development.

3. To study relation among perception of entrepreneurs on entrepreneurship development and employment generation.

4. HYPOTHESES OF THE STUDY

1. There is no significant difference in perception of entrepreneurs on entrepreneurship development among their profile.

2. There is no significant relation among perception of entrepreneurs on entrepreneurship development and employment generation.

5. METHODOLOGY

The present study is conducted in Madurai district. Entrepreneurs are chosen through simple random sampling method and structured questionnaire is used to collect data from 320 entrepreneurs. Percentages are worked out to understand profile of entrepreneurs and mean and standard deviation are calculated to know perception of entrepreneurs on entrepreneurship development and employment generation. t-test and F-test are done to scrutinize difference among profile of entrepreneurs and their perception on entrepreneurship development. Simple correlation analysis is carried out to study relation among perception of entrepreneurs on entrepreneurship development and employment generation.

6. RESULTS AND DISCUSSION

6.1. PROFILE OF ENTREPRENEURS

The profile of entrepreneurs is given in Table-1. The findings clarify that 62.81 per cent of entrepreneurs are males, while, 37.19 per cent of them are females and 28.13 per cent of them are falling under age category of 36 – 40 years, while, 7.81 per cent of them are falling under age category of less than 25 years. The findings explicate that 33.44 per cent of them are possessing under graduation while, 11.25 per cent of them are possessing secondary education and 36.56 per cent of them are doing entrepreneurial activities related to manufacturing, while, 30.63 per cent of them are doing entrepreneurial activities related to service. The findings display that 35.94 per cent of them are bearing 9 – 12 years of experience in entrepreneurial activities, while, 12.81 per cent of them are bearing below four years of experience in entrepreneurial activities and 34.37 per cent of them are having annual turn over of Rs. 10,00,001– Rs. 20,00,000, while, 17.19 per cent of them are having annual turn over of more than Rs. 30,000,00.

Table-1: Profile of Entrepreneurs

Profile	Number of Entrepreneurs	Percentage
Gender		
Male	201	62.81
Female	119	37.19
Age Category		
Less than 25 years	25	7.81
26 – 30 years	73	22.81
31 – 35 years	85	26.56
36 – 40 years	90	28.13
More than 40 years	47	14.69
Education		
Secondary	36	11.25
Higher Secondary	45	14.06
Diploma	61	19.06
Under Graduation	107	33.44
Post Graduation	71	22.19

ISSN 2394 - 7780

Kind of Entrepreneurship		
Manufacturing	117	36.56
Trading	105	32.81
Service	98	30.63
Experience		
Below 4 years	41	12.81
5 – 8 years	101	31.56
9 – 12 years	115	35.94
Above 12 years	63	19.69
Annual Turn Over		
Less than Rs. 10,00,000	60	18.75
Rs. 10,00,001– Rs. 20,00,000	110	34.37
Rs.20,00,001– Rs. 30,00,000	95	29.69
More than Rs. 30,000,00	55	17.19

6.2. PERCEPTION OF ENTREPRENEURS ON ENTREPRENEURSHIP DEVELOPMENT

The perception of entrepreneurs on entrepreneurship development was studied and the results are given in Table-2.

Table-2: Perception of Entrepreneurs on Entrepreneurship Development

Perception on Entrepreneurship Development	Mean	Standard Deviation
Industrial houses and Government give very clear information for development of entrepreneurship	3.92	0.93
Government gives sufficient financial support for development of entrepreneurship	3.85	0.99
Training organizations provide enough trainings to enhance abilities and skills of entrepreneurs	3.95	0.91
Micro credits are given to entrepreneurs adequately	3.33	1.08
Government provides all type of infrastructural facilities for development of entrepreneurship	3.90	1.02
Government has business friendly rules and regulations for developing entrepreneurship	3.37	1.03
Networking encourages development of entrepreneurship	3.88	1.01
Government assures rights of labour in developing entrepreneurship	3.35	1.07
Industrial environment is conductive for entrepreneurship development	3.82	1.09
Tax benefits are given to starting all kinds of new entrepreneurial activities	3.30	1.13

The entrepreneurs are agreed with industrial houses and Government give very clear information for development of entrepreneurship, Government gives sufficient financial support for development of entrepreneurship, training organizations provide enough trainings to enhance abilities and skills of entrepreneurs, Government provides all type of infrastructural facilities for development of entrepreneurship, networking encourages development of entrepreneurship and industrial environment is conductive for entrepreneurship development, while, they are neutral with micro credits are given to entrepreneurs adequately, Government has business friendly rules and regulations for developing entrepreneurship, Government assures rights of labour in developing entrepreneurship and tax benefits are given to starting all kinds of new entrepreneurial activities

6.3. PROFILE OF ENTREPRENEURS AND THEIR PERCEPTION ON ENTREPRENEURSHIP DEVELOPMENT

To scrutinize difference among profile of entrepreneurs and their perception on entrepreneurship development, t-test and ANOVA (Analysis of Variance) test are used and the results are given inTable-3.

ISSN 2394 - 7780

Table-3: Difference among Profile of Entrepreneurs and their Perception on Entrepreneurship Development

Particulars	t-Value / F-Value	Sig.
Gender and Entrepreneurship Development	5.748** (t-value)	.000
Age Category and Entrepreneurship Development	9.590** (F-value)	.000
Education and Entrepreneurship Development	10.165** (F-value)	.000
Kind of Entrepreneurship and Entrepreneurship Development	7.926** (F-value)	.000
Experience and Entrepreneurship Development	8.832** (F-value)	.000
Annual Turn Over and Entrepreneurship Development	9.574** (F-value)	.000

** Significant at 1 % level

The t-value and F-values are demonstrating significant difference exits in perception on entrepreneurship development among profile of entrepreneurs at one per cent level. As an outcome, the null hypothesis is not accepted.

6.4. PERCEPTION OF ENTREPRENEURS ON EMPLOYMENT GENERATION

The perception of entrepreneurs on employment generation was studied and the results are given in Table-4.

Table-4: Perception of Entrepreneurs on Employment Generation

Perception on Employment Generation	Mean	Standard Deviation
Entrepreneurship development provides employment for skilled persons	3.89	1.01
Entrepreneurship development gives employment for unskilled persons	3.77	1.09
Entrepreneurship development generates more number of employment in manufacturing activities	3.80	0.97
Entrepreneurship development creates more number of employment in service activities	3.74	1.04
Entrepreneurship development gives more number of employment in trading activities	3.38	1.11

The entrepreneurs are agreed with entrepreneurship development provides employment for skilled persons, entrepreneurship development gives employment for unskilled persons, entrepreneurship development generates more number of employment in manufacturing activities and entrepreneurship development creates more number of employment in service activities, while, they are neutral with entrepreneurship development gives more number of employment in trading activities.

6.5. RELATION AMONG PERCEPTION OF ENTREPRENEURS ON ENTREPRENEURSHIP DEVELOPMENT AND EMPLOYMENT GENERATION

The relation among perception of entrepreneurs on entrepreneurship development and employment generation was studied by using correlation analysis and the results are given in Table-5.

Table-5: Relation among Perception of Entrepreneurs on Entrepreneurship Development and Employment Generation

Particulars	Correlation Co-efficient
Entrepreneurship Development and Employment Generation	0.66**

** Significant at one per cent level

The correlation co-efficient among perception of entrepreneurs on entrepreneurship development and employment generation is 0.66 and it explains that both are positively and highly related at one per cent level of significance. As a result, the null hypothesis is not accepted.

ISSN 2394 - 7780

7. CONCLUSION

The above findings elucidate that significant difference is prevailing in perception of entrepreneurs on entrepreneurship development among profile of entrepreneurs. Perception of entrepreneurs on entrepreneurship development has positive, high and significant relation with their perception on employment generation. To enhance entrepreneurship development, micro credits should be given adequately to entrepreneurs and Government must enact and execute business friendly rules and regulations for developing entrepreneurship. Besides, Government should ensure rights of labour in developing entrepreneurship and it must give tax benefits to starting all kinds of new entrepreneurial activities. Furthermore, entrepreneurship development should generate adequate number of employment through efficient vertical and horizontal extension of entrepreneurial activities and it must give more concentration on creating employment opportunities in trading business.

REFERENCES

- Adam, S., Naude, W., & Goedhuys, M. (2011). *Entrepreneurship, innovation and economic development*. Netherlands: Oxford University Press.
- Amit. (2014).Entrepreneurship development in India: Role of economic growth, foreign investment and financial development. *AIMA Journal of Management & Research*, 8(3/4), 1-9.
- Asogwa Ogochukwu Sheila, & Anah Stanley Arinze. (2017). Impact of entrepreneurship development on economic growth of Enugu state: A study of registered entrepreneurs in Enugu State, Nigeria. *International Journal of Economics, Business and Management Research*, 1(2), 227-242.
- Baba, S., Dickson, V., & Kromtit, M. (2014), Entrepreneurship and employment generation in Nigeria: A case study. *Journal of National Directorate of Employment*, 6(2), 40-58.
- Carland, J., & Carland, J. (2004). Economic development: Changing the policy to support entrepreneurship. *Academy of Entrepreneurship Journal*, 10(2), 104-114.
- John N. N Ugoani, & Grace I. Ibeenwo. (2015). Entrepreneurship development and employment generation in Nigeria: A study of the national directorate of employment. *Independent Journal of Management & Production*, 6(3), 687-710.
- Manish Kumar Jindal, & Awadesh Bhardwaj. (2016). *Entrepreneurship development in India: A new paradigm*. Proceedings of the World Congress on Engineering. WCE 2016, June 29 - July 1, 2016, London, U.K.
- Muogbo Uju, S., & John-Akamelu Chitom Racheal, (2018). Impact of entrepreneurial skills in reducing youth unemployment in Nigeria. *European Journal of Business, Economics and Accountancy*, 6(3), 1-12.
- Onyebueke, & Ochongo. (2002). *Entrepreneurship and economic development*. Enugu: Precision Printers and Publishers.
- Robita Sorokhaibam, & Guloulung Thaimei. (2012). Entrepreneurship Development and employment in north east India. *Journal of Asian Business Strategy*, 2(5), 95-105.
- Sackey, Jacob Acquah, Ejoh, Ndifon Ojong, & Jude U. Bassey. (2013). Entrepreneurship and employment generation: The formal and informal sector perspectives. *Archives of Applied Science Research*, 5(5), 20-27.
- Suraj Gaudel. (2016). Entrepreneurs, industries and employment opportunities in Nepal. *International Journal of Research in Business Management*, 4(5), 85-98.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

ANTICANCER ACTIVITIES OF CATHARANTHUS ROSEUS AND AZADIRACHTA INDICA: AN OVERVIEW

Azahar Sajjad
Department of Botany, Gandhi Faiz-e-Aam College, Shahjahanpur, Bareilly

ABSTRACT
There has been a long history of traditional medicine for serving living being all over the world. In the last few decades there has been an exponential growth in the field of herbal medicine in developing as well as in developed countries, because of their natural origin and minimum side effects. India is an agriculture based country crowned with numerous herbs and plants, the largest producer of medicinal herbs consequently called as botanical garden of the world. The phytochemicals present in the medicinal plants are vitamins, carotenoids, terpenoids, flavonoids, polyphenols, alkaloids, tannins, saponins, enzymes, minerals and many others. These phytochemicals possess antioxidant activities, which can be used in the treatment of many diseases, especially cancer. There are the several medicinal plants and herbs those have been utilizing traditionally for the prevention and treatment of cancer for the many decades. In the present communication efforts have been to overview the potential of Catharanthus roseus and Azadirachta indica in curing different types of carcinomas.

Keywords: Anticancer activity, Azadirachta indica, Cancer, Catharanthus roseus, Medicinal plants,

INTRODUCTION
Cancer is a one of the major public health problem throughout the world and only modest progress has been made in reducing the morbidity and mortality of this disease (Bhanot et. al. 2011). Every year, millions of people are diagnosed with cancer and reported to among the leading cause of death globally (Lawania and Mishra, 2013; Nigam and Rana, 2016). In its report, Indian Council of Medical Research (ICMR) reported that in 2016 the total number of new cancer cases is expected to be around 14.5 lakh and it may likely to reach nearly 17.3 lakh new cases in 2020. Over 7.36 lakh people are expected to succumb to the disease in 2016, while the figure is estimated to shoot up to 8.8 lakh by 2020. Data also revealed that only 12.5 per cent of patients come for treatment in early stages of the disease. According to report, among females, breast cancer topped the list and among males, mouth cancer is more prominent. (http://www.midday.com/articles/over17 lakhs new cancer cases in India by 2020 ICMR; Khan *et*. al 2015; Safarzadeh et. al. 2014). Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells, which begins with mutation in DNA, which instruct the cells how to grow and divide. Normal cells have the ability to repair most of the mutations in the DNA. However, certain mutations which are not repaired, causing the cells to grow and becomes cancerous (Dixit and Ali 2010). If the spread is not controlled, it can result in death. Cancer is caused by both external factors, such as tobacco, infectious organisms, an unhealthy diet and internal factors, such as inherited genetic mutations, hormones, immune conditions. The environmental factors include smoking (active and passive tobacco smoking), exposures to toxic chemicals, different types of radiations at home and work places, toxic chemicals thorough our food as well as drinking water and pollution in air (Balchandran et al., 2005 Quazi and Molvi 2014). These factors may act together or in sequence to cause cancer. Ten or more years often pass between exposure to external factors and detectable cancer. Today human beings are suffering from numerous types of cancers such as cancer of blood, skin cancers, cancer of digestive system, cancers of urinary system, cancers specially related to women and many others (Paul et. al. 2011; Higgins and Baelga 2011, Sadeghnia et. al. 2014). Cancer continues to be a mysterious challenge for cancer biologists and medical practitioners. Several tantalizing claims for discovering a sure cure for cancer have been made by scientific community from time to time. However, a trustworthy cure against most of the cancer is still a challenge even nowadays. One of the key reasons for this is the multiple pathways of their survival adopted by the cancer cells. Blockings of few pathways of their survivals do not ensure their targeted eliminations. Complete removal of the cancer without damage of the rest part of the body is goal of the treatment. This can be achieved by the surgery, chemotherapy, radiation therapy and many other methods. Now-a-days solids tumors are surgically removed and patients received adjuvant radiation treatment and chemotherapy (American Cancer Society. Cancer Facts & Figures 2016, Atlanta: American Cancer Society; 2016). However these methods are tedious, costly and also lead to several side effects which ultimately change the quality of life. Furthermore, the toxicity of some treatments restricts their uses and effectiveness.

Nature bestowed large number of plants and herbs. The traditional systems of medicines - Ayurveda, Siddha and Unani are based on the experiences in the use of plant products in amelioration of common diseases. Majority of our population, particularly those living in villages depend largely on herbal remedies (Gupta,

ISSN 2394 - 7780

1994). Traditionally medicinal plants have been in routine use in the treatment of several human diseases. This property is mainly due to the presence of phytochemicals which are classified as primary and secondary compounds. Chlorophyll, proteins and common sugars belong to primary compounds whereas terpenoids, alkaloids, cardiac glycosides and phenolic compounds fall under secondary compounds (Krishnaiah et. al. 2005). Alkaloids, coumarins, terpenoids and phenolic compounds, exhibit various important pharmacological properties i.e., anesthetic, anti-inflammatory, anticancer, anti-malarial, anti-viral and anti-bacterial properties (Mahato and Sen 1997; Thingujam et. al. 2015). According to World Health Organization (WHO) approximately 21,000 plants, are used for medicinal purposes around the world and among these 2500 species are richly found in India, out of which 150 species are used commercially on a fairly large scale. They are also promising source of anticancerous drugs with less side effect and lower cost. In present communication efforts have been made to overview the anti-cancerous properties of the phytochemical constituents of *Catharanthus roseus* and *Azadirachta indica.*

Catharanthus roseus

Catharanthus roseus is an evergreen herbaceous plant belongs to family Apocynaceae growing up to the height of one meter. It is largely grown in many tropical and sub-tropical region of the world. It is also cultivated as an ornamental plant in house garden domestically. The flower of this plant is from white to dark pink with dark red centre. *Catharanthus roseus* was investigated from the ancient time for phytochemical components and their therapeutic effect from different parts of the plant root, stem, leaves and flower are used in curing of different disease for long time. For example juice of leaves is used in treating indigestion and dyspepsia, decoction of flower is used in asthma, tuberculosis, extract of boiled plant is used to arrest bleeding. Apart from these crude leaf extracts and root has also been reported to have anticancer activity. Alkaloids are the major phytochemical constituent of the *Catharanthus roseus*. The alkaloids vinblastine and vincristine derived from stem and leaf of *Catharanthus roseus* reported for anticancer activity (chemical structures are illustrated in figure-1; Banskota, 2002; Wang et. al. 2004; Kaur 2011; Sandeep et. al. 2014, Aruna et. al. 2015; Das, 2017). These indole alkaloids have reported to have growth inhibition effects to human tumors. Vinblastine and vincristine are primarily used in combination with cancer chemotherapeuatic drugs for the treatment of a various cancers such as limphomas, leukemias, testicular cancer, breast cancer, Kaposi's sarcoma, chorio sarcinoma etc. (Cragg and Newman 2005, Mohan et. al. 2012, Almagro et. a;. 2015). Methanolic crude extract has been reported to show the anticancer activity against many cell types in in-vitro condition especially found mark-ably active against multi drug resistance tumor types.

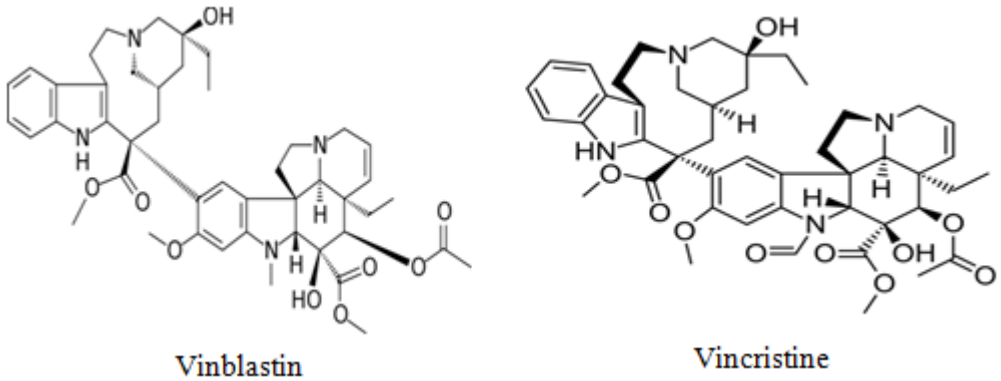


Fig-1: Chemical Structures of Vinblastin and Vincristine

Azadirachta indica

Azadirachta indica (Neem) is tropical evergreen tree belongs to family Meliaceae. The plant is abundantly available in all parts of India. Neem is the wonder tree and nature's drug store. Neem is among highly exploited medicinal plant of Indian origin. Due to its enormous domestic, agricultural, ethano medicinal and therapeutic significance, the Neem is also called village pharmacy (Biswas et. al. 2002). It is a fast growing plant and about 20 feet tall tree with a highly branched and stout solid stem. The extract of different parts of this plant has been used for several skin problems (Paul et. al. 2011). Numerous chemical compounds have been isolated and purified from this plant and are being used effectively as antiviral, antifungal, anti-inflammatory, anticancer agent and many others (Biswas et.al. 2002, Rao et al 1986; Khalid et.al. 1989). The compounds have been classified into two major groups; isoterpenoids and non-isoterpenoids. The isoterpenoid includes diterpenoids, triterpenoids, limonoids etc. The non-isoterpenoid includes proteins, polysaccharides, polyphenolic coumarin, aliphatic compound etc. (Subapriya and Nagini 2005). Different medicinal properties of neem leaves was reviewed by Sabapriya et al. Quercetin and kaemferol, the flavonoids present in neem leaf have been reported to

ISSN 2394 - 7780

retard carcinogenesis at early and promotional phases of carcinogenesis by their radical scavenging characteristics (chemical structures are illustrated in figure-2, Shareef, 2018). Quercetin has been demonstrated to inhibit the growth of tumor cells in a number of malignant cell lines. The antioxidant activities of the root bark extract from the neem tree using the 1, 1-diphenyl-2-pieryl hydrozyl (DPPH) scavenging assay was studied. Hydro-alcoholic extract of root bark of neem had antioxidant activity against DPPH radical and had significant antioxidant potential. Phytochemical screening by chemical tests and thin layer chromatography (TLC) showed that the root bark hydro-alcoholic extract have flavonoid quercetin (Kiranmai et. al. 2011, Pandey et. al. 2014). Studies reveal that pretreatment with neem is highly protective against cancer in animals. Neem leaf given to mice reduced chemically induced tumors up to significant levels and strengthening the impact on the immune system (Kiranmai et. al. 2011, Dixit and Ali 2010).

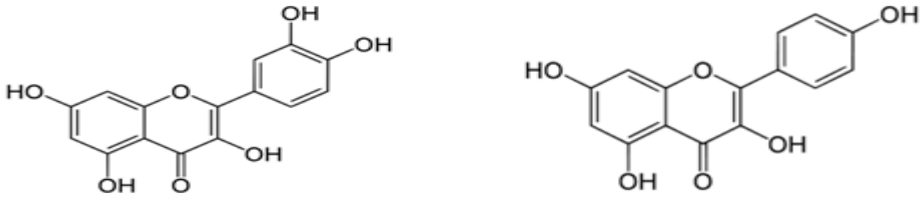


Fig-2. Chemical structures of Quercetin and kaemferol

CONCLUSION

Medicinal plants maintain the health and vitality of individual and also cure various diseases including cancer without causing toxicity. Natural products discovered from medicinal plants have played an important role in treatment of cancer. In the present article efforts have been made to overview the anti-cancerous properties of *Catharanthus roseus* and *Azadirachta indica.* The study revealed that compounds vinblastin and vincristine of *Catharanthus roseus* whereas Quercetin and kaemferol of *Azadirachta indica* are effective against various types cancer. These informations can be used to find out these constituents in other plants and herbs by simple technique like TLC to increase the stock and availability of herbal treatment where these plants are not found.

ACKNOWLEDGEMENT

Author would like to thanks authorities of the Gandhi Faiz-e-Aam College, Shahjahanpur, U.P. for providing the necessary facilities.

REFERENCES

1. Aruna M.S.; Prabha M.S.; Priya M.S. and Nadendla R. (2015) Catharanthus roseus: Ornamental plant is medicinal Boutique, Journal of Drug Delivery and Therapeutics, 5(3): 1-4.
2. American Cancer Society. *Cancer Facts & Figures, 2016*.
3. Almagro L.; Fernández-Pérez F. and Pedreno M. A. (2015) Indole Alkaloids from *Catharanthus roseus*: Bioproduction and Their Effect on Human Health, *Molecules* 2015, *20*, 2973-3000
4. Banskota A.H. (2002); Antiproliferative activity of Vientnamese medicinal plants. Biological pharmaceutical bulletin, 25(6): 753-760.
5. Bhalchandran P. and Rajgopal G. (2005) Cancer an Ayurvedic prospective. Pharmacol Res, 51: 19-30.
6. Bhanot A.; Sharma R. and Noolvi M.N. (2011) Natural sources as potential anti-cancer agents: A review. International Journal of Phytomedicine 3: 09-26.
7. Biswas K.; Chattopadhyay I.; Banerjee R.K. and Pandyopadhyay U. (2002) Biological activities and medicinal properties of Neem (Azadirachta indica), Current Science, 82: 1336-1345.
8. Cragg G.M. and Newman, D.J. (2005). Plants as source of anticancer agents. J. Ethnopharmacol. 100: 72-99.
9. Das S and Sharangi A.B. (2017) Madagascar periwinkle (*Catharanthus roseus* L.), Diverse medicinal and therapeutic benefits to humankind, Journal of Pharmacognosy and Phytochemistry 2017; 6(5): 1695-1701
10. Dixit S. and Ali H. (2010). Anticancer activity of medicinal plant extract- A review, J. Chem. & Cheml. Sci. 1:79-85].
11. Gupta S.S. (1994) Prospects and Perspectives of Natural Plants Products In Medicine, *Indian Journal of Pharmacology, 26: 1 -12*

12. Higgins M.J. and Baselga J. (2011). "Targeted therapies for breast cancer," Journal of Clinical Investigation. 121(10):3797–3803.
13. Kaur R.; Kapoor K. and Kaur H. (2011)Plants as a source of anticancer agents, *J. Nat. Prod. Plant Resour*. 1 (1): 119-124
14. Khalid S.A.; Duddeek, H. and Ganzalez-Sierra, M. (1989) Isolation and characterizationof an antimalarial agent of the neem tree Azadirachta indica. J. Nat. Prod. 52:922-926.
15. Khan A.A., Begum, W.; Roqaiya, M. and Majeedi, S.F. (2015) Breast cancer prevention: A Unani approach. International journal of Ayurvedic and herbal medicine 5(4): 1976-198.
16. Kiranmai M.; Kumar CBM and Ibrahim MD (2011) Free radical scavenging activity of neem tree (Azadirachta indica A Juss Var., Meliaceae) root bark extract. Asian Journal of pharmaceutical and clinical Research 4: 134-136.
17. Krishnaiah D.; Sarbatly R. and Bono A. (2007). Phytochemical antioxidants for health and medicine - A move towards nature. Biotechnology molecular biology review, 1, 97-104.
18. Lawania R. D. and Mishra A. (2013). Anticancer potential of plants and natural products: A review, J Pharmacological & Biomedical Analysis. 1, 1-12.
19. Mahato S.B., Sen S. (1997). Advances in triterpenoid research, 1990-1994. Phytochemistry, 44, 1185-1236.
20. Mohan K.; Jeyachandran R. and Deepa (2012) Alkaloids as anticancer agents, Annals of Phytomedicine 1(1): 46-53
21. Nigam V. and Rana A. (2016). Ethnomedicinal plants having anticancer potential: A review, Int. J. of Scientific Research 51:17-20.
22. Pandey G.; Verma K.K. and Singh M. (2014) Evaluation of Phytochemical, Antibacterial And Free Radical Scavenging Properties Of *Azadirachta Indica (Neem)* Leaves. Int. J. Phar and Pharmaceutical Sciences, 6 (2): 444-447.
23. Paul R, Prasad M and Sah NK (2011) Anti-cancer biology of *Azadirachta Indica* L. (Neem): A mini review, Cancer biology and therapy 12 (6): 467-476.
24. Quazi M.A. and Molvi K.I. (2014) Management of Cancer with Herbal Remedies, Int J Pharmaceutical Research Scholars-3: 45-51.
25. Rao DV, Singh I, Chopra P, Chhabra PC and Ramanujalu G (1986) In-vitro antibacterial activity of Neem oil. Indian J. Med Res, 84: 314-316.
26. Sadeghnia H.R.; Hesari T.G.; Mortazavian S.M.; Mousavi S.H.; Najaran Z.T. and Ghorbani A. (2014). *Viola tricolor* Induces Apoptosis in Cancer Cells and Exhibits Antiangiogenic Activity on Chicken Chorioallantoic Membrane, BioMed Research International: 1-8
27. Subapriya R. and Nagini S. (2005) Medicinal properties of Neem leaves: A review. Curr. Med. Chem-Anticancer agents. 5: 1-7.
28. Safarzadeh E.; Shotorbani S.S. and Baradaran B. (2014) Herbal Medicine as Inducers of Apoptosis in Cancer Treatment. *Adv Pharm Bull*, 2014, 4(Suppl 1), 421-427.
29. Sandeep P.; Jagjit K.; Raman K. and Kuldeep K. (2014) Cathranthus roseus: A medicinal plant with potent anti-tumour properties. Int. J. Res. Ayurveda pharm 5 (6): 652-656.
30. Shareef M. and Akhtar M.S. (2018) Neem (*Azadirachtaindica*) and its Potential for Safeguarding Health, Prevention and Treatment of Diseases, Matrix Science Pharma (MSP) 2(1) (2018) 04-08
31. Thingujam, D.; Rekha K., Megala J. and Usha B. (2015). Antioxidant and anticancer properties of *Catharanthus pusillus*. International Journal of Advanced Chemical Science and Applications (IJACSA), 3(1): 48-51.
32. http://www.midday. com/articles/over17 lakh new cancer cases in India by 2020 ICMR/ 17248152
33. Wang S, Zheng Z and Weng Y (2004) Angiogenesis and antiangiogenesis activity of Chinese medicinal herbal extracts. Life science, 74(20):2467-2478.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

DIFFUSION OF SYSTEM OF RICE INTENSIFICATION (SRI) ACROSS TIRUNELVELI DISTRICT IN TAMIL NADU

Thatchinamoorthy C
Ph.D. Research Scholar, Department of Agricultural Extension, Annamalai University

ABSTRACT
Rice is an important ingredient of household food basket, yet the yield level has been low and uncertain in India. The operational holding-size is shrinking, and land and water resources are being degraded. And therefore, some innovative rice production practice is needed to meet its growing demand due to population pressure. Under this scenario, the System of Rice Intensification (SRI) may be an appropriate practice to produce more food with less input. SRI is actually an amalgamation of refined and intensive management practices for rice production at farmers' fields. The conservation of land, water and biodiversity, and utilization of the hitherto ignored biological power of plant and solar energy, is the novelties of SRI. On account of its growing global acceptance, SRI has emerged as a movement among farmers. By SRI the annual income of the farmer increased. Due to increase in the income his family's standard of living also increased. SRI was diffused first to Tamil Nadu State in India during the year 1999. The study entitled "Diffusion of System of Rice Intensification (SRI) Across Tirunelveli District in Tamil Nadu." Aimed how SRI was diffused and adopted, gap between knowledge and adoption of SRI practices, important reason for non-adoption of SRI practices and find out reasons behind the slow adoption and diffusion of SRI practices. The study was conducted in Manur, Palayamkottai, Tenkasi and Vasudevanallur block of Tirunelveli district in Tamil Nadu. A total of 120 respondents were selected, and interviewed using a well structured, pretested interview schedule. In addition analysis to percentage analysis, cumulative frequency, correlation co-efficient and multiple regressions were the statistical tools employed.

Keywords: SRI; Diffusion; Adoption; Discontinuance; Non-adoption

INTRODUCTION
Rice is one of the prominent cereal crops in India. It is an important staple food about 50 per cent of the world's population that resides in Asia, where 90 per cent of the world's rice is grown and consumed. In Asia, India has the largest area under rice (41.66 million ha) accounting for 29.4 per cent of the global rice area (Thatchinamoorthy, C. 2017). SRI, the system of rice intensification is a system of production of rice. SRI is considered to be a intangible technological breakthrough in paddy cultivation. SRI involves the application of certain management practices, which together provide better growing conditions for rice plants, particularly in the root zone, than those for plants grown under traditional practices. This system seems to be promising to overcome the shortage of water in irrigated rice. It was developed in Madagascar in the early 1980s by Father Henride Laulanie, A Jesuit Priest, who spent over 30 years in that country working with farmers (Thatchinamoorthy, C and Rexlin Selvin. 2015).

Today, India has one of the largest numbers of SRI farmers in the world. Official record indicates that SRI diffused first to Tamil Nadu State, followed by Andhra Pradesh in India (*Prasad, 2006*). However, there is a need to study how SRI was diffused and adopted across the States of Tamil Nadu and Andhra Pradesh (*Krishnan, 2008*). Hence, the present study attempted to analyse the diffusion of SRI across Tirunelveli District in Tamil Nadu." Aimed how SRI was diffused and adopted, gap between knowledge and adoption of SRI practices, important reason for non-adoption of SRI practices and find out reasons behind the slow adoption and diffusion of SRI practices.

METHODOLOGY
Diffusion of System of Rice Intensification (SRI) was operationalised as a process by which SRI was communicated through certain channels over a certain period among the members of various States in India (Johnson,B and K.Vijayaragavan. 2011). The present study was conceived to analyse the diffusion of SRI across Tirunelveli District in Tamil Nadu. This district was purposively chosen for the study as the investigator hails from the same state. The familiarity of the place of investigation and local language would help the investigator in developing a quick rapport with the respondents which would result in meaningful and purposeful collection of appropriate data.

The ex-post facto research design was employed for the study. Data were collected by personal interview with respondents in their farm and home. The target population was farmers practicing SRI method of paddy cultivation. Hundred and twenty respondents were selected for the study. Tirunelveli district consists of eleven

ISSN 2394 - 7780

taluks (Alangulam, Ambasamuthiram, Nanguneri, Palayamkottai, Radhapuram, Sankarankovil, Shenkottai, Sivagiri, Thenkasi, Tirunelveli and Veerakeramputhur).Sivakiri taluk was purposively selected because it shares major area under SRI cultivation. Sivakiri taluk has 23 blocks Vasudewanallur block was purposively, as it has larger area under paddy. Out of 26 panchayat villages in Vasudevanallur blck, 4 villages were randomly selected namely Vasudevanallur, Sivagiri, Rayagiri and Ullar. A list of farmers practicing System of Rice Intensification (SRI) was obtained from the Assistant Director of Agriculture office of Vasudevanallur Block. There were more than 100 farmers practicing System of Rice Intensification (SRI) in each villages of the block. By considering the sample size of the study, it has been decided to select 30 farmers from each of the four villages, where the highest number of farmers practicing System of Rice Intensification (SRI) extensively. Accordingly the sample has been fixed as 120 SRI farmers. The respondents were selected by employing simple random sampling technique in each village (Thatchinamoorthy. C and Rexlin Selvin. 2014).

The profile characteristics of SRI farmers were treated as independent variables while diffusion status, knowledge and adoption of SRI formed dependent variables. The data collected were analyzed with the help of statistical tools such as percentage analysis, cumulative frequency, mean and standard deviation were the statistical tools employed.

RESULTS AND DISCUSSION

Knowledge level of respondents on SRI cultivation technologies: Knowledge is an indispensable criterion for the adoption of any innovation, as it enables the farmers to understand completely and clearly the recommended technologies. The rate of adoption of an innovation is directly linked with level of knowledge of user about the same. Hence it was felt necessary to know the knowledge level of the farmers to understand all aspects of the technologies that were taught to them. In the present study, knowledge has been operationalised as the body of understood information possessed by the respondents on cultivation of paddy under SRI method. The overall knowledge level and technology-wise knowledge level of the respondents were studied and the findings were presented in this section.

The knowledge level of respondents in SRI cultivation technology was measured by using a teacher made knowledge test consisting of SRI techniques. The test included 16 items relating to various SRI techniques.

In order to assess the overall knowledge level of the respondents, necessary data were collected and they were categorized into three groups viz., low, medium and high using cumulative frequency method and the results are shown in Table 1.

Table-1: Distribution of respondents according to their knowledge level (n=120)

S. No	Category	Number (n=120)	Per cent
1	Low	12	10.00
2	Medium	62	51.70
3	High	46	38.30
	Total	120	100.00

A glance at the Table 1, revealed that around 51.70 per cent of the respondents had medium level of knowledge followed by 38.30 per cent and 10.00 per cent who had high and with low levels of knowledge in SRI cultivation method respectively. In general it could be concluded that there existed medium to high level of knowledge with majority (90.00 per cent) of the respondents. The appropriate reason for medium to higher level of knowledge on the recommended SRI cultivation practices might be due to their higher literacy, area under rice cultivation, medium level of credit orientation and medium to high level of economic motivation and scientific orientation. The respondents' ambition to increase their farm income; would have motivated them to gain more knowledge on SRI cultivation practices.

Extent of adoption of SRI technologies: Adoption is the process of making full use of the recommended technologies by the clients. The prime duty of extension functionaries is not only to spread improved farm technologies to the farming community but also to make the innovations adopted by the farmers in order to ensure higher productivity. Hence an attempt was made to assess the extent of adoption of SRI cultivation. The cumulative frequency distribution of adoption level obtained from the survey is presented in the Table 2.

Table-2: Distribution of respondents according to their adoption level (n=120)

S. No	Category	Number (n=120)	Per cent
1	Low	8	06.70

ISSN 2394 - 7780

2	Medium	84	70.00
3	High	28	23.30
	Total	120	100.00

It could be observed from Table 2 that majority of the respondents (93.30 per cent) had medium to high level of adoption in the cultivation of paddy under SRI method and nearly seven percent of respondents had come under low level of adoption.

It could be understood that a vast majority of the respondents possessed medium to higher level of adoption. This might be due to their higher knowledge level on the recommended practices, better extension agency contact, higher risk orientation, higher scientific orientation, higher credit orientation and higher economic motivation. Further, Government of Tamil Nadu offer subsidies to buy the implements required for adopting SRI techniques. Those who avail subsidy facilities understood the efficiency of that implement through demonstrations and invariably adopted the technologies in their field.

Practice wise gap analysis from knowledge to adoption of SRI: Since there was adoption gap from knowing about SRI to adoption, reasons for delay in adoption of SRI practices was studied and presented in Table 3.

Table-3: Practice wise gap analysis from knowledge to adoption of SRI (n=120)

SI. No	Technologies	Knowledge		Adoption		Gap	
		Number	Per cent	Number	Percent	Number	Percent
1	Selection of right season.	120	100	120	100.00	0	0.00
2	Use of certified seeds.	120	100	120	100.00	0	0.00
3	Recommended seed rate.	113	94.16	112	93.33	1	0.83
4	Recommended size of nursery bed.	44	36.67	29	24.16	15	11.66
5	Recommended dose of DAP per bed.	96	80.00	90	75.00	6	70.00
6	Proper land leveling.	92	76.67	84	70.00	8	63.33
7	Recommended seedling age.	120	100.00	112	93.33	8	6.67
8	Square transplanting with recommended spacing.	120	100.00	110	91.66	10	8.34
9	Transplanting single seedling per hill	120	100.00	110	91.66	10	8.34
10	Alternate wetting and drying.	86	71.66	29	24.16	57	47.50
11	Use of leaf colour chart.	55	45.83	32	26.66	23	19.17
12	Weeding by Rotary / Cono weeders.	120	100.00	120	100.00	0	0.00
13	Use of recommended bio fertilizers.	42	35.00	73	60.83	31	25.83
14	Recommended dose of inorganic fertilizers in the main field.	75	62.50	120	100.00	45	37.50

It could be observed from above table that 47.50 per cent were not adopted alternate wetting and drying method irrigation technology. 37.50 per cent of respondents not adopted practices of recommended dose of inorganic fertilizers in the main field and 25.83 per cent of respondents not adopted practices of use of recommended bio fertilizers. Main reason for non adopted of SRI technology such as were risk involved in adopting new practices lack of awareness about SRI, shortage of agricultural labour, psychological fear of loss, poor economic condition of small and marginal farmers, not convinced with SRI performance in other fields.

Table-4: Time gap from knowledge to adoption of SRI (n=120)

SI. No	Time Period	Number	Per cent
1	Immediately	24	20.00
2	1-3 months	59	49.17
3	4-6 months	18	15.00
4	6-9 months	5	4.17
5	9-12 months	11	9.17
6	After one year	3	2.50
	Total	120	100

Only 20 per cent of respondents adopted SRI immediately after knowing SRI technology. 49.17 per cent respondents adopted SRI after one to three months period from knowing about SRI, 15.00 per cent of respondents adopted after knowing SRI technology, after six to nine months period from knowing SRI, 4.17 per cent respondents adopted. Since there was a time gap from knowing about SRI to adoption, reasons for delay in adoption of SRI practices, one of the major reason shortages of agricultural labour for timely operation and also risk in early transplanting with single seedling. Other reasons were to witness the SRI performance on other fields and to expertise in SRI practices.

ISSN 2394 - 7780

CONCLUSION

The System of Rice Intensification (SRI) is a method of increasing the yield of rice produced in farming. SRI is considered to be a disembodied technological breakthrough in paddy cultivation. Today, India has one of the largest numbers of SRI farmers in the world. However, there is a need to study how SRI was diffused and adopted across the States of Tamil Nadu. Hence, the present study attempted to analyse the diffusion of SRI across Tirunelveli District in Tamil Nadu. Based on the findings, the implications of this present study may be useful for further development of SRI cultivation. It can be concluded around 50.00 per cent of the respondents had medium level of knowledge in SRI cultivation method respectively and 70.00 per cent of the respondents had medium level of adoption in SRI. Hence, intensive training with demonstrations on these above technologies may be given by the extension personnel of the State of Department Agriculture. Adopting appropriate extension strategies such as training, demonstration, exhibitions, etc., cent percent knowledge and adoption could be achieved among the SRI farmers.

REFERENCES

1. Johnson, B and K.Vijayaragavan, Diffusion of System of Rice Intensification (SRI) Across Tamil Nadu and Andhra Pradesh in India. Indian Res. J. Ext. Edu. 11 (3), September, 2011.
2. Krishnan, J. (2008). SRI in Tamil Nadu-A status report. GEO Foundation, Tamil Nadu.
3. Prasad, S. C. (2006). System of Rice Intensification in India: Innovation History and Institutional Challenges. WWFICRISAT Dialogue on Water, Food and Environment, Patancheru, Hyderabad. http://wassan.org/sri/documents/ Shambu_SRI.pdf (21 July 2011).
4. Thatchinamoorthy, C. A Study on System of Rice Intensification (SRI): A Diagnostic Study in Tirunelveli District of Tamil Nadu, International Journal of Current Agricultural sciences, Vol. 7, Issue, 10, pp. 250-253, October, 2017.
5. Thatchinamoorthy. C and Rexlin Selvin. Adoption level of System of Rice Intensification (SRI) Technology among Farmers in Tirunelveli District of Tamil Nadu, International Journal for Innovative Research in Science & Technology, Volume 1, Issue 10, March 2015.
6. Thatchinamoorthy. C and Rexlin Selvin. Knowledge Level of the Farmer in System of Rice Intensification Cultivation Practices in Tirunelveli District of Tamil Nadu, India, Indian Journal Of Natural Sciences, Vol.4, Issue 25, August 2014.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

DOSIMETRIC COMPARISON OF IMRT PLANS OPTIMIZED WITH EQUIVALENT UNIFORM DOSE AND TARGET PENALTY ON TONGUE CANCER PATIENT

Singh, Sudha[1] and Raina, Payal[2]
Associate Professor[1] and Research Scholar[2], University Department of Physics, Ranchi University, Ranchi

ABSTRACT

Aim: The aim of this study is to compare the dosimetric parameters between Intensity Modulated Radiotherapy (IMRT) plans generated with Equivalent Uniform Dose (EUD) and Target Penalty and also investigate the usefulness of EUD for IMRT optimization.

Background: EUD for tumors is defined as the biologically equivalent dose that, if given uniformly, will lead to the same cell kill in the tumor volume as the actual nonuniform dose distribution.

Materials and Methods: For this study fifteen tongue patients were retrospectively selected. All the plans were generated in Monaco treatment planning system (TPS) version 5.11.02. A total dose of 66Gy for Planning Target Volume (PTV) and 50Gy for PTVnode were prescribed. Plan was done in two phases. Phase 1 was done for 50Gy in 25 fractions for combined PTV and PTVnode. Phase 2 was done for 16Gy in 8 fractions for PTV only.

Results: Both the plans were found to be clinically acceptable. Planning objectives were achieved with both the optimization techniques and organs at risk (OARs) were spared. But we found that, for the nearly same target coverage, EUD-based optimization is capable of improving the sparing of critical structures beyond the specified requirements.

Conclusions: It was observed that the IMRT plans optimized with target penalty had better dose uniformity in comparison to plans with target EUD but improved sparing of normal tissues were achieved by the EUD based optimization.

Keywords: IMRT, Biological optimization, Target EUD, Target Penalty, Treatment planning system.

1. BACKGROUND

Intensity modulated radiation therapy (IMRT) has replaced the three-dimensional conformal radiotherapy (3DCRT) techniques for head and neck cancer. It has been proved by many researchers that IMRT gives better dose coverage to the target and sparing of organ at risk (OAR) than 3DCRT[1,2,3]. In spite of this, treatment planning of head and neck tumor are challenging due to the OARs adjacent to the target. We face the difficulty in sparing the OARs like parotids, spinal cord , planning organ at risk (PRV) for spinal cord and brainstem with good coverage and uniformity of dose to the tumor volumes. Some of the treatment planning system like CMS XiO treatment planning system optimize IMRT plan based on dose volume parameter in which we create a plan to achieve the target coverage and then lower the doses to OARs as a secondary process until the target coverage is compromised. But biological cost functions based planning system like Monaco prioritize OARs dose [4,5]. Monaco uses biological as well as physical cost function for optimization. In Monaco planning system biological optimization is based on Target EUD. It accounts the response of tissues to dose as well as the volume effect of organs. On the other hand target penalty is the physical cost function and it is a quadratic penalty constraint which stars at the threshold dose [5,6,7] . The concept of EUD for tumors was introduced by Niemierko[8,9] originally as the biologically equivalent dose that, if given uniformly, would lead to the same cell kill in the tumor volume as the actual nonuniform dose distribution. Later, Niemierko extended the EUD concept to apply to normal tissues as well . The original definition of EUD was derived on the basis of mechanistic formulation using a linear–quadratic cell survival model. Niemierko suggested the phenomenologic form

$$\mathbf{EUD} = \left(\frac{1}{N}\sum_i D_i^a\right)^{\frac{1}{a}}$$

for both tumors and normal tissues. In this expression, N is the number of voxels in the anatomic structure of interest, D_i is the dose in the i'th voxel, and a is the tumor or normal tissue-specific parameter that describes the dose–volume effect. This formulation of EUD is based on the power law dependence of the response of a complex biologic system to a stimulus. The aim of the study is to investigate the performance of monaco planning system by comparing the plan generated by target EUD and target penalty.

ISSN 2394 - 7780

2. MATERIALS AND METHODS

Fifteen advanced case of carcinoma of tongue operated before radiation were selected. All the patients were immobilized in the supine position by using head and neck thermoplastic mask in all in one board. Three millimeter slice thickness of contrast computed tomography (CT) scans were taken on 16 slice CT simulator (GE Medical System). CT images were transferred to TPS workstation for contouring. Clinical target volume (CTV) which is the volume of microscopic / subclinical disease were contoured which included both primary region and nodal region of high risk and CTV node delineated covering nodal area of low risk region according to the histopathological report and the natural spread of the disease. CTV and CTV node was added with 5mm margin in all dimensions to make the PTV and PTVnode to account for patient setup error and motion uncertainties by an experienced radiation oncologist with radiologist's support as per multidisciplinary protocol of the institution.

Dose Prescription

Maximum dose prescribed to PTV was 66GY in 33 fractions and for PTVnode is 50GY in 25 fractions. Plan was delivered in two phases. Phase 1 was done for 50Gy in 25 fractions for combined PTV and PTVnode. Phase 2 was done for 16Gy in 8 fractions for PTV.

Linear accelerator, Record System (MOSAIQ) and X-ray volume images (XVI) system

The entire fifteen patients were treated on Elekta synergy Linear accelerator. Clinically accepted plan was transferred via Digital Imaging and Communications in Medicine (DICOM) from the Monaco TPS to the mosaiq system. Mosaiq helps in delivering and recording of the plan. Patient positioning and target location were verified by the XVI system before the treatment.

Monaco planning system:

Monaco has three biological constraints such as Target EUD, parallel and serial and six physical constraints such as Target penalty, Quadratic Overdose, Overdose DVH, Underdose DVH, Maximum dose and Quadratic Underdose. Target EUD and Target penalty are two different cost functions which are used with quadratic overdose for the target cost function. EUD is a homogeneous dose that, when applied to an organ, has the same clinical effect as any given, inhomogeneous dose distribution [10, 11]. Target penalty is the objective version of the Quadratic under dose constraint for targets. The isoeffect is a DVH based physical parameter . For some organs, high doses are harmful even if they are limited to small volumes. Serial cost function is applied for these organ. Some organ tolerate very high dose in small sub-volumes. These organs are considered as parallel organ and parallel cost function is used for that [12]. The system optimizes the plan in two steps. In the first phase of optimization, the fluence distribution is calculated by pencil beam algorithm. In the second phase, calculation done by Monte carlo method [13]. In this study we compared the plans optimized with target EUD and with target penalty.

Details of IMRT treatment planning

Two IMRT plans, one with target EUD and other with Target penalty were created with 9 coplanar 6MV photon beams for the entire fifteen patients. Beam started from 0˚ to 320˚ beam angels with internal space of 40˚. Couch and collimator angles were kept as 0˚for all plan. Calculation parameters such as grid spacing, fluence smoothning and statistical uncertainty were 0.3cm, medium and 1% per plan respectively. Plans were generated in dynamic mode. First plan was generated with target EUD combination with quadratic over dose. Second plan was generated with target penalty combination with quadratic overdose. OARs like brainstem, spinal cord and PRV for spinal cord, serial cost functions were selected and for parotid glands, parallel cost function was selected. Objective functions and parameters used in monaco for planning are given in [Table1]. Both the plan were created in such a way so as to achieve at least 95% of PTV volume receives 95% of prescribe dose and 2% of PTV volume receives not more than 105% of prescribed dose. Critical organ dose kept as low as possible at the same time does not exceed the tolerance dose [Table2].

Table-1: Objective functions and parameters used in Monaco

Monaco Treatment Planning System		
	Biological/Physical Cost Function	Cost function parameters
PTV/PTVnode	Target EUD	Prescription(cGy) Cell Sensitivity = 0.50
	Target Penalty	Prescription(cGy) Minimum volume = 95%
	Quardratic overdose	Maximum Dose(cGy) RMS Dose Excess = 50cGy

ISSN 2394 - 7780

Brain stem/Spinal cord/PRV	Serial	Equivalent Uniform Dose(cGy) Power Law exponent = 12
RT /LT parotid	Parallel	Reference Dose(cGy) Mean Organ Damage (%) Power Law Exponent = 3
Patient	Quadratic Overdose Quadratic Overdose Maximum Dose Conformality	Maximum Dose(cGy) = prescribed dose RMS Dose Excess(cGY) = 10 Maximum Dose(cGy) = 2/3*Prescribed dose RMS Dose Excess(cGY) =30 Shrink Margin = 1.5 Maximum dose =108% 0f prescribed dose Optimize Over all voxels in volume Relative Isoconstraint = 0.70

PTV-Planning Target Volume, EUD - Equivalent Uniform Dose, PRV- Planning Risk Volume, RT/LT-Right/Left, RMS - Root Mean Square.

Table-2: Treatment planning objectives

Organ at Risk	Maximum Dose	Mean Dose	Dose Volume Parameter
Brainstem	54Gy		
Spinal cord	45Gy		
Parotid glands		26Gy	
PTV	110%		95% of prescribed dose > 95% of target volume

Plan evaluation parameters

Plan evaluation was performed in terms of quantitative analysis . The evaluation parameters are described as follows.

- Homogeneity Index (HI): ($D_{2\%}$ - $D_{98\%}$ / $D_{50\%}$) It is used to evaluate the dose homogeneity in PTV and to choose the best plans among the available plans. $D_{2\%}$, $D_{98\%}$ and $D_{50\%}$ were the dose delivered to 2%, 98% and 50% volume of the PTV respectively. HI zero indicates the dose distribution is homogeneous [14].
- Conformity Index (CI): (TV/PTV) defines how well the prescription dose conforms to the PTV. It evaluates a plan ability to spare normal tissue from the high dose delivered to the treatment volume. Where TV is the volume of the reference isodose (98% of the prescribed dose) and PTV is the volume of the target [15, 16].
- Target volume: $D_{95\%}$, $D_{100\%}$, and $D_{105\%}$ for PTV were analyzed. $D_{95\%}$, $D_{100\%}$, and $D_{105\%}$ were dose delivered to 95%, 100% and 105% volume of PTV respectively. Maximum dose (Dmax), dose in 0.1cc volume and mean dose (Dmean) to PTV were also analyzed.
- For OARs dose analysis was performed using DVH, serial OARs such as spinal cord, PRV for spinal cord and brain stem were analyzed by maximum dose and 0.1cc volume dose were also analyzed. Parallel OARs, left and right parotid mean dose were analyzed.
- Treatment efficiency was analyzed using Monitor Unit (MU).
- IMRT plan dose verification was performed using delta4 phantom. Quality Assurance (QA) plan was created in the Monaco TPS. All plans were delivered as pretreatment verification and dose was measured using delta^4. TPS calculated dose fluence were compared with measured dose fluence using gamma evaluation method with critically acceptable criteria 3mm Distance To Agreement (DTA) and 3% Dose Difference (DD).
- Statistical analysis: p value was calculated for 0.05 significance level.

ISSN 2394 - 7780

RESULTS

Clinically acceptable IMRT plans by oncologist showed very less dose distribution difference in PTVs between EUD and penalty based optimization technique for all the cases. Combined Dose Volume Histogram (DVH) results for PTV and OARs are shown in figure1. The results of the analysis of DVH were given in Table3.The comparative isofill distributions of two plans are shown in figure 2.

We were able to achieve good dose coverage and OARs sparing in both the plan. Comparison of $D_{95\%}$, $D_{100\%}$, $D_{105\%}$, Dmax, Dmean, HI and CI for PTVs showed insignificant difference [Table3]. From this study we found that average of the all plans 95% of prescribed dose was covered by the 97% volume of the PTVs with target EUD based IMRT plan and in case of target penalty, 95% of the prescribed dose was covered with 98% volume of the PTVs.

The planning objective was met in both the plans. Combined maximum dose and dose in 0.1cc volume for spinal cord, PRV (for spinal cord) and brainstem were analyzed. For spinal cord dose in 0.1cc volume was 22.3 ± 0.3 in target penalty plans and 21.05 ± 0.5 in target EUD based plans . For PRV dose in 0.1 cc volume was 36.5 ± 1.3 in target penalty based plans and 36.29 ± 0.2 in target EUD plans . Similarly for brainstem dose in 0.1 cc volume was 17.4 ± 0.4 in target penalty plans and 16.2 ± 0.3 in target EUD plans .

In case of parotid right and left, mean Dose was less than the tolerance mean dose in both the plans. The mean dose of right parotid was 24.4 ± 0.6 in target penalty and 23.19 ± 1.3 in the target EUD based plans. Similarly for left parotid mean dose was 22.4 ± 1.2 in target penalty based plan and it was 21.05 ± 1.3 in the EUD based plans.

Delivery efficiency was compared with MUs required to deliver the plans. EUD based optimization technique showed more MUs required to create clinically acceptable plans generated with target penalty based optimization technique Table3.

2. DISCUSSION

This study comparers the dosimetric parameters for EUD and target penalty based optimization. For all the cases, both the techniques generate clinically acceptable IMRT plans and have their own advantages and disadvantages. Penalty based IMRT plans showed slightly better result in terms of homogeneous dose distribution within the target volume as compare to target EUD based plan. But EUD based optimization provides significantly better protection of critical structures. The maximum dose to the spinal cord was reduced from 24.2 Gy in the target penalty plan to 23.1 Gy in the EUD plan, a 4% reduction. Similarly, the maximum dose to the brainstem was reduced from 19.2 Gy to 18.6 Gy, a 3% reduction. Considering that both the cord and brainstem are considered serial organs, meaning that the degree of the complications is determined by the maximum dose, this was an important improvement. Mean doses for right parotid mean dose was 24.4Gy in target penalty reduced to 23.2 Gy in target EUD, a 5% reduction and in left parotid mean dose was 22.4 Gy in target penalty reduced to 21.05 Gy in target EUD, a 6% reduction. Also target penalty based optimization plans requires more segments to archive clinically acceptable plans and due to this increase in MUs. More number of MUs increases the treatment time. Reduction in treatment time would increase patient comfort as well as decreases uncertainty due to patient movement.

3. CONCLUSIONS

We have compared twenty cases of target EUD and target penalty based IMRT plans of tongue cancers. In both the plans, we were able to achieve good target coverage and normal tissue sparing. But with target EUD based plan one can achieve slightly better normal tissue sparing as compared to target penalty based plans. We can conclude that EUD based optimization provide the same coverage of the target as compare with target penalty based optimization and also it provides significantly better protection of critical structures with lesser monitor unit.

Parameters	IMRT with Target EUD	IMRT With Target Penalty
PTV (Phase 2)	Mean value ± SD	Mean value ± SD
D95%(Gy)	15.40 ± 0.14	15.45 ± 0.058
D98%(Gy)	14.97 ± 0.13	15.02 ± 0.12
D50%(Gy)	16.35 ± 0.034	16.36 ± 0.028
D5%(Gy)	16.69 ± 0.014	16.77 ± 0.013
D2%(Gy)	16.79 ± 0.023	16.86 ± 0.024
Dmax(Gy)	17.48 ± 0.02	17.53 ± 0.075

ISSN 2394 - 7780

Dmax in 0.1cc(Gy)	17.19 ± 0.04	17.15 ± 0.054
Dmean(Gy)	16.27 ± 0.012	16.28 ± 0.011
HI	1.07 ± 0.004	1.07 ± 0.005
CI	0.98 ± 0.002	0.98 ± 0.0002
MUs	522 ± 52	580 ± 60
PTV + PTVnode (Phase 1)		
D95%(Gy)	48.4 ± 0.36	48.7 ± 0.049
D98%(Gy)	47.63 ± 0.31	47.91 ± 0.19
D50%(Gy)	50.44 ± 0.076	50.42 ± 0.077
D5%(Gy)	51.94 ± 0.08	51.77 ± 0.071
D2%(Gy)	52.29 ± 0.05	52.20 ± 0.075
Dmax(Gy)	54.68 ± 0.3	54.71 ± 0.008
Dmax in 0.1cc(Gy)	53.53 ± 0.05	53.59 ± 0.009
Dmean(Gy)	50.24 ± 0.31	50.34 ± 0.055
HI	1.08 ± 0.0006	1.063 ± 0.0007
CI	0.98 ± 0.0002	0.98 ± 0.0002
MUs	882.89 ± 50	999 ± 73
OARs (total dose)		
Spinal cord		
Dmax(Gy)	23.1 ± 0.5	24.2 ± 0.4
Dmax in 0.1cc(Gy)	21.05 ± 0.5	22.3 ± 0.3
Brain Stem		
Dmax(Gy)	18.6 ± 0.4	19.2 ± 0.5
Dmax in o.1cc(Gy)	16.2 ± 0.3	17.4 ± 0.4
PRV for spinal cord		
Dmax(Gy)	39.19 ± 0.2	40 ± 0.4
Dmax in 0.1cc(Gy)	36.29 ± 0.2	36.5 ± 0.3
Parotid RT		
Mean dose(Gy)	23.19 ± 1.3	24.4 ± 0.6
Parotid LT		
Mean dose(Gy)	21.05 ± 1.3	22.4 ± 1.2

Table-3: Dosimetric comparison of Target EUD and Target Penalty

IMRT: Intensity Modulated Radiation Therapy, PTV: Planning Target Volume, HI: Homogeneity Index, CI: Conformity Index, RT: Right, LT: Left, MUs: Monitor Unit, SD: Standard Deviation.

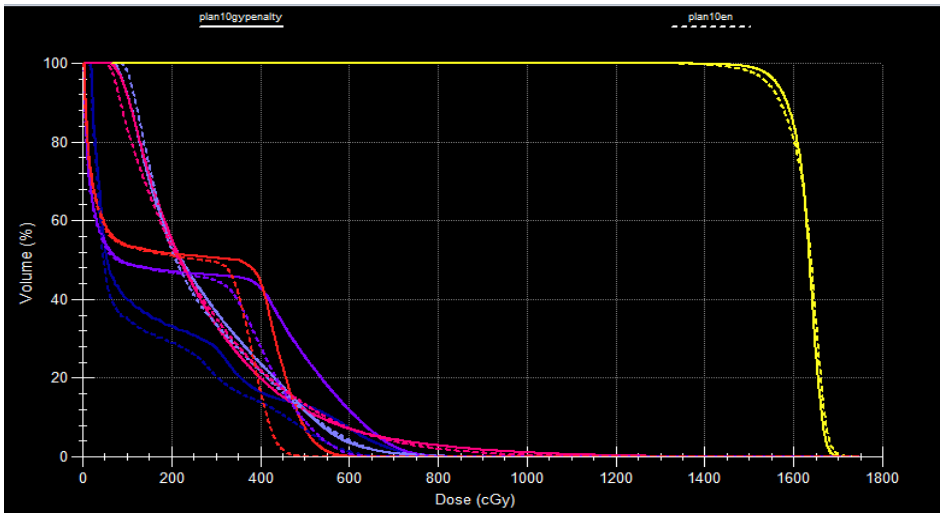


Figure-1: DVH comparison of PTV (yellow), Spinal cord (Red), Brainstem (Dark Blue), PRV (Purple), Right Parotid (Pink), Left Parotid (Light Blue), Solid Lines: Target EUD; Dashed lines: Target penalty

ISSN 2394 - 7780

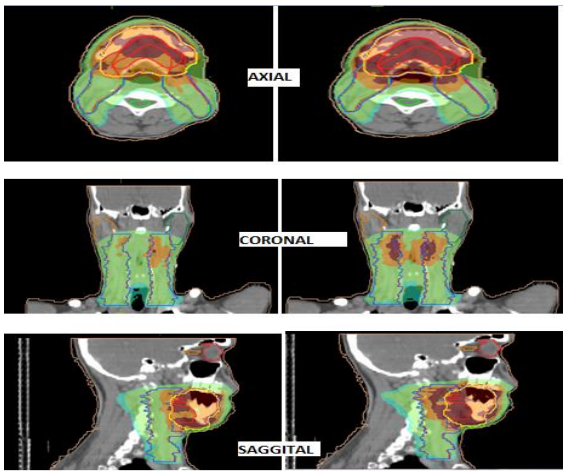


Figure-2: Isofill comparison of IMRT with Target EUD and Target Penalty

One base of tongue case. Dark Brown: 66Gy; Light brown: 62Gy

Light green: 50gy; light blue: 47.5Gy

4. Financial support and sponsorship
Nil

5. Conflicts of interest
There are no conflicts of interest

REFERENCES

1. Skorska M, Piotrowski T, Ryczkowski A. Comparision Of dose distribution for head and neck cancer patients with and without dose painting escalation during radiotherapy realized with tomotherapy unit. Br J Radiol. 2017; 90(1075): 20170019.
2. Gomez - Millan J, Fernandez JR, Carmona JAM, et al. Current status of IMRT in head and neck cancer. Rep Pract Oncol Radiother. 2013;18(6):371-375.
3. Oscar Ardenfors et al Are IMRT in the head and neck region increasing the risk of secondary cancer?Acta Oncology. 2014; 53:1041-1047.
4. Wilkins, J. J., Alaly, J.R., Zakarian, K., Thorstad, W.L., and Deasy, J.O. IMRT treatment planning based on prioritizing prescription goals. Phys. Med. Biol. 2007;**52** (6):1675-1692.
5. Monaco Biological optimization Technical Reference; Version 2.0.
6. Henriquez FC, Castrillon SV. A quality index for equivalent uniform dose. J Med Phys. 2011;36:126–32.
7. Niemierko A. Reporting and analyzing dose distributions: A concept of equivalent uniform dose. Med Phys. 1997;24:103–10.
8. Wu Q, Mohan R, Niemierko A, Schmidt_Ullrich R. Optimization of intensity - modulated radiotherapy plans based on the equivalent uniform dose. Int J Radiat Oncol Biol Phys. 2002 ;52(1):224-35.
9. Wu Q, Djajaputra D, Wu Y, Zhou J, Liu HH, Mohan R. Intensity - modulated radiotherapy optimization with gEUD- guided dose- volume objectives. Phys Med Bio. 2003;48(3):279-91.
10. Thieke, C., Bortfeld, T., Niemierko, A., and Nill, S. From physical dose constraints to equivalent uniform dose constraints in inverse radiotherapy planning. Med. Phys. 2003;**30**(9): 2332-2339.
11. Vadzim Pyshniak, Irina Fotinan et al. Efficiency of biological versus physical optimization for single – arc VMAT for prostrate and head and neck cases . Journal of Applied Clinical Medical Physics. 2014;15:39-53.
12. Qi XS, Semenenko VA, LiXA. Improved critical structure sparing with biological based IMRT optimization Med Phy. 2009;36(5):1790-99.
13. L Nithya N Arunai Nambi Raj et al. Comparative analysis of volumetric modulated arc therapy and intensity modulated radiotherapy for base of tongue cancer. JMP. 2014;39(2):121-126.

ISSN 2394 - 7780

14. Yoon M, Park SY, Shin D, Lee SB, Pyo HR, Kim DY, et al. A new homogeneity index based on statistical analysis of the dose-volume histrogram. J Appl Clin Med Phys. 2007;8:9–17.
15. Feuvtet L, Noël G, Mazeron JJ, Bey P. Conformity index: A review. Int J Radiat Oncol Biol Phys. 2006;64:333–42.
16. Pyakuryal A, Myint WK, Goppalkrishnan M, Jang S, Logemann JA, Mittal BB. A computational tool for the efficient analysis of dose-volume histogram for radiotherapy treatment plans. J Appl Clin Med Phys. 2010;11:137–157.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

EFFECT OF PHONON EXCITATION IN FUSION OF ^{40}Ca + ^{40}Ca REACTION

Nisha Chauhan[1] and S. S. Godre[2]
Ph.D. Scholar[1] and Professor[2], Department of Physics, Veer Narmad South Gujarat University, Surat

ABSTRACT
Fusion reaction ^{40}Ca + ^{40}Ca at sub-barrier energies with coupled-channels framework is investigated in detail. The coupled channel calculations are studied using the CCFULL code. In particular, the effect of octupole vibrational excitation of doubly magic spherical nucleus of ^{40}Ca on fusion cross section and fusion barrier distribution is studied. The present coupled channel calculations well account for the experimental data of the fusion cross section and barrier distributions. Present study indicates that the octupole phonon state of ^{40}Ca is much stronger than the quadrupole phonon state.

Keywords: Coupled channel calculations, Heavy-Ion fusion reactions, Phonon excitations

1. INTRODUCTION
It is now well established that the experimental cross section of heavy-ion fusion reactions between two medium nuclei at energies below the Coulomb barrier are several of magnitudes larger than the prediction of a potential model calculation [1]. This enhancement can be attributed to the coupling of translational motion with additional degrees of freedom such as nuclear surface vibration, rotation and nucleon transfer and/or neck formation between two colliding nuclei [2]. Recent study in low-energy heavy-ion reactions has been focused towards an understanding of the reaction mechanism in the framework of the coupled-channel formalism [3]. A complete understanding of the role of various reaction channels in enhancing the sub-barrier fusion cross section has not yet been achieved, even though in some systems the effect of coupling to a few specific channels has been identified.

Coupled channel formalisms have been extensively used for the heavy-ion fusion cross section calculations. Standard coupled channel calculation code CCFULL [4] uses Woods-Saxon potential, which is a deep attractive nuclear potential, as a nuclear part of the potential. In this code, the depth, range and the surface diffuseness parameters of the potential have been determined often by fitting the experimental fusion cross section at high energies.

The fusion barrier distribution (BD) analysis is a valuable tool to understand the fusion mechanism of two heavy nuclei and the role of their internal degrees of freedom leading to fusion. The fusion BD has been shown to be sensitive to the data related to the nuclear structure, such as the nuclear shapes, the multiple excitations and the anharmonicity of nuclear surface vibrations etc. For this purpose, high precision measurements of the fusion cross section data are required and have been reported for many systems [5]. Fusion BD analyses of these data provided motivation to understanding of the fusion mechanism and generated a widespread interest in the study [6]. The coupling of various channels with each other results in the splitting of the barrier and hence, the fusion cross sections are substantially enhanced in the sub-barrier region as compared to the predictions of one dimensional barrier penetration model [7]. Coupled-channels calculations as well as experimental data shows that the effect of nuclear intrinsic degrees of freedom can be studied in more detail through the fusion barrier distributions [8].

It is important to provide a clear understanding of some fundamental test cases. One such case is the fusion between two magic nuclei. The best studied example is ^{16}O+^{208}Pb, whose detailed theoretical description, however, still remains elusive [9]. Other systems of great interest are the combinations of magic calcium nucleus, namely ^{40}Ca+^{40}Ca. The closed-shell structure of ^{40}Ca immediately attracted the interest of both experimentalists and theoreticians. Fusion of ^{40}Ca+^{40}Ca was investigated again later on with the goal of extracting fusion barrier distributions from accurate measurements of the excitation functions [10, 11].

In order to study the role of important degrees of freedom of doubly magic spherical nucleus in the fusion mechanism, we have calculated the fusion cross section (CS) and fusion barrier distribution (BD) for ^{40}Ca+^{40}Ca system.

This paper is organized as follows. Section II gives the detailed of the coupled channel calculations. Section III explains the coupled-channel calculations employed to analyse the data and the last section gives conclusions.

2. COUPLED-CHANNELS FORMALISM FOR HEAVY-ION FUSION REACTIONS
In this section, the coupled-channels formalism for heavy-ion fusion reactions which includes the effects of the vibrational excitations of the target nucleus is briefly discussed. The nuclear structure effects can be taken into

ISSN 2394 - 7780

account in a more quantal way using the coupled-channels method, consider a collision between two nuclei in the presence of the coupling of the relative motion to a nuclear intrinsic motion ξ. The total Hamiltonian of the system as given in [3] is given below,

$$H(r,\xi) = -\frac{\hbar^2}{2\mu}\nabla^2 + V_N^0(r) + \frac{Z_P Z_T e^2}{r} + H_0(\xi) + V_{coup}(r,\xi) \quad (1)$$

where r is the coordinate of the relative motion between the target and projectile nuclei, μ is the reduced mass, ξ represents the vibrational coordinate in the target nucleus, $H_0(\xi)$ and $V_{coup}(r,\xi)$ are the intrinsic and the coupling Hamiltonians respectively. $V_N(r)$ is the nucleus potential which is the standard Woods-Saxon Potential form,

$$V_N(r) = -\frac{V_0}{1+\exp\left[(r-R_0)/a\right]} \quad (2)$$

where V_0 is the potential depth, a is the diffuseness parameter and radius parameter $R_0 = r_0\left(A_P^{1/3} + A_T^{1/3}\right)$

In general, the intrinsic degree of freedom ξ has a finite spin. Therefore the coupling Hamiltonian is expanded in multipoles as,

$$V_{coup}(\vec{r},\xi) = \sum_{\lambda>0} f_\lambda(r) Y_\lambda(\hat{r}) \cdot \mathrm{T}_\lambda(\xi) \quad (3)$$

Here $Y_\lambda(\hat{r})$ are the spherical harmonics and $T_\lambda(\xi)$ are spherical tensors constructed from the intrinsic coordinate.

The coupled-channels equations for $u_{nlI}^J(r)$ read,

$$\left[-\frac{\hbar^2}{2\mu}\frac{d^2}{dr^2} + \frac{l(l+1)\hbar^2}{2\mu r^2} + V(r) - E + \varepsilon_n\right] u_{nlI}^J(r) + \sum_{n',l',I'} V_{nlJ;n',l',I'}^J(r) u_{n',l',I'}^J(r) = 0 \quad (4)$$

where ε_n is the eigenvalue of the operator H_0 for the nth channel and the coupling matrix elements $V_{nlJ;n',l',I'}^J(r)$ are given as

$$V_{nlJ;n',l',I'}^J(r) = \left\langle JM(nlI) \middle| V_{coup}(\vec{r},\xi) \middle| (n'l'I')JM \right\rangle$$

$$= \sum_\lambda (-)^{I-I'+l'+J} f_\lambda(r) \left\langle l \middle\| Y_\lambda \middle\| l' \right\rangle \left\langle nI \middle\| T_\lambda \middle\| n'I' \right\rangle \times \sqrt{(2l+1)(2I+1)} \begin{Bmatrix} I' & l' & J \\ l & I & \lambda \end{Bmatrix} \quad (5)$$

and the coupling form factors are written as

$$f^N(r) = -R_P \frac{d}{dR}\left[\frac{-V_0}{1+\exp(r-R_0)/a_0}\right], \; f_\lambda^C(r) = \frac{3Z_P Z_T e^2}{2\lambda+1}\frac{R_P^\lambda}{R^{\lambda+1}} \quad (6)$$

Notice that these matrix elements are independent of M. For simplicity of the notation, a simplified notation is introduced, n = {α, *l*, I}, and suppress the index J, the coupled- channels Eq. (4) then reads,

$$\left[-\frac{\hbar^2}{2\mu}\frac{d^2}{dr^2} + \frac{l(l+1)\hbar^2}{2\mu r^2} + V(r) - E + \varepsilon_n\right] u_n(r) + \sum_{n',l',I'} V_{n;n'}(r) u_{n'}(r) = 0 \quad (7)$$

These coupled-channels equations are solved with the incoming wave boundary conditions of,

$$u_n(r) \square \sqrt{\frac{k_{n_i}}{k_n(r)}} \Im_{nn_i}^J \exp\left(-i\int_{r_{abs}}^r k_n(r')dr'\right), r \le r_{abs}$$

$$\to \frac{i}{2}\left(H_J^{(-)}(k_{nI}r)\delta_{n,n_i} - \sqrt{\frac{k_{nI_i}}{k_{nI}}} S_I^J H_J^{(+)}(k_{nI}r)\right), r \to \infty \quad (8)$$

ISSN 2394 - 7780

where n_i denotes the entrance channel. The local wave number $k_n(r)$ is defined by,

$$k_n(r) = \sqrt{\frac{2\mu}{\hbar^2}\left(E - \varepsilon_n - \frac{l(l+1)\hbar^2}{2\mu r^2} - V(r)\right)} \qquad (9)$$

where $k_n = k_n(r = \infty)$.

Once the transmission coefficients $\mathcal{T}_l$ are obtained, the inclusive penetrability $P_l(E)$ of the Coulomb potential barrier is given by

$$P_l(E) = 1 - |S_l|^2 = \frac{k_l(r_{abs})}{k}|T_l|^2 \qquad (10)$$

where $k = \sqrt{2\mu E_{cm}/\hbar^2}$ The fusion cross section is then given by,

$$\sigma_{fus}(E) = \frac{\pi}{k^2}\sum_l (2l+1)P_l(E) \qquad (11)$$

The fusion cross section enhancements observed at sub barrier energies expected from the one dimensional barrier penetration calculation require the appropriate couplings between reaction channels and elastic channel. These couplings give rise to a distribution of fusion barriers instead of a single barrier. The concept of barrier distribution directly extracted from measured fusion cross section (σ_{fus}), by taking the second derivative of the product ($E\sigma_{fus}$) with respect to center-of-mass energy (E_{cm}), as described by Rowley *et.al*. [8] is a useful tool in order to study the structural effects. The fusion barrier distribution (BD) is calculated using a three point difference formula, at energy $(E_1 + 2E_2 + E_3) / 4$, is given as

$$BD = \frac{d^2(E\sigma)}{dE^2} = 2\left[\frac{(E\sigma)_3 - (E\sigma)_2}{E_3 - E_2} - \frac{(E\sigma)_2 - (E\sigma)_1}{E_2 - E_1}\right] \times \frac{1}{(E_3 - E_1)} \qquad (12)$$

In the present study, the fusion barrier distribution is calculated with $\Delta E_{cm} = E_3 - E_2 = E_2 - E_1 = 1.5$ MeV. In the present study, BD is normalized to πR_b^2 and R_b is the barrier radius resulting from the Woods-Saxon potential.

3. RESULT AND DISCUSSION

In this section, the detailed coupled-channels analyses for heavy-ion fusion data of ^{40}Ca + ^{40}Ca is investigated. The results of coupled-channels calculations are performed using the CCFULL code [3]. The experimental data is taken from the ref. [11, 12]. In the calculations, the parameters of the nuclear potential are chosen in such a way that the calculated cross section fit well with the experimental fusion cross section data at the highest energies for this reaction. The optimum value for V_0, r_0 and a parameters are summarized in Table I. The deformation parameters values are taken from the literature [13] and are given in Table II.

Table-I: The potential parameters such as depth parameter (V_0), radius parameter (r_0) and diffuseness parameter (a_0) for different reaction used in the coupled-channel calculations.

System	V_0 (MeV)	r_0 (fm)	a_0 (fm)
^{40}Ca + ^{40}Ca	196	1.01	0.709

Table-II: The deformation parameters (β_λ), excitation energies (E_λ) and the multipolarities (λ) of the state of nuclei used in the coupled-channel calculations [13].

Nuclei	λ^π	E_λ (MeV)	β_λ
^{40}Ca	3^-	3.737	0.41
	2^+	3.905	0.123
	5^-	4.497	0.25

In performing the coupled channel calculations for ^{40}Ca + ^{40}Ca system, the low-lying vibrational state of doubly magic spherical nucleus ^{40}Ca *i.e.* 3^-, 2^+ and 5^- states are included. The results of coupled channel calculations are compared with the experimental data in Fig. 1. Figure 1(a) and 1(b) show the fusion cross sections and the fusion barrier distributions, respectively. The result when the projectile and the target are assumed to be inert i.e. no excitation level is included is denoted by dotted line in Fig. 1. This calculation underestimates the experimental data of fusion cross section and gives a single peak structure of fusion barrier distribution in Fig.

ISSN 2394 - 7780

1(b). The result of coupled channel calculations taking into account the coupling to single quadrupole (2^+) excitation of target ^{40}Ca is shown in Fig. 1 by dashed line. This calculation underestimates the experimental fusion cross section as well as barrier distribution.

The calculations including the coupling to single 5^- excitation in addition to single quadrupole excitation (2^+) of target is denoted by dashed-dotted line. But the inclusion of this coupling fails to reproduce the experimental data which indicates that more coupling are required to study this reaction. Then the calculations including the coupling to single octupole excitation of projectile ^{40}Ca in addition with the coupling of 2^+ and 5^- states of target nucleus is shown by the solid line in Fig. 1. This calculation give an overall better agreement taking into account the coupling of octupole vibrational excitation with experimental fusion cross section as well as fusion barrier distribution. From the present calculations for this reaction ^{40}Ca + ^{40}Ca system, it can be conclude that the octupole phonon state of ^{40}Ca is much stronger than the quadrupole phonon state.

4. CONCLUSION

The detailed coupled-channels analysis for heavy-ion fusion reactions of the ^{40}Ca + ^{40}Ca system is investigated using CCFULL code. In particular, the effect of octupole vibrational excitation of doubly magic spherical nucleus of ^{40}Ca on fusion cross section and fusion barrier distribution is studied. The present coupled channel calculations well account for the experimental data of the fusion cross section and barrier distributions. Present study indicates that the octupole phonon state of ^{40}Ca is much stronger than the quadrupole phonon state.

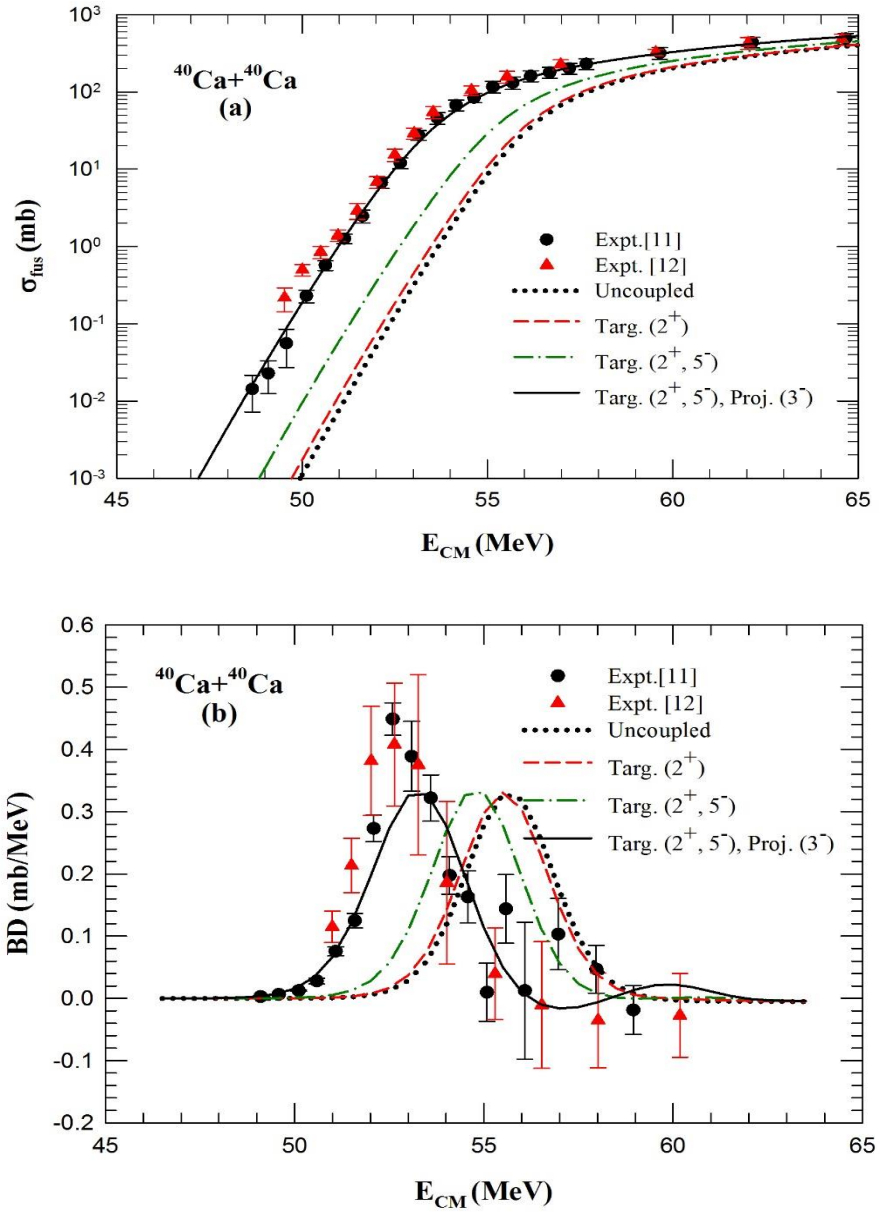


Fig-1: Comparison of coupled channel calculations with experimental data for (a) fusion cross section and (b) fusion barrier distribution for ^{40}Ca + ^{40}Ca.

ISSN 2394 - 7780

REFERENCES

1. Beckerman M. (1988), 'Sub-barrier fusion of two nuclei', *Reports on Progress in Physics* **51**, 1047-1103.
2. Balantekin A. B. and Takigawa N. (1998), 'Quantum tunneling in nuclear fusion', *Reviews of Modern Physics* **70(1)**, 77-100.
3. Hagino K. and Takigawa N. (2012), 'Sub-barrier fusion reactions and many-particle quantum tunneling', *Progress of Theoretical Physics* **128**, 1061-1106.
4. Hagino K., Rowley N. and Kruppa A. T. (1999), 'A program for coupled-channel calculations with all order couplings for heavy-ion fusion reactions', *Computer Physics Communications* **123**, 143-152.
5. Dasgupta M., Hinde D. J., Rowley N. and Stefanini A. M. (1998), 'Measuring Barriers to Fusion' *Annual Review of Nuclear and Particle Science*, **48**, 401-461.
6. Sastry S. V. S. and Santra S. (2000), 'Structure information from fusion barrier', *Pramana-Journal of Physics* **54**, 813-826.
7. Kalkal S., Mandal S., Madhavan N., Jhingan A., Prasad E., Sandal R., Gehlot J., Verma S., Garg R., Goyal S., Saxena M., Nath S., Behera B., Kumar S., Pramanik U. D., Siwal D., Mohanto G., Wollersheim H. J., Sinha A. K. and Singh R. (2011), 'Fusion and transfer reactions around the Coulomb barrier for $^{28}Si+^{90,94}Zr$ systems', *International Nuclear Physics Conference 2010(INPC2010) Journal of Physics: Conference Series* **312**, 082027-082032.
8. Rowley N., Satchler G. R. and Stelson P. H. (1991), 'On the "distribution of barriers" interpretation of heavy-ion fusion', *Physics Letters B* **254**, 25-29.
9. Morton C. R., Berriman A. C., Dasgupta M., Hinde D. J., Newton J. O., Hagino k. and Thompson I. J. (1999), 'Coupled-channel analysis of the$^{16}O+^{208}Pb$ fusion barrier distribution', *Physical Review C* **60**, 044608(1)-044608(11).
10. Jiang C. L., Stefanini A. M., Esbensen H., Rehm K. E., Corradi L., Fioretto E., Mason P., Montagnoli G., Scarlassara F., Silvestri R., Singh P. P., Szilner S., Tang X. D. and Ur C. A. (2010), 'Fusion hindrance for Ca + Ca systems: Influence of neutron excess', *Physical Review C* **82**, 041601(1)-041601(4).
11. Montagnoli G., Stefanini A. M., Jiang C. L., Esbensen H., Corradi L., Courtin S., Fioretto E., Goasduff A., Hass F., Kifle A. F., Michelagnoli C., Montanari D., Mijatovic T., Rehm K. E., Silvestri R., Singh P. P., Scarlassara F., Szilner S., Tang X. D. and Ur C. A. (2012), 'Fusion of $^{40}Ca+^{40}Ca$ and other Ca + Ca system near and below the barrier', *Physical Review C* **85**, 024607(1)-024607(8).
12. Aljuwair H. A., Ledoux R. J., Beckerman M, Gazes S. B., Wiggins J., Cosman E. R., Betts R. R., Saini S. and Hansen O (1984), 'Isotopic effects in the fusion of ^{40}Ca with $^{40,44,48}Ca$', Physical Review C 30, 1223-1227.
13. Reference Input Parameter Library (RIPL2), http://www-nds.iaea.org/RIPL-2/ and Evaluated Nuclear Structure Data File (ENSDF), http://www.nndc.bnl.gov

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

IMPACT OF GANDHIAN VALUE BASED TEACHER EDUCATION ON MORALE VALUES OF B.ED. STUDENTS

Dr. Ratani Thakur[1] and Dr. Harjot Kaur Dhatt[2]
Principal[1] and Assistant Professor[2], Oriental College of Education, Navi Mumbai

ABSTRACT
The modern materialistic India, which in the path of development, raises our standard of living but declines our standard of life i.e. the value of life. On account of population explosion, knowledge explosion (science and technology) and material explosion man has started moving towards the wrong path by considering material comforts of the world as real happiness. At present political, economic, social and moral rights as well as values are downgrading and exploiting. In the course of development, we have to think of these problems and try to find out the solutions best suited to our needs. It is the Gandhian Value System which can be used to re-invent idealistic and humane values among school students, but first these values must be inculcated in the teachers who are teaching them. The basic idea behind the value based education is that the education should not only enable a learner to earn more and but also to build his character. Similarly, value based teacher education aims at inculcating values in teachers in addition to merely concentrating on teaching skills and subject matter. This research paper aims To assess the attained understanding of B.Ed. Students about Gandhian Thoughts and values by giving them intervention in form of participation in Gandhi Vichar Sanskar Pareeksha-2018 and also to analyze the influence of GSVP exam on moral values of participants of the exam.Statistical analyses revealed significant influence of intervention on morality scale of students

INTRODUCTION
The 21st century is commonly known as "The Era of development". India being riding in the ship of development faces all the challenges of the same. While walking on the path of development, India have covered a quite a significant distance. During this course, along with its inherent problems viz. rapid growth of population, unemployment, poverty, racial discrimination, economic inequality, social injustice, corruption, India have infected itself with greater infirmities. At present political, economic, social and moral rights as well as values are downgrading and exploiting. In the course of development, we have to think of these problems and try to find out the solutions best suited to our needs.

The above said problems are not superficial but it has started impairing the young India studying in the classrooms. Observations from the Pearson Voice of Teacher Survey 2016 which was conducted across the country in July-August 2016, revealed that about 42 percentof teachers feel that students who don't give importance to values and ethics is increasing by the day while 38 percent teachers feel discipline has become a major issue to tackle with.

The reasons could be partly subjected to several social and economic factors. In today's cut throat economy, many families have become disoriented, disorganised and confused and failed to play this vital role of inculcating values and morals among their children. Not just family, the other major agency of society i.e. our school and other educational institutions are lacking behind in flourishing a good human, they rather focused on making a successful economic man, who is selfish and will do anything to satisfy his cravings and desires.

The Pearson Voice of Teacher Survey 2016 also revealed that teachers agreed that they don't get adequate training. About 49 percent respondents revealed that they prefer better training. Adequacy of teacher training is perceived to be much higher among school teachers (70 percent) than higher education teachers (30 percent), the survey claimed.

This result seems to be in sync with speculations of the analysts and educationists of the country have high lightened the importance of inculcating value-based education in their recent policy recommendations like - the Ishwarbhai Patel's; Ramamurthy commission; Prof. Yashpal's commission and the present focus on the same issues through the National curriculum framework. All these commissions, reports and recommendations have one thing in Common and that is, Changing Curriculum at different levels for capacity building among teachers. Further, recent studies revealed that teachers have responsibility of teaching a whole child developing values assumed importance in recent years. But what exactly is value based teacher education (VBTE). Teacher education trains an individual in teaching-learning process; VBTE gives him to connect with his students, his profession and whole environment in general at a deeper level. Teacher education creates a well-trained teacher, whereas VBTE creates a leader who will lead the whole society.

ISSN 2394 - 7780

GANDHIAN VALUE BASED TEACHER EDUCATION

The problem of today's society is that it leaves us without absolute foundations for determining absolute truths and values about thinking and living wisely on earth. While we are moving ahead for the peak of scientific and economic success, we need to be grounded with our roots of moral value to have mental peace and feeling content in present moment. Our history is filled with scripture, great philosophers, guide-men who have propounded and followed idealist ideologies which are still relevant in modern times.

Mohandas Karamchand Gandhi was a man considered one of the great sages and prophets. Indians called him the 'Father of the Nation'. Gandhi's exposure to realities of life in South Africa taught him about life much more than what he had learnt in formal institutions of learning. It is this understanding of life which gave shape to his views on the nature of education that a free India needed. To solve problem of deteoroting value system of Indian society, it is very important for us to re-visit his ideas on education and role of teacher.

By education, Gandhi means an all-round drawing out of the best in the child and man – body, mind and spirit. Here the "best" is nothing else but the inner voice or truth. Education which draws out the best or truth consist the development of the mind and body with a corresponding awakening of the soul. The system of basic education proposed by Gandhi leads to the development of the mind, body and soul whereas the ordinary system of education cares only for the mind.

Gandhi's philosophy of education comprises all essential elements which any good or adequate philosophy of education should possess. He advocates the concept of value education, which is based on morality. According to Gandhi moral and ethical knowledge is the first point of any good philosophy of education. Any education system that lacks moral and ethical knowledge cannot be termed as good. The underlying meaning behind this thought is that, without morality or ethical knowledge no student in the real sense can be considered to be healthy-both mentally and physically. A person, who lacks the knowledge of morality, who does not differentiate between right and wrong, who has no control on himself, cannot be called educated in the true sense. For Gandhi morality and righteousness should always be considered as an essential part of an education, so that every student would be able to gain in terms of knowledge and spirituality. Every student should gain education under the strict regimen of high morals, self-control and right thinking. On the other hand, they would also be expected to provide service to the society in general. This implies their respect towards society and social traditions and constant awareness towards their duties and responsibilities.

Gandhi also put forth expectation from teachers also. He thought that only the right type of teachers could help in achieving the objectives of education. He should be a lover of truth and non-violence and he should possess a sound base of knowledge, skill, enthusiasm, patriotism, dedication, love for children and labour, respect for the dignity of individuals and special training in the basic education.

The Teacher should be a man of action, not a man of slogan and should have a good moral character and a social bent of mind. He should lead a pure and simple life and be a man of ideals and a saga of examples.

Gandhian thoughts about education still holds a promise for a better tomorrow in the modern scenario of rapid scientific and technological advances.

RATIONALE OF STUDY

The modern materialistic India, which in the path of development, raises our standard of living but declines our standard of life i.e. the value of life. On account of population explosion, knowledge explosion (science and technology) and material explosion man has started moving towards the wrong path by considering material comforts of the world as real happiness. In the present society due to the spread of greed, self-aggrandizement, gross injustice, abuse of human rights, pervasion of power, insensitivity, dishonesty, thefts, bribery, smuggling, corruption, exploitation man are wallowing in the low and dark dimensions of his consciousness. Moral values are being throttled and the power of man is being misused. The growing influence of the negative aspects of Western culture in younger generation is stranded on the crossroads. To make youth conscious about such evils education based on moral and ethical values should be provided to them so that they become rational human beings and to know what is good, love 'good' and do 'good'.

It is the Gandhian Value System which can be used to re-invent idealistic and humane values among school students, but first these values must be inculcated in the teachers who are teaching them. The basic idea behind the value based education is that the education should not only enable a learner to earn more and but also to build his character. Similarly, value based teacher education aims at inculcating values in teachers in addition to merely concentrating on teaching skills and subject matter. It is evident from recent researches (Smith (2007), Curtner-Smith & Meek, 2000, Ram, A. R. S. 2001) that many approaches are being adapted to value orientation of teacher education i.e. meditation, yoga, religious education, social service etc.

ISSN 2394 - 7780

With the above thought in vision, researchers made use of their position at oriental College of Education, and motivated students to participate in **Gandhi Vichar Sanskar Priksha-2018**, organized by Gandhi Research Foundation, Jalgaon, Maharashtra.

Following the guideline provided by Gandhi research foundation, the exam was conducted on 17th November, 2018 at 2:00 P.M. for B.Ed. students of both the years i.e. first year (FY) and second year (SY). Students were provided with literature on Gandhian philosophy prescribed by the foundation.

There were 25 students from F.Y. B.Ed and 8 students from S.Y. B.Ed. who enrolled for the GSVP-2018. But due to college change as per counselling schedules of Mumbai University, few students did not appear in the exam. 18 students from F.Y. B.Ed and 7 students from S.Y. B.Ed. appeared for the exam on 17th November, 2018.

In order to take a step further into this aim of finding the understanding level of Gandhian thoughts among our students, conducted pre-test and post-test on moral values, for which we used self-prepared 11-point scale of Multidimensional Morality containing 40 items measuring morality on 9 dimensions.

OBJECTIVES

1. To assess the attained understanding of B.Ed. Students about Gandhian Thoughts and values.
2. To analyze the influence of GSVP exam on moral values of participants of the exam.

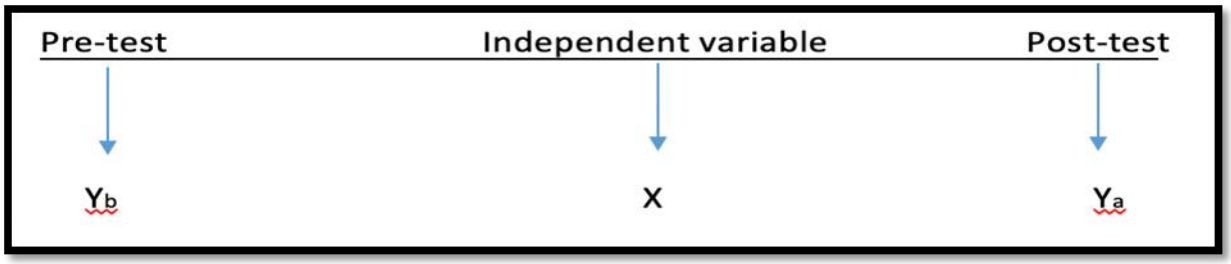
HYPOTHESES

For objective 2:

H_0: there will no significant difference between the means of pretest and posttest on multidimensional morality.

RESEARCH DESIGN AND METHODOLOGY

The present study employed a simple research design without involvement of a control group. In this design the dependent variable i.e multidimensional Morality (Y_b, pre-test) was measured before introduction of the independent variable i.e. influence of Gandhi Sanskar Vichar Preeksha (X) and again measured multidimensional Morality (Y_a, post-test) afterwards. The difference if any, between the two measurements (Y_b and Y_a) is computed and is ascribed to the manipulation of X.



First of all a pre-test was conducted on all the enrolled students i.e. 33 B.Ed students by administering Multidimensional Morality Scale.

After pretest the received books on Gandhian thoughts prescribed by Gandhi research foundation. Along with that, students were encouraged to read the material and discuss among themselves.

After giving them a good time i.e. 15 days for the said tasks, the GSVP exam was conducted on 17th November, 2018.

At last stage, after giving a gap of 20 days post-test was conducted on the same Multidimensional Morality Scale.

Sample

Sample for the study is volunteering. Students were asked to participate in the study on volunteer bases, which resulted in 33 B.Ed. students enrolled for GSVP but only 25 appeared for exam. Hence, only 25 students' data was used for the study.

Tool

1. Self-Prepared Multidimensional Morality Scale

11-point scale of Multidimensional Morality containing 40 items measuring morality on 9 dimensions. These dimensions are inspired and based on Gandhian philosophy.

ISSN 2394 - 7780

Dimensions included in the scale:

S. No.	Dimension	Items
1.	Non-violence	1,2,3,4,7
2.	Self-discipline	17,22,23,30,31
3.	Truth	14,15,27,28,29
4.	Hording	19
5.	Dignity of labour	24,25,26
6.	Fearlessness	5,10,11
7.	Equality	6,8,12,13,18,33,34,35
8.	Patriotism and local goods	9,20,21,32
9.	Rural Development	36,37,38,39,40

2. Gandhi Sanskar Vichar Preeksha Question papers for B.Ed. F.Y. and B.Ed. S.Y. by Gandhi Research Foundation.

ANALYSES AND INTERPRETATION

To provide comprehensive and easy grasp, the collected data is procured to tabular forms this is followed by analyses and interpreting in a systematic manner. The whole report is in sync with the set objectives of the study.

Objective-1: To assess the attained understanding of B.Ed. Students about Gandhian Thoughts and value

Percentage analysis

The scores obtained on the GSVP examination was subjected to percentage analysis.

Table-1: Percentage Analyses of the Data

Range	Score on GSVP	No of students	Total Students	Percentage
Poor	0-10	00	25	0%
Below Average	10-20	02	25	8%
Average	20-40	10	25	40%
Above Average	30-40	08	25	32%
Good	40-50	07	25	28%
Very Good	50-60	01	25	4%
Excellent	60-70	00	25	0%

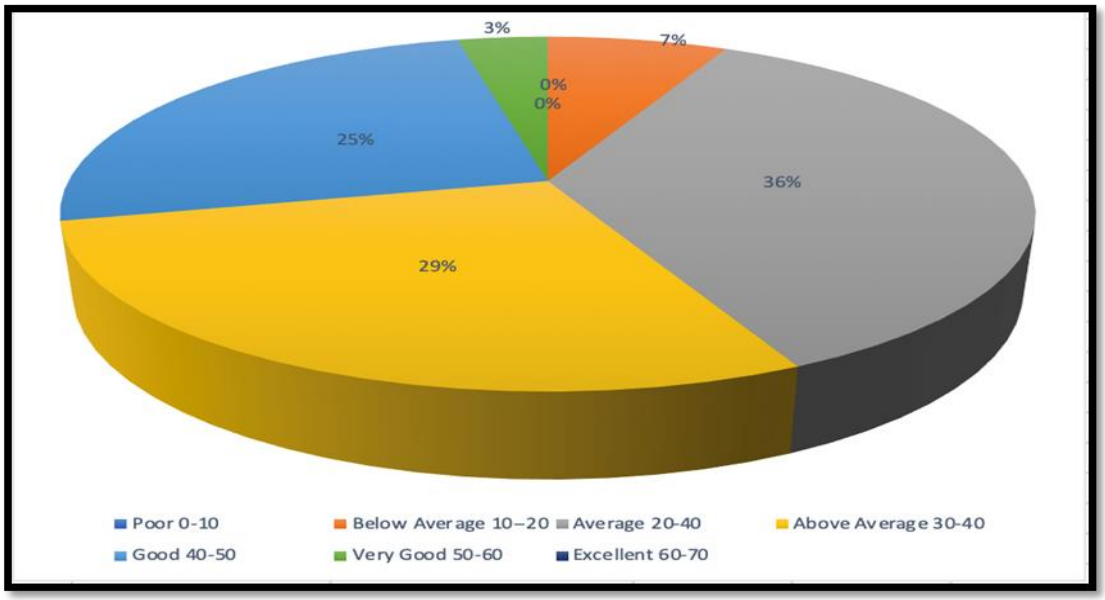


Table 1 and Pie-chart reveal that 0 out of 25 students i.e 0% lies under poor range of score on GSVP Exam. 02 out of 25 student teacher i.e. 8% lie under below average range. Whereas 10 out of the 25 of student teachers i.e 40% lies average category. 32 % of students i.e. 08 out of 25 students performed above average. 28 % students i.e. 07 out of 25 students performed good. Whereas only 01 (4%) student performed very good. And 0 student gained excellent marks.

ISSN 2394 - 7780

Objective-2: To analyze the influence of GSVP exam on moral values of participants of the exam.
To find significance of difference between mean on pretest on multidimensional morality and mean of posttest on multidimensional morality.

Hypothesis Analyses
H_0: there will no significant difference between the means of pretest and posttest on multidimensional morality.

In order determine significance of difference between pre-test mean and post-test mean, single sample correlated t-value was calculated.

N	Pretest Mean (Y_b)	Posttest Mean (Y_a)	Degree of Freedom	T-value	Calculated p-value
25	252.96	277.52	24	5.47	0.0001

The above table shows that t-value is 5.47 and found to be greater than critical value of t i.e. 2.797 at 0.01 level of significance with df =24. So, the null hypothesis i.e. There is no significant difference between the means of pretest and posttest on multidimensional morality, is Rejected.

Therefore, it can be concluded from the given analysis that there is a statistically significant difference between pre-test mean and post-test mean. The difference can be subjected to the experimental treatment given to the sample group in form of Gandhi Sanskar Vichar Preeksha.

RESULT AND DISCUSSION
The percentage analyses of the scores obtained by B.Ed. students of First year and Second year revealed that almost none of the student performed at excellent end of the range. This may be subject to lack of presence of content related to Gandhian philosophy in academic curriculum and daily practices of young Indians. However, the pre-test and post-test revealed that there is significant influence of Gandhi Sanskar Vichar Preeksha and its study material on morality scale of students. It suggests that if students study life experiences of Gandhi ji's life and try to practice his values in their life then moral values of students of 21st century can be improved.

REFERENCES

- The Pearson Voice of Teacher Survey 2016, *Decline in values, ethics and discipline among students: survey*
- https://www.thehindu.com/news/cities/Hyderabad/Decline-in-values-ethics-and-discipline-among-students-survey/article14522679.ece
- Desai, Anita. (2015). Degradation of Moral value among Indian youth: An emerging issue, *Asian Journal of Educational Research and Technology*, **5**(1), 80-83.
- Kalita, S. (2017). M.K. Gandhi's Philosophy Of Education In The Context Of Present Education System Of India. *IOSR Journal Of Humanities And Social Science* , **22**(11), PP 11-13
- http://www.iosrjournals.org/iosr-jhss/papers/Vol.%2022%20Issue11/Version-8/B2211081113.pdf
- Education : Gandhian Philosophy Of Education
- http://www.shreyasfoundation.in/gandhian-philosophy.html
- Smith, A., Moran, A., Clarke, L.,McCully, A., Abbott, L. & Montgomery, A. (2008) A values-based approach to teacher education - TLRP Research Briefing 35, (London, TLRP).
- http://www.tlrp.org/proj/asmith.html
- Ram, A. R. S. (2001) Stress Management through Yoga and Personality Development, paper presented on *Value Orientation in Teacher Education,* December 2001
- http://www.ncte-india.org/pub/rimse/spk16.htm
- Curtner-Smith, M. D. and Meek, G. A. (2000) Teachers' Value Orientations and Their Compatibility with the National Curriculum for Physical Education, *European Physical Education Review*, **6**(1), 27-45
- http://epe.sagepub.com/content/6/1/27.abstract

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

INTERESTING PROPERTIES RELATED WITH THE CLASS OF GENERALIZED LUCAS SEQUENCES

Daksha M. Diwan[1] and Devbhadra V. Shah[2]
[1]GEC-Gandhinagar
[2]VNSGU, Surat

ABSTRACT
Lucas sequence $\{L_n\}_{n=0}^{\infty}$ *is defined by the recurrence relation* $L_n = L_{n-1} + L_{n-2};\ n \geq 2$ *with initial condition* $L_0 = 2, L_1 = 1$. *One of the generalizations of the Lucas sequence is the class of sequences* $\left\{L_n^{L(a,b)}\right\}_{n=0}^{\infty}$ *generated by the recurrence relation*

$$L_n^{L(a,b)} = \begin{cases} aL_{n-1}^{L(a,b)} + L_{n-2}^{L(a,b)} & ;when\ n\ is\ odd \\ bL_{n-1}^{L(a,b)} + L_{n-2}^{L(a,b)} & ;when\ n\ is\ even \end{cases} (n \geq 2)$$

with initial condition $L_0^{L(a,b)} = 2,\ L_1^{L(a,b)} = 1$ *and a, b are positive integers. The Lucas sequence is a special case of these sequences with* $a = b = 1$. *We define* $\left\{F_n^{L(a,b)}\right\}_{n=0}^{\infty}$ *to be the sequence of generalized Fibonacci numbers with the similar recurrence relation to that of* $L_n^{L(a,b)}$ *with the initial condition* $F_0^{L(a,b)} = 0, F_1^{L(a,b)} = 1$. *In this paper we obtain relation between extended Binet's formula for* $\left\{L_n^{L(a,b)}\right\}_{n=0}^{\infty}$ *and extended Binet's formula for* $\left\{F_n^{L(a,b)}\right\}_{n=0}^{\infty}$. *We also derive some interesting properties of this Generalized Lucas sequence.*

Keywords: Lucas sequence, Generalized Lucas sequence, Binet formula.

I. INTRODUCTION

In recent years, many interesting properties of classic Fibonacci numbers, classic Lucas number and their generalizations have been studied by researchers which are applied to almost every field of science and art. Cennet, Ahmet, Hasan [1], Kenan, Adem [9] and Shah, Shah [13] defined new generalizations of Lucas sequence and gave various identities along with extended Binet formula for the concerned new generalizations. For the rich and related applications of Lucas numbers, one can refer to the nature and different areas of the science [2, 5, 6, 7, 8, 10]. The classic Lucas sequence $\{L_n\}$ is defined as

$$L_0 = 2, L_1 = 1 \text{ and } L_n = L_{n-1} + L_{n-2} \text{ ; for } n \geq 2.$$

The first few terms of the Lucas sequence are: 2, 1, 3, 4, 7, 11, 18, 29, 47, 76, 123, 199, 322, 521, … . (Koshy [9]) We define a new generalization of the Fibonacci (Lucas) sequence and call it the *generalized Fibonacci (Lucas) sequence*.

Definition: For any two positive numbers *a* and *b*, the *generalized Fibonacci sequence* $\left\{F_n^{L(a,b)}\right\} (= \{F_n^L\})$ is defined by the recurrence relation $F_n^L = a^{\chi(n)} b^{1-\chi(n)} F_{n-1}^L + F_{n-2}^L$, where $F_0^L = 0, F_1^L = 1$; a, b are any two positive integers and $\chi(n) = \begin{cases} 1; \text{if } n \text{ is odd} \\ 0; \text{if } n \text{ is even} \end{cases}$.

This can be equivalently expressed as

$$F_n^{L(a,b)} = \begin{cases} aF_{n-1}^{L(a,b)} + F_{n-2}^{L(a,b)} & ;\text{when } n \text{ is odd} \\ bF_{n-1}^{L(a,b)} + F_{n-2}^{L(a,b)} & ;\text{when } n \text{ is even} \end{cases} (n \geq 2) \text{ with } F_0^L = 0, F_1^L = 1 \qquad \textbf{(1.1)}$$

Diwan, Shah [4] obtained the extended Binet Formula for F_n^L as

ISSN 2394 - 7780

$$F_n^L = \frac{b^{1-\chi(n)}}{(ab)^{[n/2]}}\left(\frac{\alpha^n-\beta^n}{\alpha-\beta}\right), \qquad (1.2)$$

where $\alpha = \frac{ab+\sqrt{a^2b^2+4ab}}{2}$, $\beta = \frac{ab-\sqrt{a^2b^2+4ab}}{2}$. Here we note that $\frac{\alpha^2}{ab} = \alpha + 1$ and $\frac{\beta^2}{ab} = \beta + 1$.

Definition: For any two positive numbers a and b, the *generalized Lucas sequence* $\left\{L_n^{L(a,b)}\right\}(=\{L_n^L\})$ is defined by the recurrence relation

$$L_n^L = a^{\chi(n)}b^{1-\chi(n)}L_{n-1}^L + L_{n-2}^L,$$

where $L_0^L = 2, L_1^L = 1$; a, b are any two positive integers and $\chi(n) = \begin{cases} 1; \text{if } n \text{ is odd} \\ 0; \text{if } n \text{ is even} \end{cases}$.

This can be equivalently expressed as

$$L_n^L = \begin{cases} aL_{n-1}^L + L_{n-2}^L ; \text{if } n \text{ is odd} \\ bL_{n-1}^L + L_{n-2}^L; \text{if } n \text{ is even} \end{cases} (n \geq 2) \qquad (1.3)$$

with $L_0^L = 2, L_1^L = 1$.

The Lucas sequence is a special case of these sequences with $a = b = 1$.

Diwan, Shah [3] obtained the extended Binet formula for L_n^L defined by

$$L_n^L = \frac{1}{(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma\alpha^n-\delta\beta^n}{\alpha-\beta}\right) \qquad (1.4)$$

where $\alpha = \frac{ab+\sqrt{a^2b^2+4ab}}{2}, \beta = \frac{ab-\sqrt{a^2b^2+4ab}}{2}, \gamma = (b - 2ab + 2\alpha), \delta = (b - 2ab + 2\beta)$.

In this paper we derive relation between extended Binet's formula for $\left\{L_n^{L(a,b)}\right\}_{n=0}^{\infty}$ and extended Binet's formula for $\left\{F_n^{L(a,b)}\right\}_{n=0}^{\infty}$. Also we derive some of its interesting properties.

2 Relation Between L_n^L and F_n^L

We express L_n^L in terms of F_n^L using the extended Binet's formulae (1.2) and (1.4).

Theorem 2.1: For $\alpha = \frac{ab+\sqrt{a^2b^2+4ab}}{2}, \beta = \frac{ab-\sqrt{a^2b^2+4ab}}{2}, \gamma = (b - 2ab + 2\alpha)$, $\delta = (b - 2ab + 2\beta)$, the following holds: (a) $L_n^L = \frac{\gamma F_n^L}{b} + \frac{2\beta^n}{(ab)^{[n/2]}b^{\chi(n)}}$

(b) $L_n^L = \frac{\delta F_n^L}{b} + \frac{2\alpha^n}{(ab)^{[n/2]}b^{\chi(n)}}$.

Proof: From (1.2), we have $F_n^L = \frac{b^{1-\chi(n)}}{(ab)^{[n/2]}}\left(\frac{\alpha^n-\beta^n}{\alpha-\beta}\right)$.

This gives $\alpha^n = \frac{F_n^L(\alpha-\beta)(ab)^{[n/2]}}{b^{1-\chi(n)}} + \beta^n$ and $\beta^n = \alpha^n - \frac{F_n^L(\alpha-\beta)(ab)^{[n/2]}}{b^{1-\chi(n)}}$.

Again by (2.2), we have $L_n^L = \frac{1}{(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma\alpha^n-\delta\beta^n}{\alpha-\beta}\right)$, where $\gamma = (b - 2ab + 2\alpha)$, $\delta = (b - 2ab + 2\beta)$.

Substituting above value of α^n in L_n^L, we get

ISSN 2394 - 7780

$$L_n^L = \frac{1}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma F_n^L(\alpha-\beta)(ab)^{[n/2]}}{b^{1-\chi(n)}} + \gamma\beta^n - \delta\beta^n\right)$$

$$= \frac{(\gamma-\delta)\beta^n}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)}} + \frac{\gamma F_n^L(\alpha-\beta)(ab)^{[n/2]}}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)+1-\chi(n)}}.$$

But $\gamma - \delta = b - 2ab + 2\alpha - 2\beta + 2ab - b = 2(\alpha-\beta)$.

Thus $L_n^L = \frac{2(\alpha-\beta)\beta^n}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)}} + \frac{\gamma F_n^L}{b}$ and hence $L_n^L = \frac{\gamma F_n^L}{b} + \frac{2\beta^n}{(ab)^{[n/2]}b^{\chi(n)}}$.

Likewise substituting the value of β^n in L_n^L, we get

$$L_n^L = \frac{1}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\delta F_n^L(\alpha-\beta)(ab)^{[n/2]}}{b^{1-\chi(n)}} + \gamma\alpha^n - \delta\alpha^n\right)$$

$$= \frac{(\gamma-\delta)\alpha^n}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)}} + \frac{\delta F_n^L(\alpha-\beta)(ab)^{[n/2]}}{(\alpha-\beta)(ab)^{[n/2]}b^{\chi(n)+1-\chi(n)}}$$

Since $\gamma - \delta = b - 2ab + 2\alpha - 2\beta + 2ab - b = 2(\alpha-\beta)$, we finally get

$$L_n^L = \frac{\delta F_n^L}{b} + \frac{2\alpha^n}{(ab)^{[n/2]}b^{\chi(n)}}.$$

Next we obtain one more result which gives the relation between L_n^L and F_n^L. We need the following results by to obtain this relation.

Lemma 2.2 **:** (Diwan, Shah [3])

(a) $L(x) = \frac{((2a-1)x^3-(2ab+2-b)x^2+x+2)}{(x^4-(ab+2)x^2+1)}$

b) $L(x) = \frac{1}{(\alpha-\beta)}\left\{\sum_{n=0}^{\infty}\left(\frac{(1-2a)(ab)^{n+1}(\beta^{2n+1}-\alpha^{2n+1})}{(-ab)^{2n+1}} + 2a\frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}\right)x^{2n+1}\right\}$

$+ \frac{1}{(\alpha-\beta)}\left\{\sum_{n=0}^{\infty}\left((b-2ab-2)\frac{(\alpha^{2n}-\beta^{2n})}{(ab)^n} + 2\frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}\right)x^{2n}\right\}.$

Theorem 2.3 **:** $L_n^L = \frac{\gamma^{\chi(n)}\delta^{1-\chi(n)}F_n^L}{b^{1-\chi(n)}} + \frac{2a^{\chi(n)}}{(ab)^{\left[\frac{n+2}{2}\right]}}\left\{\begin{array}{l}\frac{(ab)^{\left[\frac{n+1}{2}\right]}F_{n+1}^L}{b^{1-\chi(n+1)}}\left(\frac{1-(-1)^n}{2}\right)\\ +\frac{(ab)^{\left[\frac{n+2}{2}\right]}F_{n+2}^L}{b^{1-\chi(n+2)}}\left(\frac{1+(-1)^n}{2}\right)\end{array}\right\}.$

Proof : By above lemma we have

$$L(x) = \frac{1}{(\alpha-\beta)}\sum_{n=0}^{\infty}\left\{\frac{(1-2a)(ab)^{n+1}(\beta^{2n+1}-\alpha^{2n+1})}{(-ab)^{2n+1}} + 2a\frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}\right\}x^{2n+1}$$

$$+ \frac{1}{(\alpha-\beta)}\sum_{n=0}^{\infty}\left\{(b-2ab-2)\frac{(\alpha^{2n}-\beta^{2n})}{(ab)^n} + 2\frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}\right\}x^{2n}$$

$$= \frac{1}{(\alpha-\beta)}\sum_{n=0}^{\infty}\left\{\frac{(1-2a)(\alpha^{2n+1}-\beta^{2n+1})}{(ab)^n}x^{2n+1} + (b-2ab-2)\frac{(\alpha^{2n}-\beta^{2n})}{(ab)^n}x^{2n}\right\}$$

$$+ \frac{2}{\alpha-\beta}\sum_{n=0}^{\infty}\left\{a\frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}x^{2n+1} + \frac{(\alpha^{2n+2}-\beta^{2n+2})}{(ab)^{n+1}}x^{2n}\right\}.$$

$$\therefore L(x) = \sum_{n=0}^{\infty}\frac{\gamma^{\chi(n)}\delta^{1-\chi(n)}}{(ab)^{\left[\frac{n}{2}\right]}}\left(\frac{\alpha^n-\beta^n}{\alpha-\beta}\right)x^n + 2\sum_{n=0}^{\infty}\frac{a^{\chi(n)}}{(ab)^{\left[\frac{n+2}{2}\right]}}\left\{\begin{array}{l}\left(\frac{\alpha^{n+1}-\beta^{n+1}}{\alpha-\beta}\right)\left(\frac{1-(-1)^n}{2}\right)\\ +\left(\frac{\alpha^{n+2}-\beta^{n+2}}{\alpha-\beta}\right)\left(\frac{1+(-1)^n}{2}\right)\end{array}\right\}x^n$$

ISSN 2394 - 7780

$$\therefore L_n^L = \frac{\gamma^{\chi(n)}\delta^{1-\chi(n)}}{(ab)^{\left[\frac{n}{2}\right]}}\left(\frac{\alpha^n-\beta^n}{\alpha-\beta}\right) + \frac{2a^{\chi(n)}}{(ab)^{\left[\frac{n+2}{2}\right]}}\left\{\begin{array}{l}\left(\frac{\alpha^{n+1}-\beta^{n+1}}{\alpha-\beta}\right)\left(\frac{1-(-1)^n}{2}\right)\\ +\left(\frac{\alpha^{n+2}-\beta^{n+2}}{\alpha-\beta}\right)\left(\frac{1+(-1)^n}{2}\right)\end{array}\right\}$$

Since by 1.2, we have $F_n^L = \frac{b^{1-\chi(n)}}{(ab)^{\left[\frac{n}{2}\right]}}\left(\frac{\alpha^n-\beta^n}{\alpha-\beta}\right)$, we get

$$L_n^L = \frac{\gamma^{\chi(n)}\delta^{1-\chi(n)}F_n^L}{b^{1-\chi(n)}} + \frac{2a^{\chi(n)}}{(ab)^{\left[\frac{n+2}{2}\right]}}\left\{\begin{array}{l}\frac{(ab)^{\left[\frac{n+1}{2}\right]}F_{n+1}^L}{b^{1-\chi(n+1)}}\left(\frac{1-(-1)^n}{2}\right)\\ +\frac{(ab)^{\left[\frac{n+2}{2}\right]}F_{n+2}^L}{b^{1-\chi(n+2)}}\left(\frac{1+(-1)^n}{2}\right)\end{array}\right\}.$$

3. Sums Involving Binomial Coefficients

We use extended Binet's formula for L_n^L and the binomial theorem to derive two identities which gives the value of L_{2n}^L and L_{2n+1}^L.

***Theorem 3.1.1*:** For any non-negative integer *n*, the following holds:

(a) $\sum_{k=0}^n \binom{n}{k} b^{\chi(k)}(ab)^{\left[\frac{k}{2}\right]}L_k^L = L_{2n}^L$

(b) $\sum_{k=0}^n \binom{n}{k} b^{\chi(k+1)}(ab)^{\left[\frac{k+1}{2}\right]}L_{k+1}^L = bL_{2n+1}^L$.

Proof: (a) $\sum_{k=0}^n \binom{n}{k} b^{\chi(k)}(ab)^{\left[\frac{k}{2}\right]}L_k^L$

$= \sum_{k=0}^n \binom{n}{k} b^{\chi(k)}(ab)^{\left[\frac{k}{2}\right]}\frac{1}{b^{\chi(k)}(ab)^{\left[\frac{k}{2}\right]}}\left(\frac{\gamma\alpha^k-\delta\beta^k}{\alpha-\beta}\right)$

$= \frac{1}{\alpha-\beta}\sum_{k=0}^n \binom{n}{k}(\gamma\alpha^k - \delta\beta^k)$

$= \frac{1}{\alpha-\beta}\left(\gamma\sum_{k=0}^n \binom{n}{k}\alpha^k - \delta\sum_{k=0}^n \binom{n}{k}\beta^k\right)$

$= \frac{1}{\alpha-\beta}\{\gamma(\alpha+1)^n - \delta(\beta+1)^n\}$

$= \frac{1}{\alpha-\beta}\left\{\gamma\left(\frac{\alpha^2}{ab}\right)^n - \delta\left(\frac{\beta^2}{ab}\right)^n\right\}$

$= \frac{1}{\alpha-\beta}\left(\frac{\gamma\alpha^{2n}-\delta\beta^{2n}}{(ab)^n}\right)$

$= \frac{(\alpha^{2n}-\beta^{2n})}{(\alpha-\beta)(ab)^{\left[2n/2\right]}b^{\chi(2n)}} = L_{2n}^L$

(b) $\sum_{k=0}^n \binom{n}{k} b^{\chi(k+1)}(ab)^{\left[\frac{k+1}{2}\right]}L_{k+1}^L = bL_{2n+1}^L$

L.H.S $= \sum_{k=0}^n \binom{n}{k} b^{\chi(k+1)}(ab)^{\left[\frac{k+1}{2}\right]}L_{k+1}^L$

$= \sum_{k=0}^n \binom{n}{k} b^{\chi(k+1)}(ab)^{\left[\frac{k+1}{2}\right]}\frac{(\alpha^{k+1}-\beta^{k+1})}{b^{\chi(k+1)}(ab)^{\left[k+1/2\right]}(\alpha-\beta)}$

$= \frac{1}{\alpha-\beta}\left\{\sum_{k=0}^n \binom{n}{k}(\gamma\alpha^{k+1} - \delta\beta^{k+1})\right\}$

$= \frac{1}{\alpha-\beta}\left\{\alpha\gamma\sum_{k=0}^n \binom{n}{k}\alpha^k - \beta\delta\sum_{k=0}^n \binom{n}{k}\beta^k\right\}$

ISSN 2394 - 7780

$= \frac{1}{\alpha-\beta}\{\alpha\gamma(\alpha+1)^n - \beta\delta(\beta+1)^n\}$

$= \frac{1}{\alpha-\beta}\left\{\alpha\gamma\left(\frac{\alpha^2}{ab}\right)^n - \beta\delta\left(\frac{\beta^2}{ab}\right)^n\right\}$

$= \frac{1}{\alpha-\beta}\left\{\frac{\gamma\alpha^{2n+1}-\delta\beta^{2n+1}}{(ab)^n}\right\} = \frac{b^{\chi(2n+1)}}{\alpha-\beta}\left\{\frac{\gamma\alpha^{2n+1}-\delta\beta^{2n+1}}{(ab)^{\left[\frac{2n+1}{2}\right]}b^{\chi(2n+1)}}\right\}$

$= bL_{2n+1}^L$.

We now derive exponential generating function for $\frac{L_n^L}{n!}$ as well as for $\frac{L_{nk}^L}{n!}$ and use it to derive an interesting result for L_{2n}^L.

Lemma 3.2: (a) $\frac{1}{(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma e^{\alpha x}-\delta e^{\beta x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty} L_n^L \frac{x^n}{n!}$

(b) $\frac{1}{b^{\chi(nk)}(ab)^{[nk/2]}}\left(\frac{\gamma e^{\alpha^k x}-\delta e^{\beta^k x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty} L_{nk}^L \frac{x^n}{n!}$.

Proof: We have $e^t = \sum_{t=0}^{\infty}\frac{t^n}{n!}$. This gives $\frac{\gamma e^{\alpha x}}{(ab)^{[n/2]}b^{\chi(n)}(\alpha-\beta)} = \sum_{x=0}^{\infty}\frac{\gamma\alpha^n x^n}{(ab)^{[n/2]}b^{\chi(n)}(\alpha-\beta)n!}$ and

$\frac{\delta e^{\beta x}}{(ab)^{[n/2]}b^{\chi(n)}(\alpha-\beta)} = \sum_{x=0}^{\infty}\frac{\delta\beta^n x^n}{(ab)^{[n/2]}b^{\chi(n)}(\alpha-\beta)n!}$.

Thus

$\frac{1}{(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma e^{\alpha x}-\delta e^{\beta x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty}\frac{1}{(ab)^{[n/2]}b^{\chi(n)}}\left(\frac{\gamma\alpha^n-\delta\beta^n}{\alpha-\beta}\right)\frac{x^n}{n!} = \sum_{n=0}^{\infty} L_n^L\frac{x^n}{n!}$

and $\frac{1}{b^{\chi(nk)}(ab)^{[nk/2]}}\left(\frac{\gamma e^{\alpha^k x}-\delta e^{\beta^k x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty}\frac{1}{b^{\chi(nk)}(ab)^{[nk/2]}}\left(\frac{\gamma\alpha^{nk}-\delta\beta^{nk}}{\alpha-\beta}\right)\frac{x^n}{n!} = \sum_{n=0}^{\infty} L_{nk}^L\frac{x^n}{n!}$, as required.

We use these results to prove the following interesting identity:

Theorem 3.3 : $L_{2n}^L = (ab)^n\sum_{k=0}^{\infty}\binom{n}{k}L_k^L$.

Proof: It is known that if $A(t) = \sum_{n=0}^{\infty}\frac{a_n t^n}{n!}$ and $(t) = \sum_{n=0}^{\infty}\frac{b_n t^n}{n!}$, then

$A(t)B(t) = \sum_{n=0}^{\infty}\left(\sum_{k=0}^{n}\binom{n}{k}a_k b_{n-k}\right)\frac{t^n}{n!}$. (Koshy [9] p.p. 233)

Now, in particular, if we take $A(x) = C\left(\frac{\gamma e^{\alpha x}-\delta e^{\beta x}}{\alpha-\beta}\right)$ and $B(x) = e^x$, where $C = \frac{1}{b^{\chi(nk)}(ab)^{[n/2]}}$, then

$C\left(\frac{\gamma e^{\alpha x}-\delta e^{\beta x}}{\alpha-\beta}\right)e^x = C\left(\frac{\gamma e^{(\alpha+1)x}-\delta e^{(\beta+1)x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty}\left(\sum_{k=0}^{n}\binom{n}{k}L_k^L\right)\frac{x^n}{n!}$.

This gives

$$C\left(\frac{\gamma e^{(\alpha^2/ab)x}-\delta e^{(\beta^2/ab)x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty}\left(\sum_{k=0}^{n}\binom{n}{k}L_k^L\right)\frac{x^n}{n!} . \qquad \textbf{(3.1)}$$

But $C\left(\frac{\gamma e^{(\alpha^2/ab)x}-\delta e^{(\beta^2/ab)x}}{\alpha-\beta}\right) = \sum_{n=0}^{\infty} C\left(\frac{\gamma\left((\alpha^2/ab)\right)^n-\delta\left((\beta^2/ab)\right)^n}{\alpha-\beta}\right)\frac{x^n}{n!}$

$= \sum_{n=0}^{\infty} C\left(\frac{1}{ab}\right)^n\left(\frac{\gamma\alpha^{2n}-\delta\beta^{2n}}{\alpha-\beta}\right)\frac{x^n}{n!}$

ISSN 2394 - 7780

$= \sum_{n=0}^{\infty} \left(\frac{1}{ab}\right)^n L_{2n}^L \frac{x^n}{n!}$. **(3.2)**

Thus by (3.1) and (3.2), we have $\sum_{n=0}^{\infty} \left(\sum_{k=0}^{n} \binom{n}{k} L_k^L\right) \frac{x^n}{n!} = \sum_{n=0}^{\infty} \left(\frac{1}{ab}\right)^n L_{2n}^L \frac{x^n}{n!}$.

This finally gives $L_{2n}^L = (ab)^n \sum_{k=0}^{\infty} \binom{n}{k} L_k^L$.

REFERENCES

[1] Cennet Bolat, Ahmet Ipek, Hasan Kose : On the sequence related to Lucas numbers and its properties, Mathematica Aeterna, Vol. 2, (2013), No. 1, 63 – 75.

[2] Civcic H. and Turkmen R. : Notes on the (s,t)-Lucas and Lucas Matrix sequence, Ars Combinatoria, 89 (2008), 271 – 285.

[3] Diwan Daksha M., Shah Devbhadra V.: Some Interesting properties and Extended Binet Formula for the Generalized Lucas Sequence, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, (2015), 1111 – 1116.

[4] Diwan Daksha M., Shah Devbhadra V.: Extended Binet's formula for the class of generalized Fibonacci sequences, Proceeding of 19th Annual Cum 4th International conference of Gwalior Academy of Mathematical Sciences, (2014), 109 – 113.

[5] Falcon S., Plaza, A : On the Fibonacci K-numbers, Chaos, Solitons & Fractals, 32 (5), (2007), 1615 – 1624.

[6] Falcon S., Plaza, A. : On the 3-dimensional k-Fibonacci spirals, Chaos, Solitons & Fractals, 38 (4), (2008), 993 – 1003.

[7] Falcon S., Plaza, A : The k-Fibonacci hyperbolic functions, Chaos Solitons & Fractals, 38 (4), (2008), 409 – 420.

[8] Falcon S., Plaza, A : The k-Fibonacci sequence and Pascal 2-triangle, Chaos, Solitons & Fractals, (33) (1), (2007), 38 – 49.

[9] Kenan Kaygisiz, Adem Şahin : New generalization of Lucas Numbers, Gen. Maths. Notes, Vol. 10, No. 1, May (2012), 63 – 77.

[10] Kocer E. G., Tuglu N., Stakhov A. : On the m-extension of the Fibonacci and Lucas p-numbers, Chaos, Solitons & Fractals, 40 (4), (2007), 1890 – 1906.

[11] Koshy Thomas : Fibonacci and Lucas Numbers with applications, John Wiley and Sons, Inc., N. York, 2001.

[12] Marcia Edson, Omer Yayenie : A new generalization of Fibonacci sequence and extended Binet's formula, Integers, Volume 9, Issue 6, (2009), 639 – 654.

[13] Shah Mansi S., Shah Devbhadra V. : A New Class of generalized Lucas Sequence, International Journal of Advanced Research in Engineering, Science & Management, (2015), 1–7.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

PHOTOLUMINESCENCE PROPERTIES OF $Sr_2La_2MgMo_2O_{12}:Eu^{3+}$ RED EMITTING PHOSPHOR

B. V. Tupte[1], D. H. Gahane[2] andd S. V. Moharil[3]
[1]Department of Physics, S.G.M. College Kurkheda
[2]Department of Physics, N. H. College, Bramhapuri
[3]Ex-Head Department of Physics RTM Nagpur University, Nagpur

ABSTRACT
Novel $Sr_2La_2MgMo_2O_{12}:Eu^{3+}$ phosphor (x=0.01, 0.03, 0.07 and 0.09 mole %) molybdate red phosphors had been synthesized via using a combustion Method at as temperature 750^0C. The phase formation of the samples was investigated by way of X-ray diffraction measurements. The excitation and emission spectra indicated that this phosphor could be excited successfully by the visible light, and then emitted red light with the peaks positioned at 617nm. Upon 393 nm near – UV excitation, this phosphor show characteristic fluorescence $^5D_0 \rightarrow {}^7F_J$ (J = 0, 1, 2, 3, 4) of the Eu^{3+} ions. The electronic transition located at 617 nm corresponding to $^5D_0 \rightarrow {}^7F_2$ of Eu^{3+} ions, which is superior than the magnetic dipole transition located at 593 nm corresponding to $^5D_0 \rightarrow {}^7F_1$ of Eu^{3+} ions. Different pathways concerned in emission process have been studied. Concentration quenching has been observed for Eu^{3+} concentration 7%. Eu^{3+} doped $Sr_2La_{2-x}MgMo_2O_{12}$ is a promising phosphor for applications in displays and optical devices.

Keywords: Combustion Method, Crystal Structure, Molybdates, Photoluminescence, Phosphor,

1. INTRODUCTION
White LEDs, the next generation of solid state lighting, have got much deliberate attention recently due to their leverage over conventional light sources such as, high efficiency, long life time, energy saving, stability, environmental friendly, no pollutant and have potential applications in many fields such as devices like indicators, back lights, automobile headlights and general illumination, etc. [1-4]. Now-a-days, special attention is focused on discovering a novel red phosphor which is thermally and chemically more stable and also shows better luminous efficiency then the conventional ($Y_2O_2S:Eu^{3+}$) sulphide based red phosphors. To obtain a red emitting phosphor among many rare earth ions, Eu^{3+} is the best choice as an activator ion because it can be effectively excited by near-UV and blue light and then emit stronger red fluorescence ascribed to $^5D_0 - {}^7F_J$ (J = 0,1,2,3) transitions [5,6].

In this study, we have designed $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (0.01, 0.03, 0.07 & 0.09 mole) phosphors by combustion synthesis process. In addition, the influences of the doping Eu^{3+} ions concentration on the microstructures and luminescent properties of the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ red-emitting phosphors have been discussed in detail. The red emission intensity of the combustion synthesis prepared sample has been compared with that of the commercially used $Y_2O_2S:Eu^{3+}$ red phosphors to elucidate the advantage of combustion synthesis. Our results may provide new insights into the research and applications of the $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ phosphor materials.

2. EXPERIMENTAL
The Eu^{3+} activated $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (where x = 0.01, 0.03, 0.07 & 0.09 mole) phosphors were prepared by the combustion synthesis. The starting AR grade materials (99.99% purity) were taken as strontium nitrate ($Sr(NO_3)_2$) , magnesium nitrate ($Mg(NO_3)_2 \cdot 6H_2O$) , ammonium molybdate ($(NH4)_6Mo_7O_{24}.4H_2O$), Lanthanum Oxide (La_2O_3), Eu oxide (Eu_2O_3) & Urea (NH_2CONH_2) was used as fuel.

In the present investigation, materials were prepared according to the chemical formula $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (where x = 0.01, 0.03, 0.07 & 0.09 mole). The mixture of reagents was grind together to obtain a homogeneous powder. La^{3+} and Eu^{3+} ions were introduced as a $La(NO_3)_3$ and $Eu(NO_3)_3$ solution by dissolving La_2O_3 and Eu_2O_3 into a dil. HNO3 solution. The molar ratio of the rare earth was varied in $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (where x = 0.01, 0.03, 0.07 & 0.09 mole) phosphors relative to the Sr/La/Mg/Mo ions. For various compositions of the metal nitrates (oxidizers), the amount of urea (fuel) was calculated maintaining total oxidizing and reducing valences of the components equal to unity, so that the heat liberated during combustion is a maximum [7]. After stirring for about 30 min, the precursor solution was transferred to a furnace which was preheated to 750 ^{0}C. Porous products were obtained. Rare-earth ion doped $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (where x = 0.01, 0.03, 0.07 & 0.09 mole) phosphors were prepared by introducing Eu ion as $Eu(NO_3)_3$ solutions with different concentrations, respectively, and the processes were repeated as explained above.

ISSN 2394 - 7780

3. RESULTS AND DISCUSSION

3.1 XRD and Size Distribution Characterization

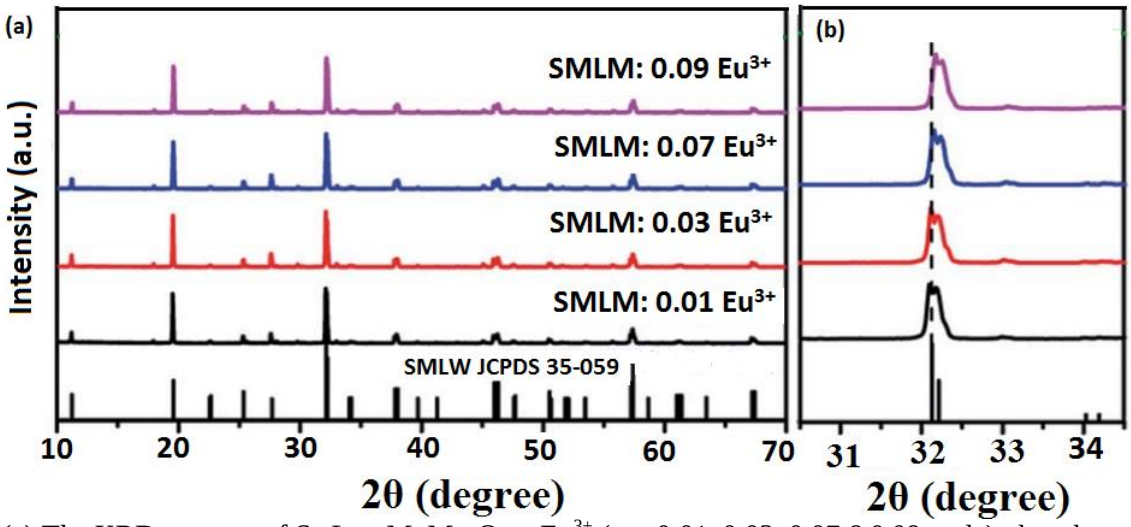


Fig-1: (a) The XRD patterns of $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x = 0.01, 0.03, 0.07 &0.09 mole) phosphors and the standard PDF card SMLW (JCPDS # 35-0259). (b) The local XRD patterns in the 2q range from 30.5 to 34.5 degree.

Fig. 1 (a) shows the XRD patterns of the as-prepared Sr_2La_{2-x} $MgMo_2O_{12}:xEu^{3+}$ (SMLM: xEu^{3+}) (x= 0.01, 0.03, 0.07 &0.09 mole) and the standard PDF card of SMLW (JCPDS # 35-0259). The XRD patterns of the samples matched well with the standard data of SMLW (JCPDS # 35-0259) except that there were two weak impurity peaks due to the $SrWO_4$ (JCPDS # 08-0490). This result indicated that doping Eu^{3+} into SMLM did not make significant changes to the host crystal structure. According to the local XRD patterns in the 2θ range of 30.5–34.5 degree shown in Fig. 1. (b), we can find that the XRD diffraction peaks slightly shifted to the larger angle in comparison with the standard data when the Eu^{3+} doping concentration was increased for the reason that the smaller ions Eu^{3+}(r = 0.53 A) ˚ substituted larger ions Mo^{6+} (r = 0.62 A) in the SMLM host which resulted in the expansion of the lattice on the basis of Bragg equation ($2d\sin\theta = \lambda$, where d, θ, and λ refer to crystal surface spacing, diffraction angle, and X-ray wavelength, respectively). The results further confirmed the above conclusion that Eu^{3+} ions can occupy the sites of Mo^{6+} ions

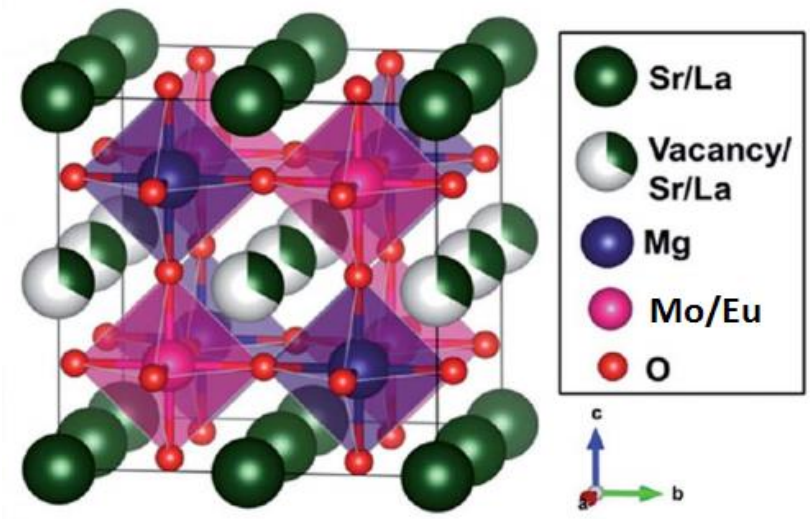


Fig-2: The crystal structure of $Sr_2La_{2-x}MgMo_2O_{12}$:0.07% Eu^{3+} phosphors

According to the refinement results, we can find that the crystal structure of SMLM:0.07 Eu^{3+} belongs to orthorhombic crystal system with the P222 space group, and the cell parameters were calculated to be a = 7.8465 Å, b = 7.8627 Å, c = 7.9014 Å, a=90, b= 90, g = 90, and V = 487.47 $Å^3$. The crystal structure of SMLM: 0.07Eu^{3+} included [MgO_6] and [MoO_6] octahedrons formed by Mg and Mo atoms coordinated with six oxygen atoms around respectively, as can be seen in Fig. 2. As well-known, Eu^{3+} ions can occupy the cation sites of octahedrons.[8] In this work, Eu^{3+} ions were more likely to occupy the site of Mo^{6+} because the radius of Eu^{3+} ion (0.53 A) is much closer to that of Mo^{6+} ion (0.62 A) than Mg $^{2+}$ ion (0.72 A). [9,10]

ISSN 2394 - 7780

3.2 Photoluminescence Properties of $Sr_2La_2MgMo_2O_{12}:Eu^{3+}$

Fig. 3 shows the excitation spectra of the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x=0.07 mole) phosphors monitored with 617 nm emission. One can see that all the $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ phosphors exhibit the similar excitation spectra with the various intensities. There are excitation peak located at 393nm, which are assigned to $^7F_0 \rightarrow {}^5L_6$ transition come from 4f orbital of Eu^{3+} ions, respectively. Moreover, each excitation spectrum also has a strongest charge transition band from 250 to 400 nm centered at around 340 nm, which is attributed to the intense charge transition from 2p orbital of O^{2-} ions to the 4d orbital of Mo^{6+} ions.

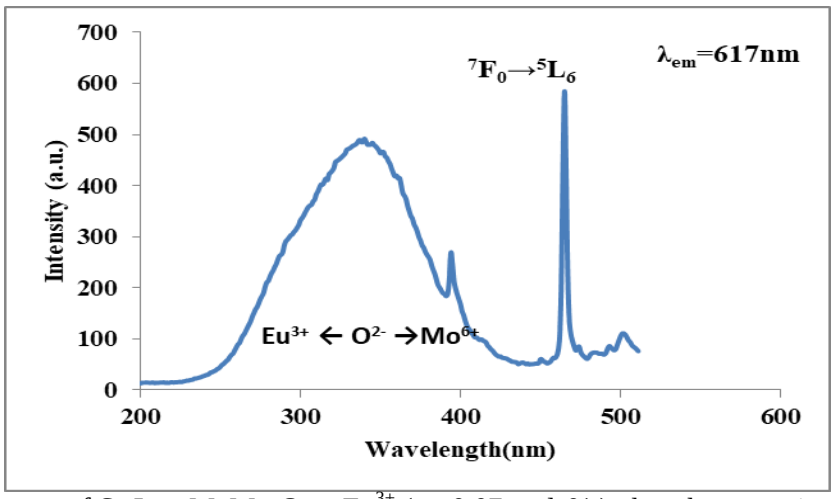


Fig-3: PLE spectra of $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x =0.07 mole%) phosphors monitored at 617 nm.

Clearly, all the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x=0.03) phosphors have strongest charge transition band (CTB) at 340 nm, indicating that the near ultraviolet absorbed energy by the $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ phosphors can efficiently transfer to the luminescent center. And it means that the as-fabricated phosphors can be effectively excited from near ultraviolet (NUV) to blue light, suggesting that they can be used as the promising red-emitting luminescence materials for WLEDs.

Fig. 4 depicts the emission spectra of the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x = 0.01, 0.03 0.07 and 0.09 mol) phosphors under excitation of 395 nm NUV light respectively. As can be seen, the emission spectra obtained at two excitation wavelengths both exhibit the two characteristic emission peaks located at 594 and 617 nm, which are assigned to $^5D_0 \rightarrow {}^7F_1$ transition and $^5D_0 \rightarrow {}^7F_2$ transition of Eu^{3+} ion, respectively. As well known, the $^5D_0 \rightarrow {}^7F_1$ transition located at around 594 nm is magnetic dipole transition and the $^5D_0 \rightarrow {}^7F_2$ transition around at 617 nm is electrical dipole transition of Eu^{3+} ions.

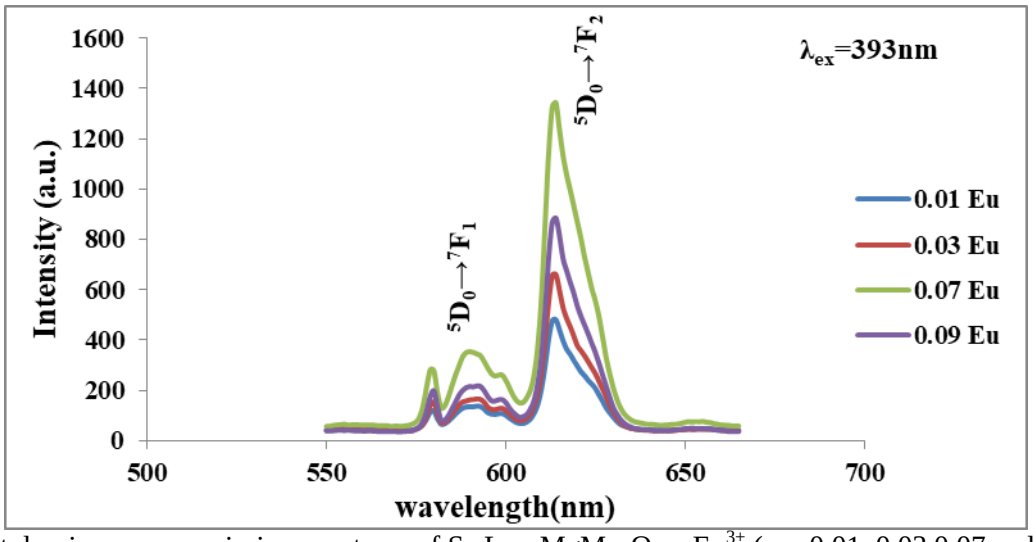


Fig-4: Photoluminescence emission spectrum of $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x = 0.01, 0.03 0.07 and 0.09 mol) phosphors under 393 nm excitation.

The magnetic dipole transition ($^5D_0 \rightarrow {}^7F_1$) is insensitive to the site symmetry, whereas the electric dipole transition ($^5D_0 \rightarrow {}^7F_2$) is a hypersensitive transition. Generally, the intensities of $^5D_0 \rightarrow {}^7F_1$ and $^5D_0 \rightarrow {}^7F_2$ transition depend on the local symmetry of the crystal field of Eu^{3+} ion. When the doped-Eu^{3+} ions are situated in the crystal lattice without inversion symmetry, the $^5D_0 \rightarrow {}^7F_2$ hypersensitive electric dipole transition will dominate.

ISSN 2394 - 7780

Oppositely, if the doped-Eu^{3+} ions are situated at a site with inversion symmetry, the $^5D_0 \rightarrow {}^7F_1$ magnetic dipole transition will be dominant. Clearly, the $^5D_0 \rightarrow {}^7F_2$ emission peaks are much stronger than the $^5D_0 \rightarrow {}^7F_1$ emission peaks in all the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$(x = 0.01, 0.03, 0.07 & 0.09 mole) phosphors, suggesting that the Eu^{3+} ion locates in the sites without inversion symmetry in the host crystal lattice [11–12].

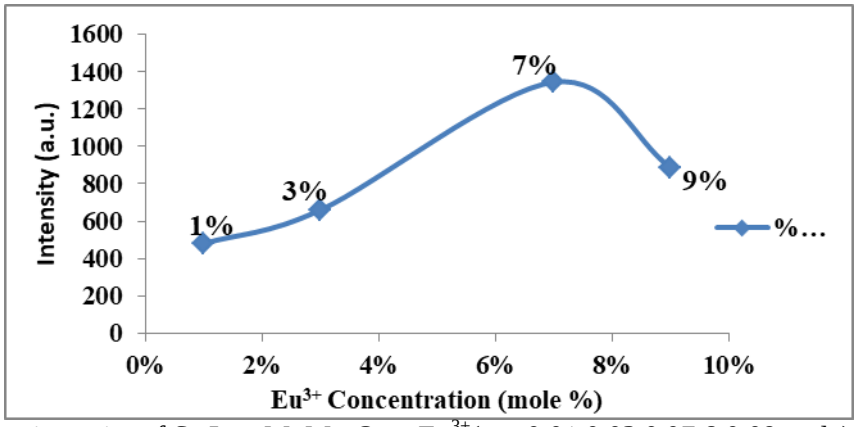


Fig-5: Luminescence intensity of $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$(x = 0.01,0.03,0.07 &0.09 mole) as function of Eu^{3+} concentration.

Furthermore, the emission intensities of Eu^{3+} for the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ phosphors are dependent on the doping Eu^{3+} ion concentration, and the dependence of excitation intensity (395 nm) and emission intensity (617 nm) on x are given in fig. 5. It is observed that from fig.6.5**,** the intensities of the $^7F_0 \rightarrow {}^5D_2$ excitation peak (395 nm) of the obtained $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ phosphors initially increase and then sharply decrease with the increasing x, giving the maximum at x=0.07 mole. These results indicate that there is a non-radiative energy migration between Eu^{3+} ion with different sites, which would result in concentration quenching effect. Concentration quenching may occur because the excitation energy migrates about a large number of centers before being emitted [13].

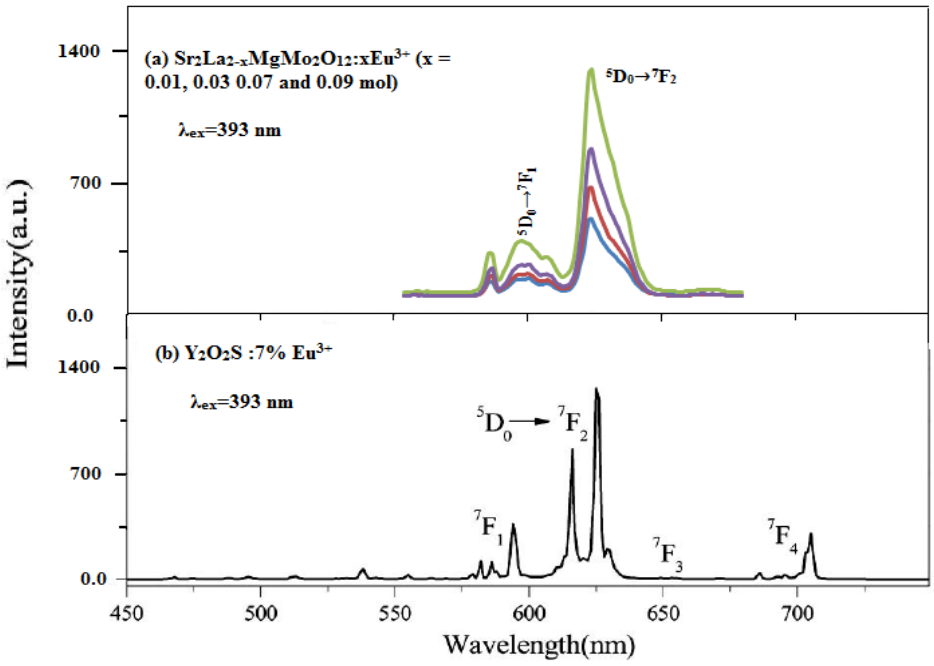


Fig-6: (Color online) Emission spectra of (a) $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x = 0.01, 0.03, 0.07 &0.09 mole) and (b) Y_2O_2S:5%Eu^{3+} under 393nm excitation.

The emission spectra of the optimized $Sr_2La_{2-x}MgMo_2O_{12}:xEu^{3+}$ (x = 0.01, 0.03, 0.07 &0.09 mole) sample and commercial $Y_2O_2S:Eu^{3+}$ under 393nm light excitation are shown in Fig.6. Both spectra show the characteristic emission of Eu^{3+} ions. However, the spectral distributions of the emission spectra are quite different as a result of different site symmetry for the Eu^{3+} ions in the host lattice [14, 15]. The main emission peaks of $Y_2O_2S:Eu^{3+}$ are located in the red region, and the strongest line is at 627 nm. Comparing the two emission spectra, integrated emission intensity of $Sr_2La_2MgMo_2O_{12}:Eu^{3+}$ under 393nm light excitation is about 2.3 times higher than that of $Y_2O_2S:Eu^{3+}$.

ISSN 2394 - 7780

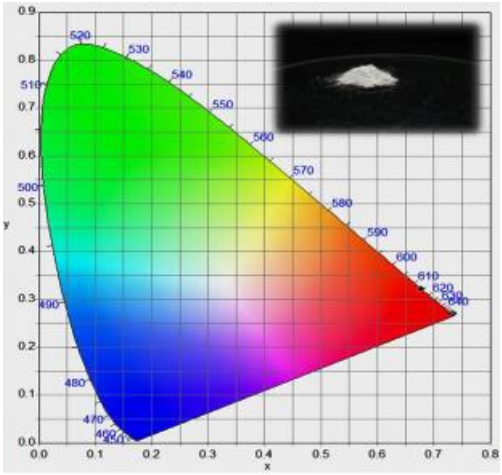


Fig-7: CIE chromaticity diagram for $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} phosphor (λ_{ex}=393 nm).

Fig.7. shows the CIE chromaticity diagram for the emission spectra of $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} phosphor. The CIE chromaticity coordinates (x, y) of the $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} phosphor upon 393 nm excitation wavelength lie at x = 0.678 and y = 0.322 which are very close to the standard chromaticity coordinate values of NTSC (x = 0.670, y = 0.330).Hence, the CIE diagram illustrates that the obtained phosphor particles show red emissions when excited by a single wavelength (λ_{ex}=393 nm) and thus the obtained results confirm that the combustion method prepared $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} phosphor is a promising red emitting components for near-UV InGaN-based white LED.

4. CONCLUSION

Well crystalline Eu^{3+} activated $Sr_2La_2MgMo_2O_{12}$ phosphor powders of scheelite-type have been successfully prepared by combustion synthesis route at room temperature. Upon 393 nm near – UV excitation, the $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} phosphor showed strong red emission lines at 617 nm corresponding to forced electric dipole transitions. The optimum doping concentration of Eu^{3+} content in $Sr_2La_2MgMo_2O_{12}$ for the enhanced red emission is found to be 7 mol%. The intensity of emission spectra of $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} excited at 393 nm is remarkably stronger than that of the same phosphor excited at 462 nm and this suggests that $Sr_2La_{2-x}MgMo_2O_{12}$:0.07Eu^{3+} particles are suitable red emitting phosphor in near –UV based White LEDs than blue GaN based White LEDs. The emission intensity of the optimized $Sr_2La_2MgMo_2O_{12}$:Eu^{3+} under 393 nm light excitation is 2.3 times higher than hat of the commercial phosphor for use in a white LED, and it also has a better color purity. $Sr_2La_2MgMo_2O_{12}$:Eu^{3+} could be a promising candidate with red emission for NUV excited white LEDs.

REFERENCE

1. Chiu C. H, Liu C. H, Huang S. B, and Chen T. M, “Synthesis and luminescence properties of intensely red-emitting M5Eu(WO4)4−x (MoO4)x (M = Li, Na, K) phosphors”, J. Electrochem. Soc, Vol. 155, pp. J71–J78, 2008.
2. He H, Fu R. L, Qian F. J, and Song X. F, “Luminescent properties of Li2CaSiO4 :Eu2+ phosphor”, J. Mater. Sci: Mater.Electron, Vol. 23, pp. 599-604, 2012.
3. Cao F. B, Tian Y. W, Li L. S, Chen Y. J, and Xiao L. J, “Preparation of Eu3+ -Y3+ co-doping red-emitting phosphors for white-light emitting diodes (W-LEDs) application and investigation of their optical characteristics”, J. Mater. Sci: Mater. Electron, Vol. 22, pp. 510- 514, 2011.
4. Du G, Guo W, Khalaf Al-zyadi J. M, Han Y, Liu P, and Liu Z, “Effect of Ce3+ dopant ions on the shape and luminescence of YPO4:Eu3+ and YPO4:Tb3+ nanocrystals”,J. Nanopart Res, Vol. 15,pp.1619-1-5,2013.
5. Rosa I. L. V, Marques A. P. A, Tanaka M. T. S, Melo D. M. A, Leite E. R, Longo E, Varela J. A, “Synthesis, Characterization and Photophysical Properties of Eu3+ Doped in BaMoO4”, J Fluoresce, Vol.18, pp. 239-245, 2008.
6. Thirumalai J, Krishnan R, Shameem Banu I. B, Chandramohan R, “Controlled synthesis, formation mechanism and lumincence properties of novel 3-dimensional Gd2(MoO4)3:Eu3+ nanostructures”,J. Mater. Sci. Mater.Electron., Vol. 24, pp. 253-259, 2013.
7. I.M. Nagpure, K.N. Shinde, S.J. Dhoble, A. Kumar, J. Alloy. Compd. 481, 632 (2009)

ISSN 2394 - 7780

8. R. Cao, X. Ceng, J. Huang, H. Ao, G. Zheng, X. Yu and X. Zhang, Opt. Mater., 2016, 62, 706–710.
9. R. Cao, Z. Shi, G. Quan, Z. Luo, P. Tang, H. Ao and X. Yu, Opt.Mater., 2016, 57, 212–216. [11] R. Cao, X. Ceng, J. Huang, X. Xia, S. Guo and J. Fu, Ceram. Int., 2016, 42, 16817–16821
10. Q.H. Zenga, P. He, M. Pang, H.B. Liang, M.L. Gong, Q. Su, Sr9R2−xEuxW4O24 (R = Gd and Y) red phosphor for near-UV and blue InGaN-based white LEDs. Solid State Commun. 149, 880–883 (2009)
11. P. Du, J.S. Yu, Synthesis and luminescent properties of red-emitting Eu3+-activated Ca0.5Sr0.5MoO4 phosphors. J. Mater. Sci. 51, 5427–5435 (2016)
12. Y.C. Chang, C.H. Liang, S.A. Yan, Y.S. Chang, Synthesis and photoluminescence characteristics of high color purity and brightness Li3Ba2Gd3(MoO4)8: Eu3+ red phosphors. J. Phys. Chem. C 114, 3645–3652 (2010)
13. L.L. Li, L. Liu, W.W. Zi, H. Yu, S.C. Gan, G.J. Ji, H.F. Zou, X.C. Xu, Synthesis and luminescent properties of high brightness MLa(WO4)2: Eu3+ (M=Li, Na, K) and NaRE(WO4)2: Eu3+ (RE=Gd, Y, Lu) red phosphors. J. Lumin. 143, 14–20 (2013)
14. J. A. Alonso, F. Rivillas, M. J. Martinez-Lope, and V. Pomjakushin, J. Solid State Chem. 177, 2470 (2004).
15. K. Rajamohan Reddy, K. Annapurna, and S. Buddhudu, Mater. Res. Bull. 31, 1355 (1996).

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019

ISSN 2394 - 7780

PHYSICO-CHEMICAL EVALUATION OF INDUSTRIAL CREEKS' EFFLUENT TO BE FOUND AROUND SURAT CITY, GUJARAT

Alpa Varsani[1] and Kapila Manoj[2]
Faculty[1] and HOD[2], Department of Aquatic Biology, Veer Narmad South Gujarat University, Surat

ABSTRACT
There are many major and minor industries located in or around Surat city which are the biggest consumers of water supply and they produce large amount of effluent in treated or untreated form which drained directly into different creeks nearer to those industries. Besides these public sewer and storm water is also drained through creeks which ultimately reach to the Mindhola river. The contaminants which are found may pose a high risk to the water body on a large scale and hence needed to be monitored at regular intervals. The day by day increasing tremendous industrial pollution has prompted us to carry the systematic and detail study of physico-chemical properties of industrial creeks' effluent. For the assessment water samples were collected monthly from three sampling sites for the period of six months during April-2013 to Sep-2013. The physico-chemical parameters selected for the study were pH, Temperature, Silicate, Phosphate, Nitrate and Nitrite. Intensive assessment of water clearly indicates that the collected water from selected creeks is strongly affected by the industrial effluent and sewage waste water. So, it is point out that there is a need of regular monitoring of water resources and further improvements in the industrial waste water treatment methods.

Keywords: creeks, effluent, industries, pollution, sewage.

INTRODUCTION
Nowadays water has become very essential for the development of industries and agriculture in short for the overall development of the country. The same water resources are also utilized for the disposal of industrial effluent and sewage, leading to water pollution. The pollution of rivers and streams by industrial waste and domestic sewage has increased tremendously and producing the most polluted condition in water body (Kumar, 2002). Worldwide water bodies become the primary dump sites for the disposal of waste, especially from industries that are nearer to them. These effluents from industries have a great toxic influence on the water body as they can alter the physical, chemical, and biological nature of the receiving water body (Ewa *et al*., 2011). Industrial activities, agricultural chemicals and improper disposal of waste give origin to many pollutants which moves into surface water as well as groundwater which change its physical, chemical and biological property.

Surat is one of the most important growing city of the Gujarat on the industrial map of the country with many large industries developed over here. The economic base of Surat consists of textile manufacturing, trade, diamond cutting and polishing industries, intricate jari works, chemical industries and the petrochemical and natural gas based industries. All these major and minor industries are located in or around Surat city. They are biggest consumers of water supply and produce large amount of effluent in treated or untreated form which drained into different creeks nearer to those industries. Beside these public sewer and storm water is also drain through creeks which reach to the Mindhola river.

Mindhola river originates from Jan Khadi of Doswada (Songadh) near Palsana in Surat city and meets Arabian Sea near Danti after merging with Unn-Sonari creek near Magdalla. Mindhola is a state river flowing within state boundary of Gujarat and considerable part of its catchment area lies in Surat city. The Mindhola river system within Surat city comprises of 7 natural tributaries (creeks) namely Koyali, Mithi, Kankara, Khajod, Bhedwad, Sonari and Varachha. Due to urban migration, slums have developed near some of these tributaries which resulted in the encroachment in the water body, thus reducing the water way of stream. More over villages, colonies, slums also discharge their wastewater and refuge directly in these creeks. The major devastation of its ecological health happens as it reaches the southern part of Surat city which drains its storm drainage through Mithi, Kankara, Khajod, Koyali, Bhedwad, Sonari and Varachcha creek which ultimately drains into Mindhola river (Jariwala and Samtani, 2012).

These may cause contaminants which may pose a high risk to the water body on a large scale and hence needed to be monitored at regular intervals. The day by day increasing tremendous industrial pollution has prompted us to carry the systematic and detail study of physico-chemical properties of industrial creeks' effluent. The present study was focused to gather data about the state of water quality in creeks of Surat city and make recommendations based on finding for measures to prevent pollution by industries.

ISSN 2394 - 7780

MATERIALS AND METHODS

Area of Study

Geographical location of Surat district is 21.0 ^{0} to 21.23^{0} N latitude and 72.38^{0} to 74.23^{0} E longitude. Surat is a city which drains its storm drainage through Mithi, Kankara, Khajod, Koyali, Bhedwad, Sonari and Varachcha creek into Mindhola river. The Creek receives domestic raw sewage as well as industrial effluent from surrounding habitation and nearby industrial belt. There are many creeks flow through Surat city from which three sites were selected viz. Site-1 Bhedwad Khadi (Bamroli), Site-2 Mithi Khadi (Udhana) and Site-3 Saniya Hamed (Saroli).

Physico-chemical Analysis

Water samples were collected monthly from three sampling sites for the period of six months during April-2013 to Sep-2013 as described in APHA and transported to the laboratory for analysis. Temperature was measured at site and collected samples were brought to the laboratory for further analysis. The physico-chemical parameters selected for study were pH, Temperature, Silicate, Phosphate, Nitrate and Nitrite. For the physico-chemical analysis standard methods were followed as described in APHA and IS-3025.

RESULTS AND DISCUSSION

The physicochemical properties of water samples collected from different sampling stations illustrated in Table-1. Maximum water temperature was found 33 ˚C at Site-1 during May and June-2013 and minimum water temperature 28˚C at Site-2 during July and September-2013 throughout the study period (Figure 1). This variation depends on seasonal fluctuation in temperature as well as other factors like industrial effluent discharge and sewage discharge which ultimately determines which species will live and thrive in a water body.

pH was found maximum 7.85 at Site-3 during April-13 and minimum pH was found 6.72 at Site-1 during June-13 and Aug-13 (Figure 2). Variation in pH increase solubility of minerals, nutrients and heavy metals (Alpa and Kapila, 2015; Alpa and Kapila, 2016).

Table-1: Physico-chemical properties of water samples collected from different sampling stations

Month	Site	Temperature (°C)	pH	Nitrite (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)	Silicate (mg/l)
April-13	1	30	7.50	ND	1.30	5.56	54.83
	2	30	7.71	0.04	0.73	4.37	36.55
	3	31	7.85	0.04	0.14	4.62	33.42
May-13	1	33	6.92	0.02	0.92	3.26	50.70
	2	32	7.10	0.01	0.83	2.15	30.13
	3	32	7.15	0.01	0.75	2.30	29.15
June-13	1	33	6.72	0.93	1.38	2.78	58.29
	2	32	7.28	0.05	1.03	1.38	43.82
	3	31	7.36	0.07	1.20	1.52	49.63
July-13	1	30	6.91	0.03	0.72	1.63	62.12
	2	28	7.48	0.02	0.56	0.92	53.26
	3	29	7.52	0.01	0.43	0.90	52.10
Aug-13	1	31	6.72	0.07	1.78	1.20	79.13
	2	30	7.34	0.06	0.98	0.83	68.92
	3	29	7.41	0.07	0.86	0.80	65.28
Sep-13	1	29	6.92	0.15	4.62	2.40	59.20
	2	28	7.40	0.10	1.70	1.96	42.13
	3	30	7.31	0.13	1.43	1.75	40.65

ND- Not Detected

ISSN 2394 - 7780

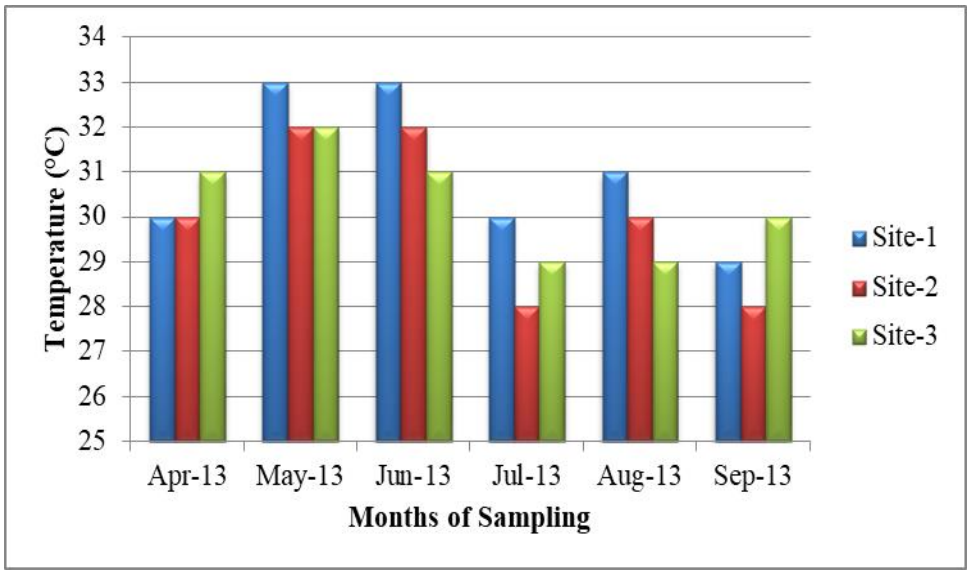


Figure-1: Monthly variation in Temperature at different Sites

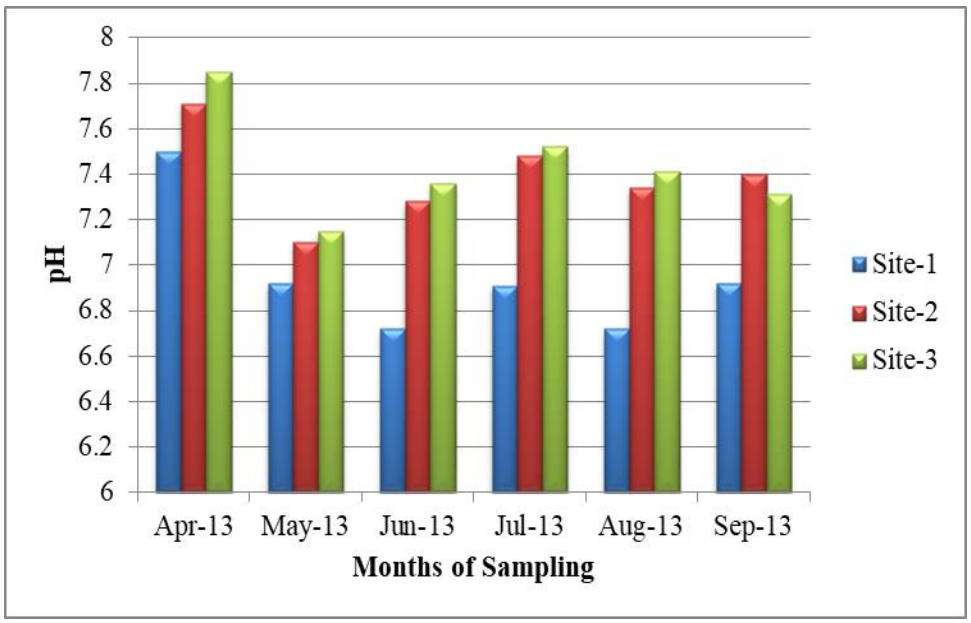


Figure-2: Monthly variation in pH at different Sites

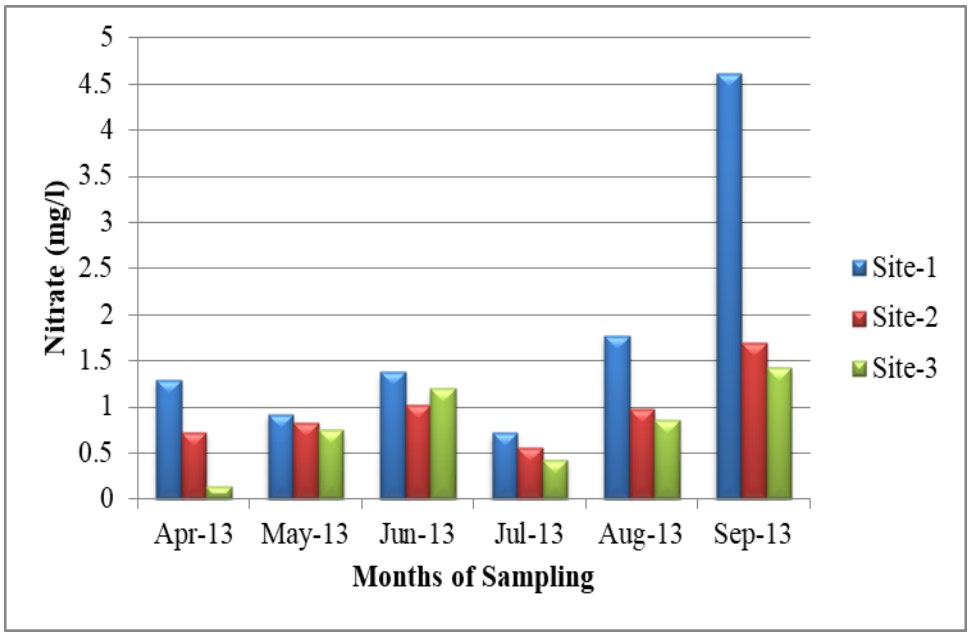


Figure-3: Monthly variation in Nitrate at different Sites

ISSN 2394 - 7780

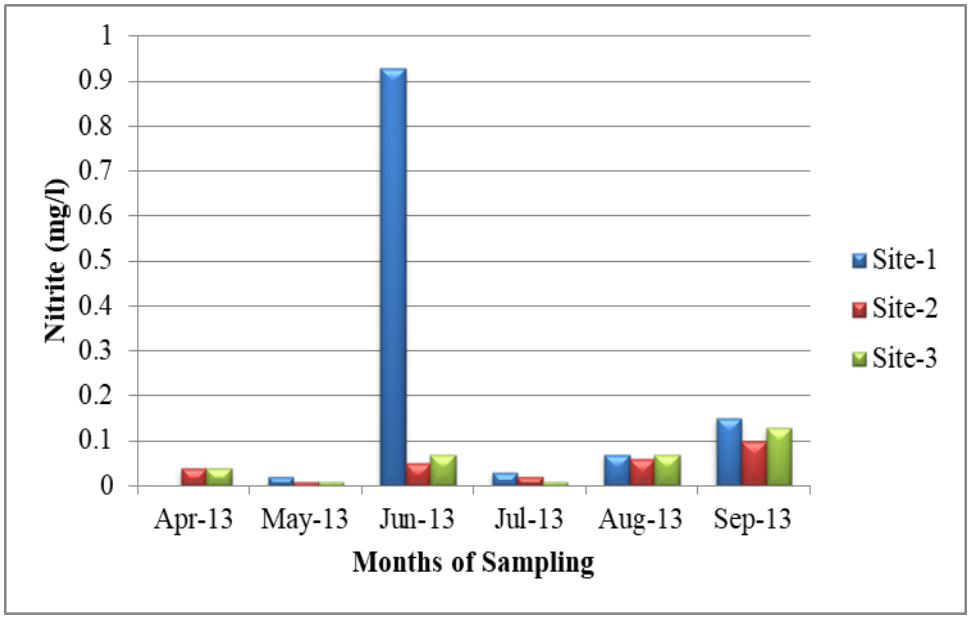


Figure-4: Monthly variation in Nitrite at different Sites

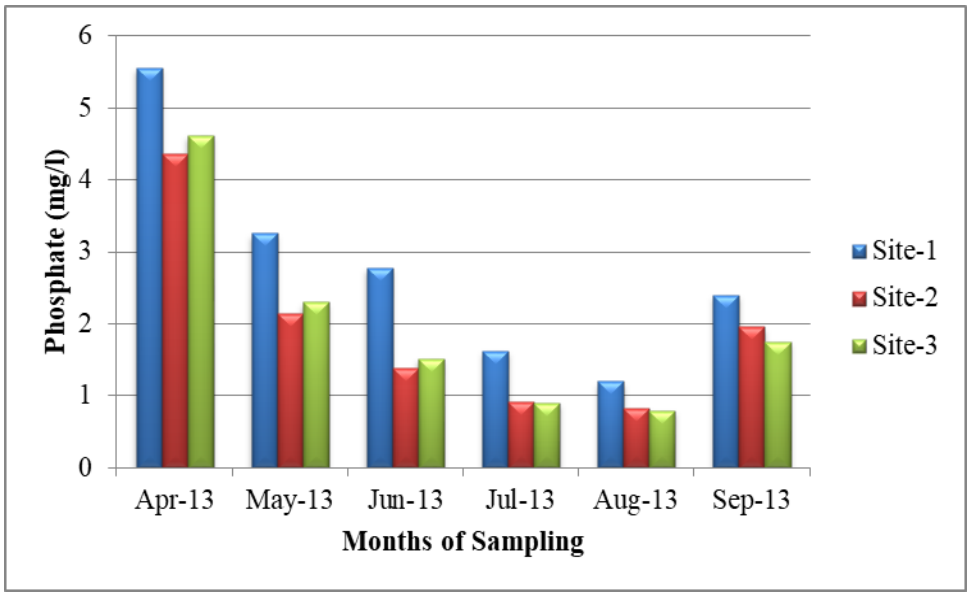


Figure-5: Monthly variation in Phosphate at different Sites

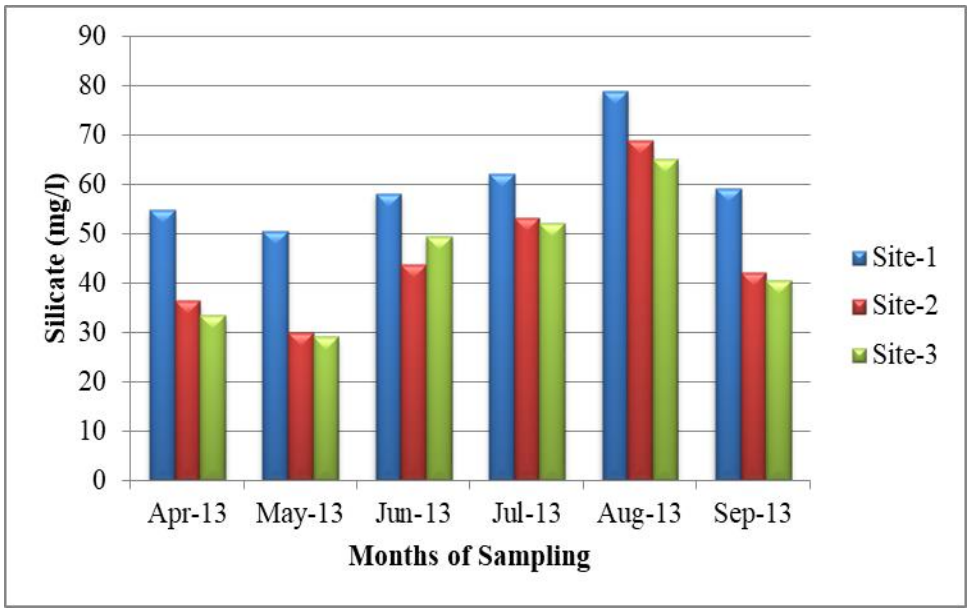


Figure-6: Monthly variation in Silicate at different Sites

ISSN 2394 - 7780

Nitrate is considered important to assess organic load in water. Even at low concentrations (<1mg/l) nitrate accelerate the growth of algae and cause eutrophication (Mook et al., 2012; Ragheb, 2013). Maximum concentration of nitrate was found 4.62 mg/l at Site-1 during Sep-13 and minimum 0.14 mg/l at Site-3 during April-13 (Figure 3) where as Nitrite was found maximum 0.93 mg/l at site-1 during June-13 and minimum ND at site-1 during April-13 (Figure 4). Nitrate present in water may be the end product of oxidation of nitrogenous matter carried out by microorganisms during the nitrification and denitrification activities and its concentration may depend on the rate of these activities. Ravindra and Arvind (2015) was also suggested this.

Phosphate was found maximum 5.56 mg/l at Site-1 during April-13 and minimum 0.80 mg/l at Site-3 during Aug-13 (Figure-5). The key sources of Phosphate is various industries at different levels as well as domestic usage which are indirectly releasing it into creeks this may be reason for high concentration of phosphate found. This was also supported by **(**Singh and Choudhary, 2013; El-Amier *et al*., 2015). High concentrations of nutrients can cause acidification, eutrophication and spoiled the water quality to survive aquatic organisms (Taha *et al*., 2004; Camargo and Alonso, 2006).

Maximum concentration of silicate was found 79.13 mg/l at Site-1 during Aug-13 and minimum was found 29.15 mg/l at Site-3 during May-13 throughout the study (Figure 6). Silicon oils are applied for textile impregnation. Alkali silicones are added to cleansing agents, glue and bleaching agents for textiles. Zeolites are silicones that are applied as foam regulators in detergents. These directly influence water quality. Other silicon compounds may be applied as absorbents (https://www.lenntech.com/periodic/water/silicon/silicon-and-water.htm#ixzz5i8yoInoy). Higher concentration of silicate was found during the study may be because of these reasons. Industrial effluent is the main source for high level of silicate in water was observed by (Alpa and Kapila, 2016; Maguire and Fulweiler, 2017).

CONCLUSION

Intensive assessment of water clearly indicates that the collected water from selected creeks is strongly affected by the industrial effluent and sewage waste water as higher concentration of silicate, phosphate and nitrate was found. The study concludes that the water quality of the creek is severely depreciated and will affect the aquatic organism where the water of these creeks is dump near Danti in Arabian sea. So, it is pointed out that there is a need of regular monitoring of water resources and further improvements in the industrial waste water treatment methods.

REFERENCES

1. Alpa, V., & Kapila, M. (2015). Study on Pollution Status of Sediment with Reference to its Physico-Chemical Properties along Industrial Creeks of Surat City, Gujarat. *International Journal of Science and Research, 4*(7), 2078-2080.
2. Alpa, V., & Kapila, M. (2016). Water Quality Evaluation of Industrial Creeks Found Around Surat City with Respect to Physico-Chemical Properties, Gujarat. *International Journal of Research and Scientific Innovation, 3*(2), 1-4.
3. APHA. (2005). *Standard Method for the Examination of Water and Wastewater* (21st ed.). New York.
4. Buero of Indian Standard. IS 3025.
5. Camargo, J. A., & Alonso, A. (2006). Ecological and Toxicological effects of Inorganic Nitrogen pollution in Aquatic Ecosystems: A Global Assessment. *Environment International, 32*, 831-849.
6. El-Amier, Y. A., Mahmoud, A. E. K. Z. & Sadam, H. A. M. (2015) Assessment the Physico-Chemical Characteristics of Water and Sediment in Rosetta Branch, Egypt. *Journal of Water Resource and Protection, 7*, 1075-1086.
7. Ewa, E. E., Iwara, A. I., Adeyemi, J. A., Eja, E. I., Ajake, A. O., & Otu, C.A. (2011). Impact of Industrial Activities on Water Quality of Omoku Creek, Sacha. *Journal of Environmental Studies, 1*(2), 8-16.
8. Jariwala, R. C., & Samtani , B.K. (2012). The Estimation of Flood and Its Control by Section Modification in Mithi and Kankara Tributaries at Surat. *International Journal of Engineering Research and Applications, 2*(4), 862-867.
9. Kumar, A. (2002). *Ecology of polluted water* (Vol. 2). A.P.H. Publishing Corporation, New Delhi.
10. Lenntech (2019). *Silicon and water: reaction mechanisms, environmental impact and health effects*. Retrieved 18th March, 2019, from https://www.lenntech.com/periodic/water/silicon/silicon-and-water.htm#ixzz5iW9K42hD

ISSN 2394 - 7780

11. Maguire, T. J., & Fulweiler, R. W. (2017). Fate and Effect of Dissolved Silicon within Wastewater Treatment Effluent. *Environmental Science & Technology, 51*(13), 7403-7411.
12. Mook, W. T., Chakrabarti, M. H., Aroua, M. K., Khan, G. M. A., Ali, B.S., Islam M. S., & Hassan, M. A. (2012). Removal of Total Ammonia Nitrogen (TAN), Nitrate And Total Organic Carbon (TOC) from Aquaculture Wastewater Using Electrochemical Technology: A Review. *Desalination, 285*(2012), 1-13.
13. Ragheb, S. M. (2013). Phosphate Removal from Aqueous Solution Using Slag and Fly Ash. *HBRC Journal, 9*(3), 270-275.
14. Ravindra, & Arvind, J. (2015). Physico-Chemical Studies on Kamla River Water. *International Journal of Advanced Research in Computer Science and Software Engineering, 5*(5), 1411-1415.
15. Singh, L. & Choudhary, S. K. (2013). Physico-Chemical Characteristics of River Water of Ganga in middle Ganga Plains. *International Journal of Innovative Research in Science, Engineering and Technology, 2*(9), 4349-4357.
16. Taha, A. A., El-Mahmoudi, A. S., & El-Haddad, I. M. (2004). Pollution Sources and Related Environmental Impacts in the New Communities' Southeast Nile Delta, Egypt. *Emirates Journal for Engineering Research, 9*, 35-49.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019

ISSN 2394 - 7780

POLL PREDICTION BASING ON SENTIMENT USING NAÏVE BAYES AND DICTIONARY BASED CLASSIFIERS

Tarun Matta[1], Kishore Sabbavarapu[2], Ch. Swapna Priya[3] and Dr. Narasimham Challa[4]
Student[1,2], Assistant Professor[3] and Professor[4], Department of CSE, Vignan's Institute of Information Technology, Visakhapatnam

ABSTRACT
Opinion is a view or judgment formed about something or someone. General Elections are the ultimate measure of public's opinion in any democratic nation. Being curious about people's judgment in an Election, many conduct different forms of surveys to forecast the opinion of public. The surveys used to be in person-to-person mostly conducted by the print and electronic media organizations. Previously the surveys are constrained to limited and available people around offices and local areas. None of the surveys are considered to be reliable as the source of information may or may not be legitimate. The rapid advancement of technology and transformation into digital nations enabled most of the people to have an access to the social networking sites almost anywhere and everywhere. People now tend to express their views on micro-blogging sites likes twitter, facebook etc. In this paper we collect such data representing the views of public to depict the inclination of people towards a particular political party. We use machine learning classifiers viz. Naïve Bayes approach and Dictionary based approach to extract and analyze the sentiment from collected data. We hence deduce through our findings that the above mentioned algorithms in combination work with more accuracy.

Keywords: Dictionary based approach, Machine learning classifiers, Naïve Bayes approach, Opinion of public, Sentiment.

1. INTRODUCTION
Sentiment analysis is the process of determining the emotions of people and categorizing opinions that are expressed in social media or micro-blogging sites on a certain topic. It has become an effective tool to gather the opinion of public. Stock market, Business Intelligence, Law/Decision making, Political science and many such applications in which there is a huge scope for sentiment analysis.

Election poling is one of the influential applications of survey research. Polling is the process of discernment of an individual or a political body. Polls help us to understand what is really important in election, opinion of people. Earlier, Election polls were conducted through some banal survey methods such as using telecommunication like television or news paper and by finding out the opinion of a person on a political party in person-to-person. But now the scenario has changed with an advent in technology and usage of internet as a source of voicing their opinion. Hence surveying methods became smart by collecting the user data directly available on the micro-blogging sites and performing the required operations on the data to conclude the public's inclination.

In this paper, we selected three main political parties in regard of 2019 General Elections. Then we manually collected the official pages of these political parties form twitter, facebook and youtube. Regular expressions are used to clean the collected data. After a lot of research we came to a conclusion that Naïve Bayes algorithm and Dictionary Based classification algorithms work efficiently to classify textual data.

The rest of the paper will be organized as follows. Section-II deals with a few notable works on sentiment analysis. In Section-III our design is introduced along with the proposed method. Section-IV deals with the experimental process. Results are provided in Section-V. Finally we draw conclusions in section-VI.

2. RELATED WORK
There is a lot of research done in the field of research using Sentiment Analysis. Many researchers used Sentiment Analysis to extract the opinion of public in the form of reviews on various services, products etc. from micro-blogging sites like Twitter and Facebook.

In this paper [1], the author designed a system that helps the non-Japanese learners to learn Japanese in a very easy and efficient way. In the previous approaches the system was able to deliver the translation of a sentence into English along with an example sentence. In some cases the system was unable to provide an example sentence. The drawback with this system was that the given examples are context free although a word may have several meanings. To overcome this and provide a more reliable system for non-Japanese, the authors designed a Word Sense Disambiguation classifier that could translate the sentence into English along with bilingual usage i.e. it gives examples both in Japanese and English. If the sentence has more than one meaning

ISSN 2394 - 7780

then it checks the context of the sentence from the dictionary and outputs the example sentence which has more similarity with the given input sentence.

The author of paper [2] was successful in improving the efficiency of Naive Byes classifier. The dataset they considered for training and testing the classifier is a movie dataset collected from Internet Movie Database. To improve its accuracy they included the concept of Negation Handling which handles the negative sense of words efficiently. The paper also dealt with Feature Selection which removes the noise. The authors also assigned a small probabilistic value to a word that did not occur in the training datasets. Their work also includes bigrams and trigrams to correctly classify complex adjectives and adverbs. All of this resulted in improving the classifier's accuracy to eighty eight percent.

In the paper [3] it was proposed that instead of using the machine learning classifiers individually to classify the tweets, it would be better if they are used together which is said to be a hybrid classifier. The authors used k-nearest neighbors and support vector machine algorithms and used them together. This work involves three phases where pr-processing, feature extraction and tweet polarity classification are performed respectively. The results showed that their model performed better than the individually used algorithms. The performance is calculated on the basis of factors, f-measure and recall.

Author, Ajay Deshwal in his paper [4] , the author mainly focused on getting highly accurate classifier results by using the machine learning algorithms. There was no system that could analyze which algorithm is the best for classification. So in this paper, the author used six machine learning classifiers to analyze the dataset collected from Sanders from Twitter. The author also included various features like emoticons, punctuations, exclamatory marks and unigrams which resulted in getting better results. The work resulted that Naive Bayes and SMO algorithms outperformed the other classifiers. One of the major applications of Sentiment Analysis is Politics.

In the paper [5] the author collected the tweets from Twitter on five National political parties to predict the 2016 general elections. The tweets were collected only in Hindi language. He used three approaches to classify the tweets which are dictionary based approach, Naive Bayes and Support Vector Machine. They considered the results of SVM as it has the highest accuracy of seventy eight percent compared to Naive Byes and dictionary based classifier. They predicted that BJP would win the election which was proved to be true.

Another research was done by the authors in the paper[6] where they proposed a sentiment analysis method which combines Lexicon-based and learn-based techniques to analyze the cross-domain sentiment of Chinese product reviews . They first built three domain specific corpora from which are hotels, books and electronics . Later they used four categories of features to build six classifiers. They conducted experiments to evaluate the proposed method. The experimental result showed that the domain Lexicons outperformed other classifiers in the field of Books and Hotels but was not so efficient in Electronics.

In the paper [7] the author collected the data of a television show from Twitter. In general the tweets are classifier based on how the classifier is trained. But a training dataset is applicable only to its corresponding domain and not to other domains. But, training the classifier every time for different purposes becomes difficult. So, the author proposed a system that can develop a generalized training dataset that can be used for classification irrespective of the domain. Sentiment Analysis is widely applied on reviews of public on the products which helps them to understand their customers better.

In this paper [8] the authors collected the data from Twitter, Blog spots and Facebook. The domains of his work include electronic products like mobile phones, tablet and laptops. Twitter Sentiment Analysis becomes difficult when compared to the other analyses because it contains slang words and spellings which are not correct or misspelled. Also, Twitter allows only upto 140 characters per tweet which is quite insufficient to express their opinions. To eliminate this ambiguity, the authors proposed a new feature vector before classification. Knowledge based approach and Machine Learning Approach are the two approaches used for analyzing the sentiment polarity of the tweets. The results showed that almost all the algorithms have the same accuracy for this feature vector.

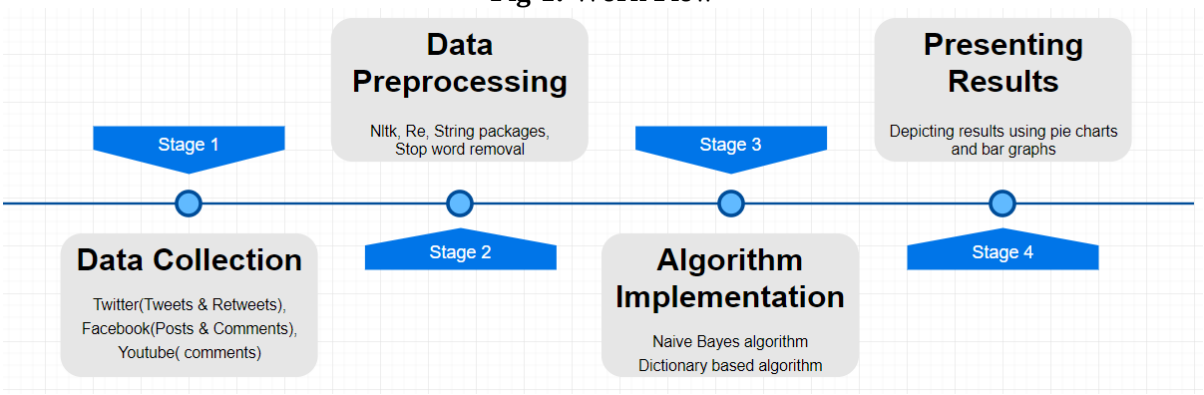
In the paper [9] the author concentrated on the Political Analysis. He collected the data of Donald Trump and Hillary Clinton from Twitter to predict the United States presidential elections. He used a two phase approach to classify the tweets. He first collected the data and pre-processed it. Then, he found out the sentence polarity of each tweet and classified them accordingly. The results showed that Donald Trump has more positive opinion in public rather than Hillary Clinton and predicted that Donald might win the run which came out to be true. Sentiment Analysis is also applied on the policies implemented by the Government.

ISSN 2394 - 7780

3. METHODOLOGY

Our work consists of following stages which are shown in fig.1:

Fig-1: Work Flow



3.1 Data Collection

The first step of our project is to decide from where the data to be analyzed should be collected. We decided to collect the data from three major social-networking sites viz. facebook, twitter and youtube. Any political party is having their official accounts in these social media platforms. We have collected the data belonging to party X, party Y and party Z from their social media accounts. During feature selection we selected “text” as it is more reliable and extractable, So the “text” data which are present in different forms like tweets, facebook comments and youtube comments are collected.

To extract tweets from twitter, create a Twitter user account and log in with your Twitter user account. Then visit the Developers account of Twitter while staying logged on in your account. Then, click “Create New App” and fill out the form, like name of the application, purpose of the research etc. and click “Create your Twitter application”. Then, the API key is generated which needs to be copied and pasted on the next page for access tokens. Scroll down and click “Create my access token which further generates the access tokens and access secret token which are necessary to access the tweets from Twitter.

To extract comments from Facebook, Open Facebook and go to any page and copy the URL. Paste the URL in the browser to generate the ID of the post. Open Facepager tool and in the Facebook page click the Login with facebook button and login to get a valid access token. Then, in Facepager, click on "New Database" in the toolbar to create a new database for a party. Then, Click on “Add Node” and paste the generated ID. Select the node in the view and click “Fetch data” resulting in all the posts in that page .Select all the posts and click on “Fetch Data” to extract the comments.

To extract comments on the politically related videos on YouTube, Open YouTube and go to the related video and copy the video URL. Open any open-sourced YouTube comment scrapper which will ask you for the URL of the YouTube video. Paste the available URL here and hit scrap which will result in the extraction of comments present on the particular video into a CSV file.

The extracted tweets and comments are maintained in separate datasets in accordance to the party.

3.2 Preprocessing

Real-world data is very incomplete and is likely to contain noise which needs to be reduced. Data pre-processing is a technique that involves converting the raw data into an understandable format by removing the unwanted data. The extracted tweets and comments are pre-processed by importing nltk, re, string packages in python. 3.3 Algorithm Implementation

In this section, we will discuss the implementation of the two algorithms namely Naive Bayes algorithm and Dictionary Based approach.

3.3.1 Naive Bayes Algorithm

We have implemented the Naive Bayes algorithm. The inputs for the classifier are the datasets after pre-processing. The working of Naïve Bayes classifier is as follows:

Start

Step 1: Load the dictionaries (positive & negative) and assign the probabilistic value to them.

Step 2: Find the number of words both in positive and negative files along with its frequency of occurrence, vocabulary size becomes the summation of the total number of words.

ISSN 2394 - 7780

Step 3: To classify the tweets, load the test data set or pre-processed tweets of a party and split them into individual tweets.

Step 4: Find the probability of a word in the positive file as well as the negative file. If the word is not found in the file even then, it is assigned a small amount of probability without neglecting it.

Step 5: If the probabilistic value of a word in the positive file is greater than the negative file, then the word is said to be positive. Else, the word is said to be negative.

Step 6: Repeat the same for all the tweets and count the number of positive tweets and negative tweets.

Step 7: Calculate the percentage of positivity and negativity in the tweets of a party.

Step 8: Repeat the Steps 3 to 7 for the remaining two parties.

Stop

3.3.1 Dictionary based Approach

To implement the proposed algorithm, the prerequisites are positive word list (English and Telugu) and negative word list (English and Telugu) which are our word corpora. The sequential steps involved in the algorithm are:

Start

Step 1: Load the dictionaries for training the classifier.

Step 2: Load the dataset of a party to classify the tweets which is the test data.

Step 3: Read the file and split the file into individual lines.

Step 4: For each line, split the line into words and compare each word with the dictionaries.

Step 5: If the word is occurred in positive word list, then positive_word = positive_word+1; If the word is present in the negative word list, then negative_word = negative_word+1;

Step 6: Count the number of positive and negative words in a sentence. If positive>negative, then the polarity of a sentence is "Positive". positive_sentence =positive_sentence=1 If negative>positive, then the polarity of a sentence is "Negative" negative_sentence =negative_sentence=1

Step 7: Repeat Steps 4 to 6 until all the tweets in the dataset are classified.

Step 8: Calculate the percentage of support and disagreement for the party. Support percent = (positive_sentence/total no. of tweets)*100 Disagreement percent = (negative_sentence/total no. of tweets)*100

Step 9: Repeat the steps 2 to 8 for the remaining two parties.

Step 10: The party which scored the highest support percent is predicted to succeed in the upcoming elections.

Stop

4. EXPERIMENTAL WORK

Our work is mostly done using python language which provides rich collections of pre-defined packages. We made use of the following packages:

- Tweepy (for extraction of twitter data)
- RE (Regular expression for cleaning data)
- String (for data pre-processing)

4.1 Data Collection

Using tweepy package in python language we are able to collect a stream of tweets with a mention of particular keyword. The keywords used for streaming are the official account names of particular parties viz, party X, party Y and party Z. These are saved in .csv format for easier preprocessing.

Doing some manual analysis we have collected a set of facebook posts and youtube videos which are suitable for extracting comments from. So using facepager and YouTube comment scrapper, data is collected and stored in .csv format.

4.2 Data pre-processing

Often the real world data is very noisy and inconsistent. So, there is a need to make the data consistent and understandable. We applied pre-processing techniques to clean the data. At first, we removed all the usernames

ISSN 2394 - 7780

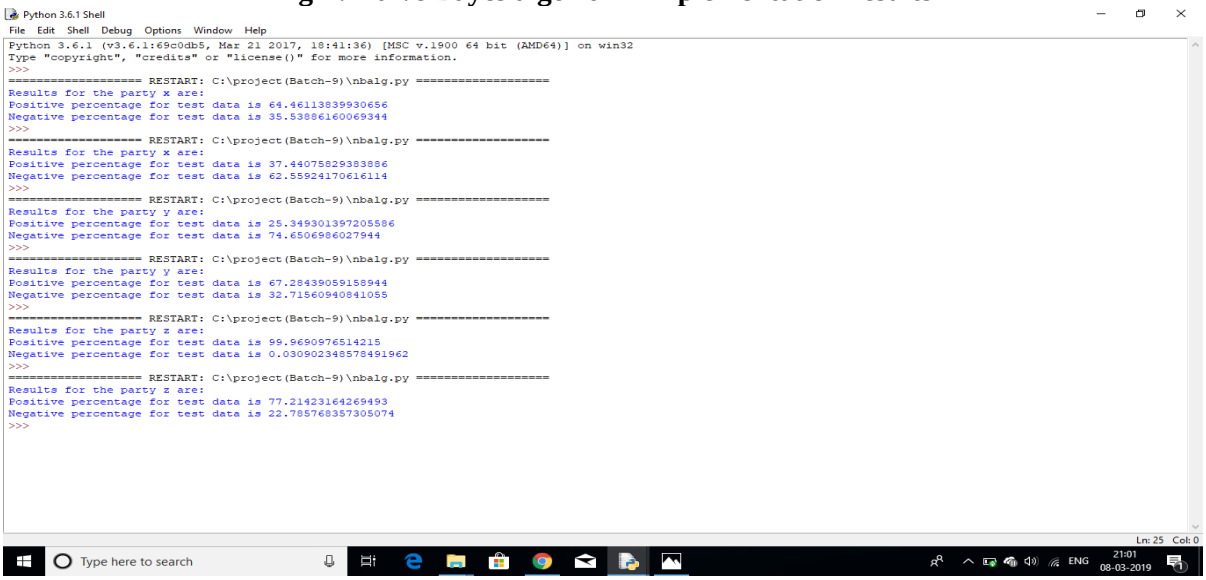
from the tweets and then we removed the URLs/links from them. We removed trends which are followed by # or @ and also removed special symbols and numbers from the text. Stop word removal is also applied to improve the search efficiency of algorithms. Finally, we normalized the text i.e. converting all the upper-case characters into lower-case.

5. FINDINGS

Naïve Bayes algorithm implementation

We have the collected and preprocessed data which is ready for classification. The Naïve Bayes algorithm is given a set of positive and negative words to train the algorithm. Python is the language selected by us for algorithm implementation. The code is hence in written in python(3.6.1) with negative_words.txt and positive_words.txt and Final_data.txt as inputs for the program. On successful compilation of the program, It shows the positive and negative percentage of sentiment of the data given. The output for each party will be as follows(Fig 2) on giving the individual data for each political party.

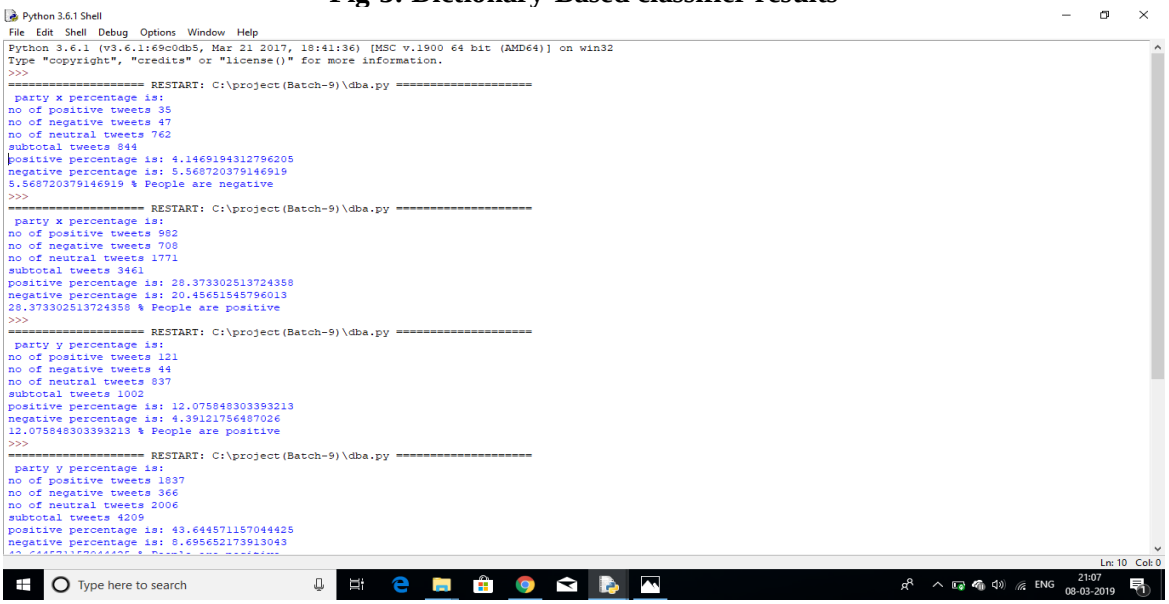
Fig-2: Naïve Bayes algorithm implementation results



Dictionary-Based classification algorithm implementation:

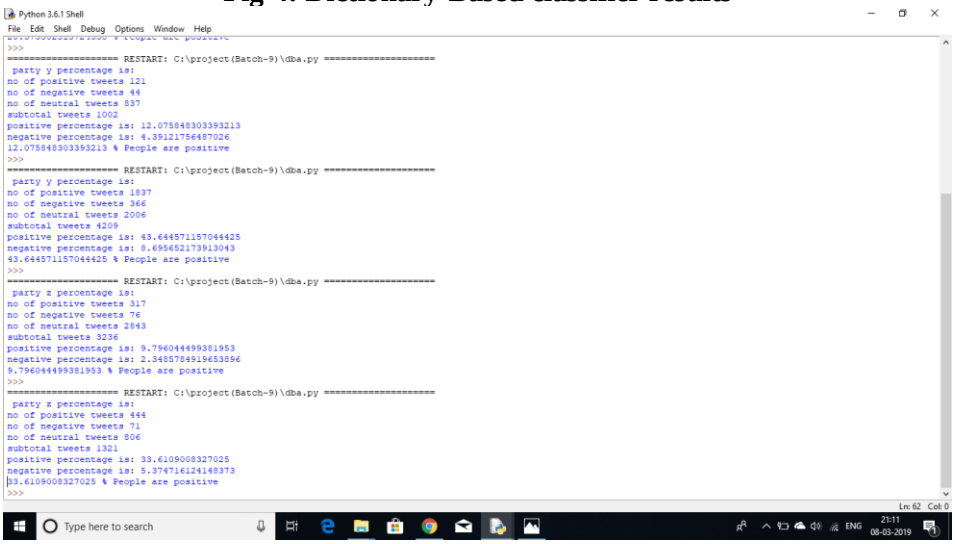
We are not relying on the results of a single classifier algorithm and hence we decided to classify the collected data using Dictionary-based algorithm too. The collected data, positive words and negative words data set is given as input to program written in python to implement the Dictionary-Based classifying algorithm. The successful compilation of code gives the results in the following manner. The main difference between both the algorithms is that Dictionary Based classifier will have a third type named neutral where the data which does not available on the training data sets will be set to neutral.

Fig-3: Dictionary-Based classifier results



ISSN 2394 - 7780

Fig-4: Dictionary-Based classifier results

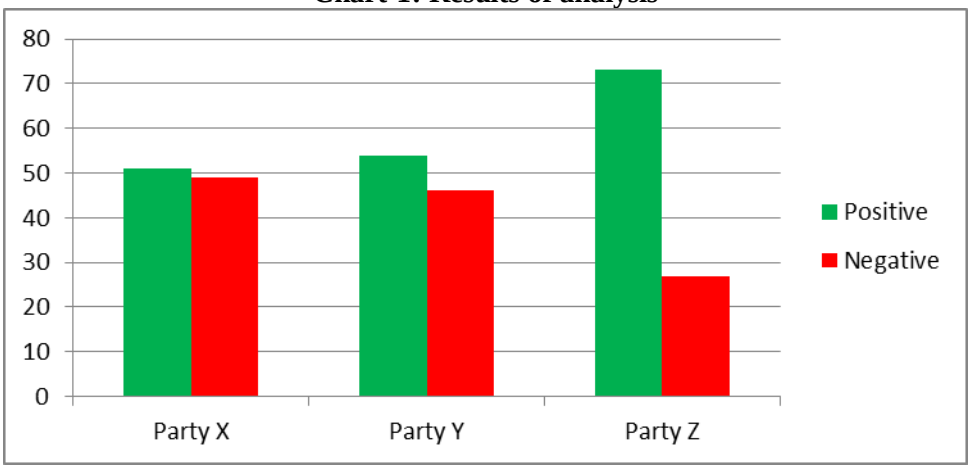


6. RESULTS

Table-1: Results of analysis

	Party X	Party Y	Party Z
Positive Sentiment	**51**%	**54**%	**73**%
Negative Sentiment	**49**%	**46**%	**27**%

Chart-1: Results of analysis



The above chart which is the result of our analysis is depicting the voters inclination towards the party Z than the other two. On a scale of 100 party X and Y almost have similar amount of positive and negative image in the social media. Where as, party Z has got higher positive percentage than negative percentage.

CONCLUSION

We conclude that in this paper we have collected data from social media to fetch the public opinion, cleaned the data and made into suitable format to apply classifiers. Then we applied Naïve bayes and Dictionary Based classification algorithms and combine their results to obtain the mentioned statistics. The statistics are evident enough that Party Z has good positive vibe in the public and we predict the party's win through our analysis.

REFERENCES

1. Pulkit Kathuria and Kiyoaki Shirai ,"Example Based Word Sense Disambiguation towards Reading Assistant System" The association for Natural Language Processing, 2012.
2. Vivek Narayanan, Ishan Arora and Arjun Bhatia," Fast and accurate sentiment classification using an enhanced Naive Bayes model 2012.
3. Ankita Gupta, Jyotika Pruthi and Neha SahuSentiment," Analysis of Tweets using Machine Learning Approach", International Journal of Computer Science and Mobile Computing, Vol.6 Issue.4, April- 2017, pg. 444-458.

ISSN 2394 - 7780

4. Ajay Deshwal1 , Sudhir Kumar Sharma," Twitter Sentiment Analysis using various Classification Algorithms", 5th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), Sep. 7-9, 2016, AIIT, Amity University Uttar Pradesh, Noida, India.
5. Parul Sharma andTeng-Sheng Moh , "Prediction of Indian election using sentiment analysis on Hindi twitter ",2016 IEEE International Conference on Big Data (Big Data).
6. Kaili Mao, Jianwei Niu , Xuejiao Wang, Lei Wang and Meikang Qiu," Cross-Domain Sentiment Analysis of Product Reviews by Combining Lexicon-based and Learn-based Techniques", 2015 IEEE 17th International Conference on High Performance Computing and Communications (HPCC).
7. Vaibhavi N Patodkar and Sheikh I.R. ,"Twitter as a Corpus for Sentiment Analysis and Opinion Mining", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 5, Issue 12, December 2016.
8. Neethu M S and Rajasree R ,"Sentiment Analysis in Twitter using Machine Learning Techniques", 4th ICCCNT 2013 July 4 - 6, 2013, Tiruchengode, India.
9. Jyoti Ramteke, Darshan Godhia, Samarth Shah and Aadil Shaikh, "Election Result Prediction Using Sentiment Analysis" 2016 International Conference on Inventive Computation Technologies (ICICT), DOI: 10.1109/INVENTIVE.2016.7823280.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

TALCUM POWDER FORMULATION OF ACTINOBACTERIAL ISOLATES AND ITS EFFECT ON *SACCHARUM OFFICINARUM* ON VARIETY CO-86032 NIRA: IN VITRO STUDY

[1]Sakure Sunita Satish, [2] Hamde Venkat [b]
Head[1], Department of Microbiology, S. B. B. Alias Appasaheb Jedhe College
Head[2] and Professor, Department of Microbilogy, Yogeshwari Mahavidyalya, Ambejoagai

ABSTRACT
Keeping in view the number of challenges faced by modern agriculture with respect to soil fertility, pathogen attack and role of ecofriendly approach; present study does involved the number of actinobacteria previously been isolated from rhizosphere soil samples and found to be potent for plant growth promoting properties involved in soil fertility have been investigated in plant species sugar cane (Saccharum officinarum on variety CO-86032 Nira) using 90 days pot trial. Talcum powder based Bioinoculum prepared from actinobacteria (A3, BF5, TU, D and consortium) when tested under pot assay, all these isolates best preformed to act as plant growth promoter when treatment was given to sugarcane. A highly significant with about 10 times increase in shoot weight (9.89gm) was recorded in consortium group to control with only 0.95gms. In a positive control group also treatment with NPK+IAA also helped to increase shoot weight to 10.1gms which showcase that probably consortium providing vital nutrients for sugarcane growth. As compared to control (0.201 gm) root weight Bf5 isolate found to be highest (0.657 gm) and comparable with positive control (NPK+IAA) with 1.089 gm of root weight.Isolate A3 also performed better for improvement of root and shoot length compared to control. In conclusion, systematic selection of potential actinobacteria and their further inoculation as consortium or individual certainly improved the growth of sugar cane and hence recommended to get involved in agricultural bioinoculant programs.

Keywords: Actinobacteria, Bioinoculum, Ecofriendly, Sugarcane, Talcum powder.

1 INTRODUCTION
As it is known that microbes in rhizosphere able to transmit number of plant growth promoting content via soil, which does assist in plant's greater yield. Actinomycetes are one of the members of the soil microbial population which can add nutrient content in soil (Halder et al., 1991; Elliot L.F. et al., 1995) along with many plant growth promoting capabilities (Merzaeva O.V. et al., 2006). It is noted that when actinomycetes grows in soil it produces number of important biomolecules such as lytic enzyme , PGP substances and antibiotics (Cattelan A. J. et al., 2000). Among number of actinomycetes *Streptomycetes* spp dominates the soil as major microbe and assist in degradation of number of complex molecules to simple molecules which can improve plant yield and overall development (Petrosyan P et al., 2003; Ding C.H. et al., 2004).

Being an aerobe spore forming , Gram positive bacteria all actinomycetes are featured with substrate and aerial mycelium growth when added in the soil or when present naturally they play key roles in cycling of organic matter, plant pathogens inhibition, decomposition of complex material especially of dead plants, animals and fungal material by producing several vital enzymes. Besides that they improve nutrient content, minerals by producing metabolites and plant growth regulators (Bhatti A.A. et al., 2017).

Looking at today's scenario with intensive agricultural practices and cultivation, fertility of soil is decreasing at a faster rate which is making increasing crop loss for many instances. As per estimation with such improper practice about 30% of total world cultivated soil may get degraded by the year 2020. Here soil degradation is mainly related with loss of soil texture and fertility and that will lead to loss in crop productivity. Hence it is now taken as a priority to ensure ever increasing future food demand and supply. In requirement, treatment of soil with bacteria and fungi is strongly recommended to regain feature of the soil. These microbes does provide nitrogen fixation and mobilization of other nutrients such as phosphorus, potassium and iron which can be reached directly to the plant while also remediate soil structure by improving its aggregation and stability. Study also reported that co-inoculation of bacteria and fungi with or without organic fertilizer are also been beneficial for reinstating the soil fertility and organic matter content instead of single inoculum (Rashid M I et al., 2015).

Actinobacteria has been nominated as the plant growth bacteria and able to improve soil and plant health and it also remain the sustainable agricultural practices by looking at the high prices and destructive effect of chemical fertilizers especially in the countries of south-east Asia and Africa. Actinobacteria has also been recommended to use along with crop for better yield and to use along with crop for better pest control (Sathya A et al., 2017).

ISSN 2394 - 7780

Saccharum officinarum on variety CO-86032 Nira is very popular for making Juice. This variety is released in 1996. This is hybrid having more sucrose content and also resistant to smut and wilt. Quality of this crop in market is mainly determined by shoot weight. Farmers use the IAA mainly to increase the yield. The actinobacterial isolates showing potential results for IAA production; Phosphate solubilization, antifungal activity and siderophore production were selected for Formulation using talc as carrier base. In the present study bioformulations are successfully tested for improvement of growth parameters of sugarcane in single inoculum or in consortium as compared to positive control organic fertilizer.

2 MATERIALS AND METHODS:

2.1 Biofertilizer preparation using Talcum powder as a binder

A3, Bf5, Tu and D were individually inoculated in 800ml of CSA broth in four 1000ml flasks. The flasks were kept on rotary shaker to get final concentration of each isolates as 10^8CFU/ ml . 1 kilograms of talcum powder, 15 g of calcium carbonate and 10g carboxymethyl cellulose was allowed to mix in with 400ml fully grown bacterial inoculum. The shelf life of isolates in bio-formulation was calculated by a serial dilution technique and the samples were kept at room temperature (28 ± 2ºC) for storage. Each of 1g of sample taken from each formulation at 1st, 2nd and 3rd month storage was mixed with 10 ml of sterile normal saline water and the number of colony forming unit (CFU) of bacteria was counted on CSA after 24 hours plating.

(Ei SL Lwin KM, Padamyar, Khaing HO and Yu SS 2017**)**

2.2 Pot assay

In a pot assay standard protocol was followed using sugarcane variety CO-86032 Nira as affector plant species. Treatment soil used in the study was recorded with the carbon content of 1.01% having initial pH of 7.12. The given soil was recorded for mineral content and found to be with, Phosphorous 67.2 kg/ha, Nitrogen 275.7 kg/ha and Potassium 268.8 kg/ha. In a control pot set, first control with only NPK addition and second control was IAA+NPK was used. In an experimental set, total five sets having set of A3, D, Bf5, Tu and consortia were used.

During experiment standard dose of 0.25 mg Of IAA per kg of soil was maintained in positive control. NPK proportion used was 120:60:60. After treatment to soil, affecter plant sugarcane stem buds with one eye was planted. Experiment was carried out in triplicates. 2 ml of each talc-based carrier bio-formulation of each isolate and consortia was poured into the base of each plant to reach the root area in all sets except positive and negative control. After two weeks, 2 ml of each prepared treatment was poured into the base of each plant Every set was then labeled and periodic watering was maintained in the plastic pot used for treatment study All the pots were checked periodically for the Germination, shoot length, and root length, dry weight of root and shoot and overall change recorded up to 90 days of treatment Data was analyzed using single factor ANOVA.

3 RESULTS AND DISCUSSION

3.1 Talc based formulation were prepared as shown in the photograph below. TVC count was taken for three months .TVC count of each bioformulation revealed the presence of average about 10^6 CFU/ml after three months storage.

Figure-1: Talc based formulation of Actinobacterial isolates.

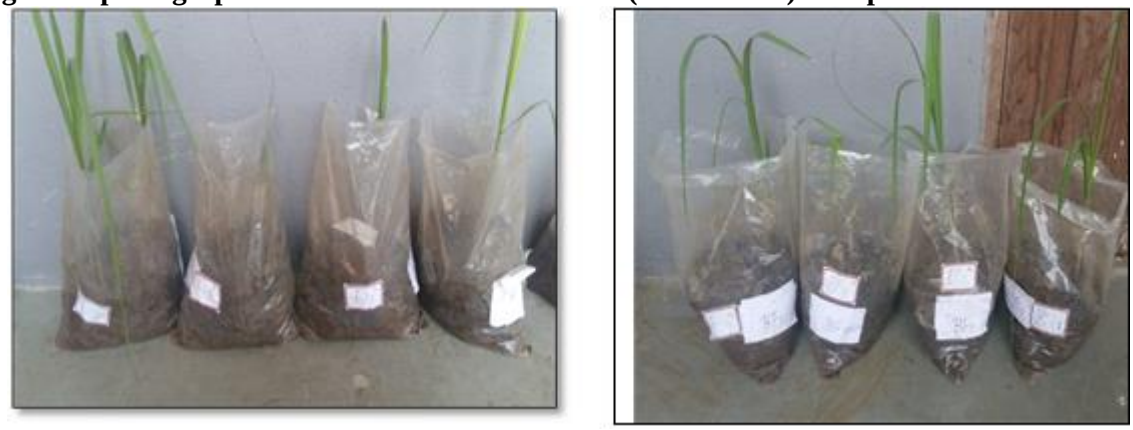
3.2 Pot assay

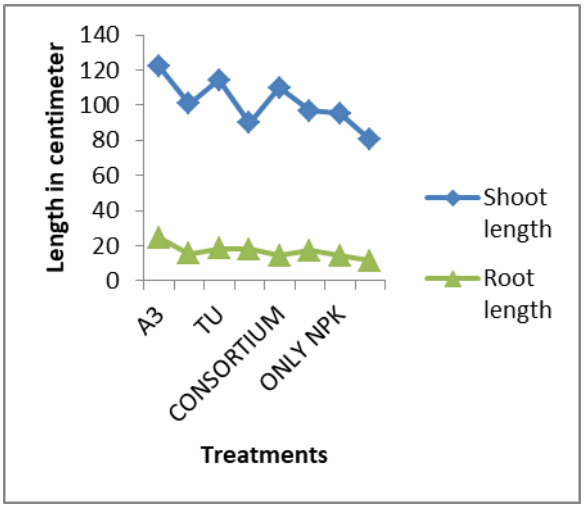
In a pot assay affecter plant sugarcane (*Saccharum officinarum*) certainly found to be affected by the microbial consortium as well as by their individual treatment and results are comparable with positive control (NPK+IAA or NPK). The treatments showed overall increased growth as compared to control. Plant sugarcane (*Saccharum officinarum*) when tested under pot assay upto 90 days and firstly in control set its shoot and root length (cm) was recorded to be 80.5 cm and 11.5 cm, respectively which was improved significantly after inoculation of

ISSN 2394 - 7780

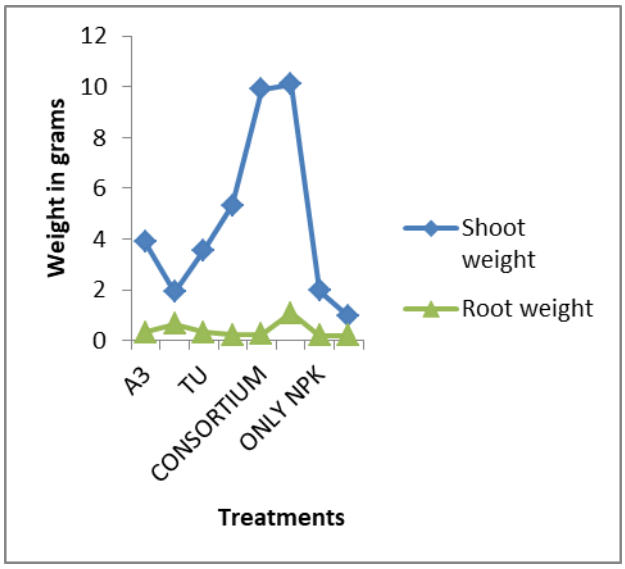
almost all four actinobacteria in an individual inoculation and in consortium also. Among them, isolate A3 responded the best for the root length factor and about 24.5 cm length was recorded as compared to 11.5 cm in control. It is important to note the performance of isolate A3 which was better than (significant) positive control (NPK+IAA or NPK) which makes it the successor in further testing. Treatment Data when analyzed by ANOVA showed significance of treatments statically.

Figure-2: photograph of two sets of treatments trial (A3 and BF5) in triplicate and one control.





Graph-1: Effect of Treatments of talcum powder formulations on root and shoot length.



Graph-2: Effect of Treatments of talcum powder formulations on root and shoot length

A highly significant with about 10 times increase in shoot weight (gm) was recorded in consortium group as 9.89gm as compared to control with only 0.95gms. In a positive control group also treatment with NPK+IAA also helped to increase shoot weight to 10.1gmswhich showcase that probably consortium providing vital

ISSN 2394 - 7780

nutrients for sugarcane growth. As compared to control (0.201 gm) root weight Bf5 isolate found to be highest (0.657 gm) and comparable with positive control (NPK+IAA) with 1.089 gm of root weight. Overall results suggested that consortium has better effect on sugarcane weight, they certainly transfer benefits to the growing sugarcane in all aspects as evidenced in present study.

4 CONCLUSION

Previously selected Actinobacerial isolates from PGPR properties have been proved to be efficient for pot trial. Talc based formulation has been also showing good effect on survival of Actinobacteria and Treatment on sugarcane proved their potential as bioinoculant**.**

ACKNOWLEDGEMENT

The research study was supported by Department of Microbiology, Yogeshwari Mahavidyalya, Ambejogai. The author would like to express gratitude towards Dr. V. Hamde,Head & Professor, Department of Microbiology, for guidance and support.

REFERENCES

1. Bhatti AA, Haq S, Bhat RA. ,(2017). Actinomycetes benefaction role in soil and plant health. Microbial Pathology. Oct;111 :458-467
2. Cattelan A.J., Hartel P.G. Socieda de Brasileira de Ciência do Solo. (2000) Tópicos em ciência do solo. Socieda de Brasileira de Ciência do Solo; Viçosa:. Traits associated with plant growth-promoting rhizobacteria (PGPR) pp. 213–234
3. Ding C.H., Jiang Z.Q., Li X.T., Li L.T., Kusakabe I. High activity xilanase production by *Streptomyces olivaceoviridis* E-86. World J Microbiol Biotechnol. 2004;20:7–10.
4. Elliot L.F., Lynch J.M. (1995) The international workshop on establishment of microbial inocula in soils: cooperative research project on biological resource management of the organization for economic cooperation and development (OECD) Am J Altern Agric.; 10:50–73.
5. Ei sL Lwin K.M.Padamyar,Khaing , H O Yu ss (2017) ,Study on IAA producing IAA Rhizobaterial Isolates and their effect in talc based carrier on some plants.Journal of soil science and plant health,1:1
6. Halder A.K., Mishra A.K., Chakarbarty P.K. (1991). Solubilization of inorganic phosphates by Bradyrhizobium. Indian J Exp Biol.29:28–31.
7. Meena VS, Maurya BR, Verma JP. (2014) May-Jun. Does a rhizospheric microorganism enhance K^+ availability in agricultural soils? Microbiol Res.;169 (5-6):337-47.
8. Merzaeva O.V., Shirokikh I.G. (2006) Colonization of plant rhizosphere by actinomycetes of different genera. Mikrobiologiia. 75:271–276.
9. Petrosyan P., García-Varela M., Luz-Madrigal A., Huitrón C., Flores M.E. (2003) *Streptomyces mexicanus* sp. nov., a xylanolytic micro-organism isolated from soil. Int J Syst Evol Microbiol. 53(Pt 1):269–273.
10. Rashid MI, Mujawar LH, Shahzad T, Almeelbi T, Ismail IM, Oves M. (2016) Bacteria and fungi can contribute to nutrients bioavailability and aggregate formation in degraded soils. Microbiol Res. Feb;183 :26-41
11. Sathya A, Vijayabharathi R, Gopalakrishnan S. (2017) Plant growth-promoting actinobacteria: a new strategy for enhancing sustainable production and protection of grain legumes. 3 Biotech. Jun; 7(2):102.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

VISUAL MERCHANDISING: SCALE DEVELOPMENT AND CONSTITUENT FACTORS

Dr Padma Singhal[1] and Dr. Rajiv Gupta[2]
Assistant Professor[1], Durga Devi Saraf Institute of Management Studies, Mumbai
Professor[2], Institute of Management Studies, DAVV, Indore

ABSTRACT
Introduction: Visual merchandising can be defined as the presentation of a store's merchandise to the customer through the integration of the store's advertising, display, special events, fashion coordination and merchandising departments to sell the products offered by the store (Mills et al., 1995). Due to increasing competition and the similarity of merchandise, retailers utilize visual merchandising to differentiate their offerings from others as well as to improve the desirability of products (Kim, 2003).

Purpose: The current study aims to develop and standardize a measure for evaluating visual merchandising and to explore the constituent factors of visual merchandising in the readymade branded apparel industry as perceived by the customers.

Methodology: Standardization of scale has been done by calculating reliability, validity, and ITC. The Principal Component Factor Analysis was applied with the varimax rotation to identify the underlying factors of visual merchandising.

Results: The 11 items of visual merchandising resulted in two factors as unplanned purchase and persuading.

Keywords: Visual Merchandising, Branded Apparel, Retailers, Customer.

INTRODUCTION
The essence of visual merchandising is to expose customers to attractive visual presentations of a retail outlet. The prospective buyers stop and look into the window of retail outlet, thereby witnessing the attractive visual presentations of products of that store. These presentations motivate them to come into the store and they are so attractive that even those customers with limited time stop to scan the offering and sometimes make unplanned purchases as well. Usually, it's not the uniqueness of the merchandise but the presentation in which the item appears, makes customers buy the product immediately. Fashion retailers use visual merchandising in their brick-and-mortar operation which acts as high attention seeking medium. It's the way of communication by which company's fashion value and the quality image are presented to prospective customers.

Various types of visual merchandising include floor merchandising, form or mannequin display, in-store display, signage, and window display. The objective of visual merchandising is to update the customers with the new offerings of the store in an attractive and unique way along with encouraging the sales of merchandize (Frings, 1999). Store image id built through visual presentations which attract shoppers and finally transform them into customers by developing brand loyalty and encouraging customers buying behaviours. Visual Merchandising educates and attracts the customers about the products and services offered and finally bend the customers from exploring to buying. It creates a platform to present merchandise in a unique and attractive environment thus creating an strong impact and product recall.. Visual merchandising sets the context of the merchandise, establishes the linkage between fashions, product design, and marketing by keeping the focus on the product. Further, it draws the attention of the customers and helps them match their needs with the visually merchandised product.

According to Buttle (1988) visual merchandising was not given much weightage in the past as it involves cost creativity and space. Also space occupied by a product in the shelf display and its attractiveness is directly proportional to sales. Mehrabian and Russell (1974) stated that note that dominance, arousal and pleasantness are the store atmosphere factors and these can alter the consumer's response to buy a product. This response also influences the purchase behaviour. Also customers' forms a store image and implicitly shapes the product quality image in the minds of the customers. Social identity of the store is also shaped up by lightening, music and other store features. Greenwood (1998) argued that visual merchandising has been identified as a centralized professional function and require more concentration as compare to the traditional store display. Store managers use to ignore this in the past but now it is more systematized sophisticated and creative. The objective of visual merchandising is to build and communicate brand image, to create product differentiation, use of latest technological tools and communicating to customers in an integrated way. According to Bell and Ternus (2002), store displays trend has changed over a period of time. From the displays focusing on

ISSN 2394 - 7780

promotional tools, now the objective is to enhance store image, communicate product information and support customers to make purchase decision, thus creating an overall shopping environment.

Kerfoot et al. (2003) investigated the impact of visual merchandising and its effects on purchase behaviour in context to branded female fashion offerings. The results of the study indicated a direct relationship between purchase intention with that of product display, product colour, presentation, props display, lightening effect and product texture. Sprott and Shimp (2004) conducted a study on product trial availability at the store, with that of perceived product quality. The result showed that perceived quality of store brand was enhanced and benefitted significantly when customers under the study tried these brands before judging their quality. But this was not the case with the national brand. The subject of shelf space allocation is of utmost consideration for designing the layout of the store. There exists little research that specifically focuses on the influence of store brand in shelf space management.

Nogales and Suarez (2005) conducted a study on the difference in the way the shelf space is managed by national and private label brands in the store. They found that space allocation to the private labels was much larger than that assigned to the whole of brands on average. According to Spangenberg et al. (2006), scent of a retail set up can change the consumer's view a lot. These effects are usually moderated by congruity between the scent and the retailer's product offering. Past research data does not document such studies highlighting congruity effects for products without scent and real world settings. The result concluded that scent congruity influence perceptions of the store, its merchandise, and actual sales. Results of the study conducted by Ha et al. (2007), argued that the application of offline visual merchandising features can be seen in an online context. Also, many of the visual merchandising features of online apparel stores do not have an offline parallel. The taxonomy of visual merchandising cues has been used by researchers to systematically study the effects of those cues. Consumer's perception, expectation and loyalty regarding a retailer are built through store retailers online and offline brand image. Another study by Kwon and Lennon (2009) reveal that offline brand image exerts significant effects on online brand image. It also support that online perceived risk and online customer loyalty is also significantly related.

A window display supports the stores selling strategies and its a direct connection between the inside store environment and customer's perspectives from the outside environment. Window displays is a selling strategies and it transfers the type and positioning of merchandize along with communicating the promotional strategies and corporate image. Somoon and Sahachaisaeree (2010) conducted a study on the use of window displays for clothing to examine patterns, selling strategies, merchandize types and target groups. They investigated the effect of store design on the customer response to configurations. The results of the study showed that displays with spotted light have effective impact. Lights focusing on the product and warm colour could bring about arousal and interest in merchandize along with enhancing its attractiveness. Certain store set up designs which includes props and the whole display seems to induce all range of perceptions. Results also showed that displays with fewer props are more effective as compare to huge and variety of props. The study also finds that design with focused light and unique props are the most important factors inducing the aspects of complexity, purchase willingness and shop attractiveness. On the other hand, design factors including the level of design's complexity and the existence of mannequin show no impact on a wide range of customer's perceptions. The realness of mannequin shows little impact on all aspects, except for the complexity. The design with disordered display shows minor effect on many buyers perceptions, besides the merchandize value and uniqueness.

METHODOLOGY AND DESIGN

The Study

The study is exploratory in nature and aims to examine the constituent factors of visual merchandising in readymade branded apparel industry as perceived by the customers. It also aims to develop and standardize a scale to measure visual merchandising.

The Sample

The sample included 300 customers of readymade branded apparels in Indore city. The population under the study comprised of all the customers of readymade branded apparel industry. The sampling element for the study was individual customer of readymade branded apparels. The customers visiting the store outlet during the data collection phase and those who have shopped earlier from the store were included in the sample frame for the study. The non-probability purposive technique of sampling was used to collect the data. Those customers who were at or who have been to stores like Pantaloons, Globus, Westside and Max within the last six months were asked to give responses for all 11 items of Visual Merchandising in the questionnaire.

ISSN 2394 - 7780

Data Collection

Data was collected through self-designed questionnaire, comprised of total 11 items. All these 11 items were presented on a 5 point likert type of scale wherein 5 indicated strongly agree and 1 indicated strongly disagree. It was presented to a sample of 300 respondents. The collected data was also screened for the response error.

Data Analysis

To ensure the internal consistency of all the items of Visual Merchandising, item to total correlation was carried out. Pearson correlation was applied between the item scores and the total scores, for all the items of Visual Merchandising. The questionnaire was then checked for the Validity and Reliability. Cronbach's Alpha and Guttman's Split-half Reliability Coefficient measures were calculated.

After this Factor Analysis using principal component extraction method with varimax rotation was carried out so as to identify the factors of Visual Merchandising. Bartlett's test for sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was also applied along with factor analysis.

RESULTS

Reliability Measure

The reliability of Visual Merchandising was computed using SPSS16 software. Cronbach Alpha's and Split Half Reliability Coefficients were computed to calculate the reliability of all items in the questionnaire. It can be seen from the following statistics that the reliability measure for visual merchandising variables is higher than the standard value of 0.7. So it can be said that all the items in the questionnaire are highly reliable.

Table: Showing Cronbach's Alpha Reliability Statistics for visual merchandising

Measure	Cronbach's Alpha Reliability	Number of Items
Visual Merchandising	0.826	11

Table: Showing Guttman's Split-half Reliability Coefficient Statistics for visual merchandising

Measure	Guttman's Split-half Reliability Coefficient	Number of Items
Visual Merchandising	0.845	11

Consistency Measure for Visual Merchandising

The consistency of all the statements in the questionnaire of visual merchandising was checked through item to total co-relation. For this Pearson Correlation was applied. In this, co-relation of every item with total was measured and the computed value was compared with the standard value (r_{300}=0.4) (Nunnally, 1967). Since all the measures were having item to total correlation higher than the critical value so none of the item was declared as inconsistent or dropped from the questionnaire. This means that all the items in the scale contribute significantly to the Visual merchandising variable. All the items in the Visual Merchandising measure with their item to total co-relation are shown in the following table:

Table: Showing Item to Total Correlations for the Measure Visual Merchandising

S. No.	Items	Computed correlation value	Consistency	Accepted/ Dropped
1	Even if I have limited time, I stop and look into the window of retail shop to admire the offerings.	0.590452	Consistent	Accepted
2	I tend to enter a store when I am attracted by an eye-catching window display.	0.668429	Consistent	Accepted
3	It is not the uniqueness of the merchandise but the setting in which the item appears is attractive.	0.459426	Consistent	Accepted
4	Visual presentation often stimulate me to make unplanned purchase	0.642303	Consistent	Accepted
5	I get an idea of what I want to buy after looking through in-store form/mannequin display.	0.635049	Consistent	Accepted
6	When I see clothing that I like on in-store form/mannequin display, I tend to buy it.	0.620906	Consistent	Accepted
7	When I see clothing featuring a new style or design on display, I tend to buy it.	0.591752	Consistent	Accepted
8	I tend to try on clothing that catches my	0.656541	Consistent	Accepted

ISSN 2394 - 7780

	eye when I walk along the isle.			
9	I tend to rely on store displays when I make a decision to purchase clothing.	0.551765	Consistent	Accepted
10	When I see a special promotion sign (reduced price, Sale/clearance signs etc.) in the store, I go to look at that clothing.	0.594881	Consistent	Accepted
11	I tend to choose which store to shop in depending on eye-catching window displays.	0.624257	Consistent	Accepted

Validity

The content validity was found good as the instrument contain a representative sample of the universe of subject matter. It adequately covered all the topics of the relevant dimensions. A high validity was ensured by a careful definition of the topic, right selection of items to be scaled, personally collecting data and consultation from a panel of judges.

Factor Analysis for the Items of Visual Merchandising

The Principal Component Factor Analysis was applied with Varimax Rotation so as to identify the underlying factors of visual merchandising.

Before proceeding for factor analysis, the raw data was checked for sampling adequacy and sphericity. The positive result shows application of factor analysis is appropriate. For visual merchandising scale the KMO measure was 0.868 which is more than 0.5 indicating that the sample is adequate for the application of factor analysis. The Bartlett's Test of Sphericity was tested through Chi-Square value 786.422 significant at 0% level of significance. Its associated probability is .000 and is less than 0.05 indicating that the data has low or no sphericity. Bartlett's Test of Sphericity is significant this means that the correlation matrix is not an identity matrix. Thus the data collected for the visual merchandising is suitable for undertaking factor analysis.

Table: Showing KMO and Bartlett's Test Results for Visual Merchandising Variable

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.868
Bartlett's Test of Sphericity	Approx. Chi-Square	786.422
	df	55
	Sig.	.000

The Factor Analysis with Principal Component Method and Varimax Rotation was applied. The raw scores of the 11 items of the Visual Merchandising comprised of two factors namely unplanned purchase and persuading.

Factor 1: Unplanned Purchase: This factor is constituted of six variables. The variables being stimulate (.785), attracted (.721), attention (.658), inducing sale (.615), trials (.557) and admire (.489). This factor has 36.753 percent of variance.

Factor 2: Persuading: This factor is constituted of five variables. The variables being featuring (.736), idea (.673), store selection (.617), attractive setting (.615) and rely (.457). This factor has 9.790 percent of variance.

Table: Showing the Result of Factor Analysis for the Items of Visual Merchandising

Factor Name	Eigen values			Variables converged	Loading
	Total	% Variance	Cumulative variance		
Unplanned purchase	4.043	36.753	36.753	Visual presentation often stimulate me to make unplanned purchase	.785
				I tend to enter a store when I am attracted by an eye-catching window display.	.721

ISSN 2394 - 7780

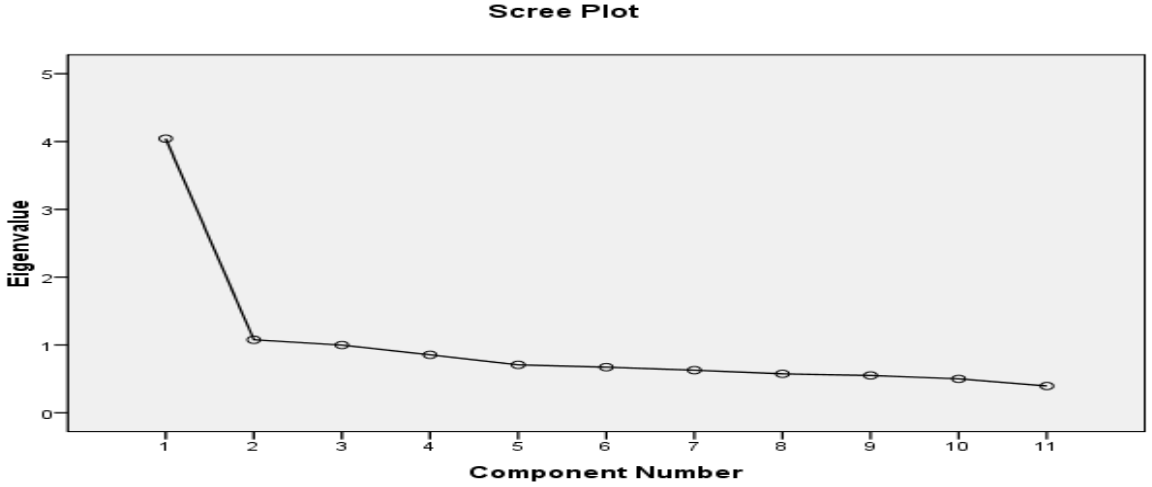
				When I see a special promotion sign (reduced price, Sale/clearance signs etc.) in the store, I go to look at that clothing.	.658
				When I see clothing that I like on in-store form/mannequin display, I tend to buy it.	.615
				I tend to try on clothing that catches my eye when I walk along the isle.	.557
				Even if I have limited time, I stop and look into the window of retail shop to admire the offerings.	.489
Persuading	1.077	9.790	46.543	When I see clothing featuring a new style or design on display, I tend to buy it.	.736
				I get an idea of what I want to buy after looking through in-store form/mannequin display.	.673
				I tend to choose which store to shop in depending on eye-catching window displays.	.617
				It is not the uniqueness of the merchandise but the setting in which the item appears is attractive.	.615
				I tend to rely on store displays when I make a decision to purchase clothing.	.457

Scree Plot for Visual Merchandising

The scree plot graphs the Eigen value against the factor number or component number. It tells the number of factors that can be retained for analysis. One rule is to consider only those with Eigen values over 1. Another rule is to plot all the Eigen values in their decreasing order. The plot looks like the side of a mountain. Scree graph plots all the Eigen values in the decreasing order of their magnitude. It helps to visualize the relative importance of the factors. A sharp drop in the plot signals that subsequent factors are ignorable. A scree graph is suitable to drawn when the sample size is 300 or above.

It can be seen from the following graph that the slop is falling till the second factor. From the second factor on, the line is almost flat, meaning the each successive factor is accounting for smaller and smaller amount of the total variance.

Figure-4.4: 3c Showing Scree Plot for the Factors of Visual Merchandising Variable



ISSN 2394 - 7780

REVIEW OF LITERATURE

Unplanned purchase and persuading has emerged as the two important factors of visual merchandising. From a psycho physiological point of view, arousal is a fundamental feature of behaviour. As reported in different empirical studies based on insights from theories of consumer behaviour, store atmosphere should evoke phasic arousal reactions to attract consumers. Majority of these empirical studies applied verbal scales in order to measure the sales motivation at the point-of-sale. Han et al (1991) stated that without having prior information of a new product or intention to purchase a certain item, a consumer is exposed to stimuli suggesting that a need can be satisfied through the purchase. The apparel store stimuli serve as a type of information aid for those who go to the store without any predetermination of what they need or buy. The more the store stimuli, such as visual merchandising which serves as a shopping aid, the more likely the possibility of a desire or need arising and finally creating an impulse purchase. The study was conducted on three samples female consumers, using four impulse buying dimensions and demographic characteristics. Predictor variable of impulse buying was also identified and it was found that non-student consumers were more planned buyers while students were most likely to be impulse buyers. Comparisons of the three groups of consumers on other shopping behaviours and demographic variables further supported the proposition that these groups constituted of varied market segments. Multiple regression analyses revealed that impulse buying behaviour could be predicted from other shopping behaviours and demographic variables, especially for the student groups. The results of the study provided a conceptual and empirical understanding of impulse buying variable.

Summers and Hebert (2001) studied the influence of display lighting as a component of store atmospherics on consumer approach and avoidance behaviour. For the purpose of the study, the authors used supplemental lighting which was temporarily installed and manipulated on merchandise displays in two retail stores to test the effect on consumer behaviour. The observations were made for the number of items touched and number of items picked up. Statistical analysis revealed that additional attractive had a positive effect on consumer behaviour, supported by good display. Interactions between lighting and display were found to be statistically significant. Thus store managers must include in-store lighting as an integral part of a store image development to attracting and retaining consumer. Window displays are the ubiquitous and prominent but under-researched element of retail strategy. Sen et al (2002) explored how the store and product category information communicated by a store's window displays are related to consumer's shopping decisions, such as store entry and product purchase. They also explored the relationships that vary for consumer segments that differ in terms of their knowledge of the retailer's product. The study was conducted in the context of clothing retailers. Results demonstrate that the store entry decision is related both directly as well as indirectly through acquisition of inferred, store-related information to the acquisition of observed, store-related information from window displays. Fashion related information and product self-fit contributed more to the product purchase decision rather than store related information like window display and store image. Further it was found that shoppers with least shopping experience were more influenced by unique and attractive window displays as compare to low or high level of shopping experience.

Backstrom and Johansson (2006) conducted a study to show how retailers as well as consumers relate to in-store experiences. The research results shows that retailers are using advanced techniques with the objective of creating persuasive store experience for their customers.

Store experiences were majorly influenced by employee's behaviours, comfortable product selection environment and store layout. Seock (2009) examined the influence of consumer's perceived importance of apparel retail store environmental cues and demographic characteristics on their apparel store patronage behaviour across various retail store formats. Three apparel retail store environmental cue dimensions were identified viz. customer service, convenience and physical atmosphere. Out of these three dimensions, customer service appeared as a significant determinant in the consumer's decision to shop at department stores, specialty stores, and mass merchant stores. In the context of speciality store, convenience emerged as an important factor. Physical atmosphere emerged as an important determinant for shopper's choice of a retail store. The image of retail store offers an important means for differentiation in highly competitive retail markets. Front displays at a store generally gather a lot of attention and increases that footfall at the store. Cornelius et al (2010) investigated perceived image differences among storefront displays and explored its relationship with store image formation. Innovative displays captures attention and enhances store image was another important finding of the study.

Somoon and Sahachaisaeree (2010) studied 11 designing factors for window displays viz. colour tone, diffused/spotted lighting, with graphical illustration/non-graphical illustration, text/ non-text, existence of prop/ non-prop, number of prop, level of complexity, existence of mannequin/ non- mannequin, abstract/ realistic mannequins, whole/partial perception, ordered/ disordered displays. The images of the display included stimuli

ISSN 2394 - 7780

factor as complexity, interesting, arousal, attractiveness, merchandize uniqueness, value, shopping willingness and shop attractiveness. The results of the current study indicate that visual merchandising has positive significant impact in building apparel store image. This is in line with the results of the study conducted by Cornelius (2010) which reveal that different types of storefront displays carry different image potential and that innovativeness drives image valuation. These results also suggest that a store might benefit from using innovative storefront displays. Even those customers who were familiar with the store or had negative attitude toward storefront display, exhibited positive image from innovative displays. For consumers with less resistance i.e. low familiarity and positive attitudes toward storefront displays, the effects strengthen to include positive spill over effects on the overall store image. The findings therefore suggest that storefront displays represent an effective tool for transferring image components to a retail store. Compared with costly in-store reengineering or other marketing activities, storefront displays offer an attractive and cost- effective alternative means to improve retail store image. In addition, this mode of advertising is especially effective for new customers. This study show that people unfamiliar with the store are influenced in both image dimensions by a storefront display.

CONCLUSION AND RECOMMENDATIONS

The study has resulted into the development of a administrable scale for the measurement of visual merchandising for readymade branded apparels. The scale was standardized and then used for the study. The standardization procedure resulted into 11 items for visual merchandising. The study has resulted in the constituting factors for visual merchandising. The raw scores of the 11 items of visual merchandising revealed two factors viz. unplanned purchase and persuading.

To gain a competitive advantage, individual company wise study application should be done. Also one product category i.e. readymade branded apparel has been considered. The same study can be conducted for a particular brand of readymade apparel and many other product categories as well. There are various other demographic variables and psychographic variables which may affect the perception towards visual merchandising. Various combinations of these variables may generate better and newer results. This way visual merchandising can be understood and defined more effectively and precisely. Including bigger sample and more number of cities in the study will help generation of further precise findings. Efficiency of visual merchandising can be understood by the analysis of overall sales and financial performance. A logical extension of this research would be to investigate how visual merchandising influences other relevant store outcomes such as the number or frequency of visits or sales. The database that apparel retailers possess can be explored for further diagnosis and building future promotions.

REFERENCES

- Backstrom, Kristina and Johansson, Ulf (2006). Creating and Consuming Experiences in Retail Store Environments: Comparing Retailer and Consumer Perspectives. Journal of Retailing and Consumer Services, 13 (6) (November), 417-430.
- Bell, J. and Ternus, K. (2002). Silent Selling. Fairchild Publication: New York
- Buttle, F. (1988). Merchandising. European Journal of Marketing, 18 (5), 4-25.
- Cornelius, Britta., Natter, Martin and Faure, Corinne (2010). How Storefront Displays Influence Retail Store Image? Journal of Retailing and Consumer Services, 17 (2) (March), 143-151.
- Frings, G.S., (1999). Fashion: From Concept to Customer. 6th edition. Prentice-Hall: New Jersey p. 347
- Ha, Hong-Youl, Joby John, Swinder Janda and Siva Muthaly (2011). The Effects of Advertising Spending on Brand Loyalty in Services. European Journal of Marketing, 45(4).
- Han, Y.K., Morgan, G.A., Kotsiopulos, A. and Kang-Park, J. (1991). Impulse Buying Behavior Of Apparel Purchasers. Clothing and Textile Research Journal, 9, 15-21.
- Kerfoot, Shona, Barry Davies and Ward, Philippa (2003). Visual Merchandising and the Creation of Discernible Retail Brands. International Journal of Retail & Distribution Management, 31(3).
- Kim, Jiyeon (2003). College Students' Apparel Impulse Buying Behaviors in Relation to Visual Merchandising. E-copy of the Phd thesis. Available on www.fcs.uga.edu/ss/docs/kim_jiyeon_200308_ms.pdf, *retrieved on 5 Sep 2011*
- *Kwon, Wi-Suk and Lennon, Sharron J. (2009). Reciprocal Effects Between Multichannel Retailers' Offline and Online Brand Images. Journal of Retailing, 85 (3) (September), 376-390.*

ISSN 2394 - 7780

- *Lea-Greenwood, Gaynor (1998). Visual Merchandising: A Neglected Area in UK Fashion Marketing. International Journal of Retail & Distribution Management, 26(8).*
- *Mehrabian, A. and Russell, James A. (1974). An Approach to Environmental Psychology. MIT Press: Cambridge.*
- Mills, K.H., Paul, J.E. & Moorman, K.B., (1995). Applied Visual Merchandising. 3rd ed. Prentice-Hall, Englewood Cliffs: New Jersey. p-2
- *Nogales, Fernandez and Suarez, M. Gomez (2005). Shelf Space Management of Private Labels: A Case Study in Spanish Retailing. Journal of Retailing and Consumer Services, 12 (3) (May), 205-216.*
- Sen, Sankar, Block, Lauren G. and Chandran, Sucharita (2002). Window Displays and Consumer Shopping Decisions. Journal of Retailing and Consumer Services, 9 (5) (September), 277-290.
- Seock, Yoo-Kyoung (2009). Influence of Retail Store Environmental Cues on Consumer Patronage Behavior across Different Retail Store Formats: An Empirical Analysis of US Hispanic Consumers. Journal of Retailing and Consumer Services, 16 (5) (September), 329-339.
- Somoon, Kanokwan and Sahachaisaeree, Nopadon (2010). Factors Determining Window Display Conveying Merchandise's Positioning and Style: A Case of Shopping Mall Clothing Display Targeting Undergraduate Students. Procedia - Social and Behavioural Sciences, 5, 1236-1240.
- Spangenberg, Eric R., Sprott, David E., Grohmann, Bianca and Tracy, Daniel L. (2006). Gender-congruent Ambient Scent Influences on Approach and Avoidance Behaviours in a Retail Store. Journal of Business Research, 59 (12) (November), 1281-1287.
- Sprott, David E. and Shimp, Terence A. (2004). Using Product Sampling to Augment the Perceived Quality of Store Brands. Journal of Retailing, 80 (4), 305-315.
- Summers, Teresa A. and Hebert, Paulette R. (2001). Shedding Some Light on Store Atmospherics: Influence of Illumination on Consumer Behavior. Journal of Business Research, 54 (2) (November), 145-150.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

A STUDY ON APPROACHES OF B-SCHOOLS IN MODERN ERA

Prof. Arti Sharma[1] and Prof. Priyanka Vijay[2]
Research Scholar[1] and Research Guide[2], Banasthali Vidhyapith, Rajasthan

ABSTRACT
Management Institute has an important role being played in a student's life. It can make their life whereas also demean the purpose of life hence it is very important to select the management institute carefully by the students and their guardians. Nowadays the education sector has also at the par of other organizations in respect to the marketing and advertising. Everything from rankings to placements to branding has become buzz word today and the importance which should be given to Learning, Innovation, Problem solving and Pedagogy etc. are disappearing. Management Institutes should emphasize on students preparation not on the current curriculum prevailing in the present organization but in advance on the basis of probability of organization changes. If students are really aided after studying the MBA Course and they are not able to get through campus placement but surely they will be able to crack many more interviews on their own, later in their life.

This paper highlights the understanding of Management Institute's priority and action plan which they design and the impact of it on to the students and their parents. The paper also highlights the marketing strategies' advantages and disadvantages to the institute.

Keywords: Management Institute, marketing, Development

INTRODUCTION
Management education is undergoing a rapid change. If we see the growth in the management education, it is enormous and expect to be same in future but with modifications into the operations and communication to the students and their parents. Management institute is a bridge between the present and future. Every courses, whether it is M.Com, MA, MSc. etc. produces not masters but managers. Management Institute is a network between organizations "customers" that is students, alumni, faculty members, and staff members. All are the pillars without which they cannot function. Here in an institute it is not only the dissemination of the knowledge which matters but also the way it is done that is with which technology and tools whether updated or outdated.

Another revolution in this area was done through ranking system initiated by Media which was first introduced in year 1988. After that all management institutes got engaged in various activities and focused on criteria's which were important to them to excel in ranking list. Hence product tinkering, packaging and marketing are more thought upon. Subsequent to this, the popularity of MBAs rose.

These Institutes are also affected by Global competition, as the time is passing on world is becoming smaller and students are moving to bigger cities and universities abroad for better prospects. Internet mode of communication and transportation has made life very easy and comfortable. Information sharing is quick and clear. Therefore to attract students has become very tough and complicated. Now the millennials understands the fake and genuine of information. They have their own area of interest and dreams to which they seek to fulfill by any means. Earlier this was the advantage to the higher income sector to receive education but now by the help of banks and other financial institutions providing loans to other sector and hence dreams of low and medium sector people are also promised to fulfil as they too can afford the management degree.

The number of B Schools has increased manifold. Now the challenges faced by the institute are to spread their existence and awareness into the market in front of the target customers. Every day customers are getting a bombarded of innumerable advertisements online and offline. Few of which he remembers and many gets slipped from his mind. Students are clever and they understand that all the glitters is not gold. They do complete analysis and research and make their mindsets before taking any admission. E-leaning and computer based learning packages are making inroads slowly.

In year 2016 many of the management institutes and engineering colleges were shut down throughout the country by the AICTE and UGC as they were not able to comply with basic requirements. Hence it has become a red signal to the existing institutions on to their survival. All Management Institutes are up on their knees to get all factors fulfilled, comply all the rules and regulations and get their maximum seats full. To get more and more admissions and enrollment of the students, they leave no stone unturned. Strategies like product strategy, price, place, promotion, distribution, process, physical evidence and placement are the different strategy prepared by the Management Institute to attract more and more students for admission.

ISSN 2394 - 7780

A business school not only imparts knowledge but also create knowledge. Here they study many new problems faced by the real world and come to solution by suggesting their recommendations which are further forwarded to the corporate houses after a lot of research and brainstorming hence B schools also act as a consultant to many of the SME's and big Corporate houses. Not only this even the government of India also seek advice and consultancy in relation to the policy formation in commerce industry

MANAGEMENT EDUCATION IN INDIA

Managers are required in every sector. India is a vast country and it has huge demand of managers which will remain evergreen. To fulfil the demand of future managers the management Institute has to be on the toes selecting and preparing the future managers. Quality is the need of an hour Hence government of India has made IIM's which cater the need of the world. In Mumbai there are many management institutes which are autonomous, private, state government approved and foreign collaborated. Few Institutes are world recognized like SP Jain Institute of management, Jamnalal Bajaj Institute, Xaviers Institute of management etc.

Moreover autonomous institutes approved by AICTE, universities running distance education program and open mode like IGNOU,NM College, Mumbai University- Alkesh Dinesh Mody , Bharti Vidhyapith University, ICFAI and several others are also offering courses in management. Some recognized institutes and universities are also offering 3 years part time program in evening faculty for working

REVIEW OF LITERATURE

Vipin Gupta, Kamala Gollakota and Ancheri Sreekumar presented paper on ***"Quality in Business Education: A Study of the Indian Context"*** reveals that recently, with the bursting of clicks as well as ethics bubbles, the credibility the business education has taken a beating. The rapid growth and proliferation of business schools, has led to the emergence of some schools having dubious quality – and business education has come under scrutiny The research article entitled ***"Management Education - Present Scenario in Indian Context"*** by Dr. T.Ramesh and Mr. P. Sreenafh reveals that management is of the most integrated, dynamic and civilized education system. The concerning aspect of management education are of high standard and yield oriented approach. AICTE which is known as highest apex body, is controlling the institution for achieving high quality with genius professionalism. The article written by Rajesh.S.Modi and Raju Rathod entitled ***"New Version of Education: Seed of Development"*** is mainly focused to address the key issues of current education system and how a new version of education can address the problems and bring a quality improvement in education , which is considered, to be a seed of development.

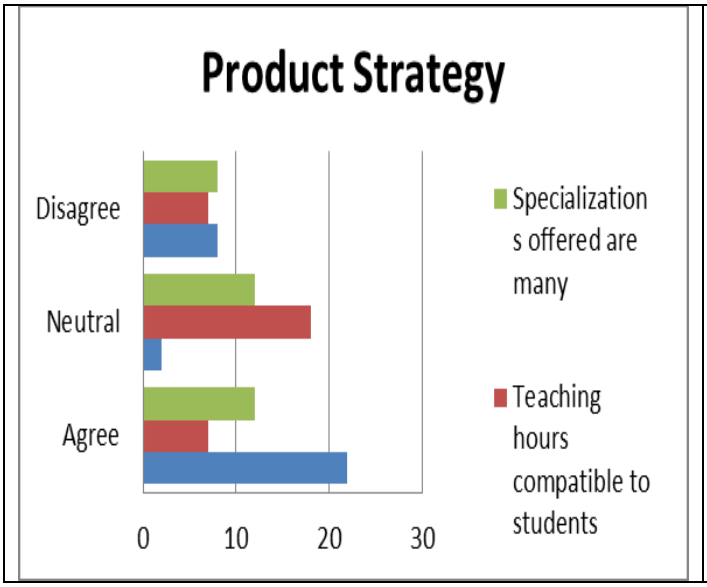
RESEARCH METHODOLOGY

The present study incorporates the collection of both primary and secondary data for an in depth investigation. Out of the questionnaires mailed to 35 institutes of selected B- schools in Mumbai region, 32 responded back, therefore the sample size for the Management Institute stands at 32. Secondary data has been selected through books, magazines, newspapers, thesis etc.

DATA FINDING, ANALYSIS AND INTERPRETATION

The data received from the survey done has been analyzed and interpreted as below

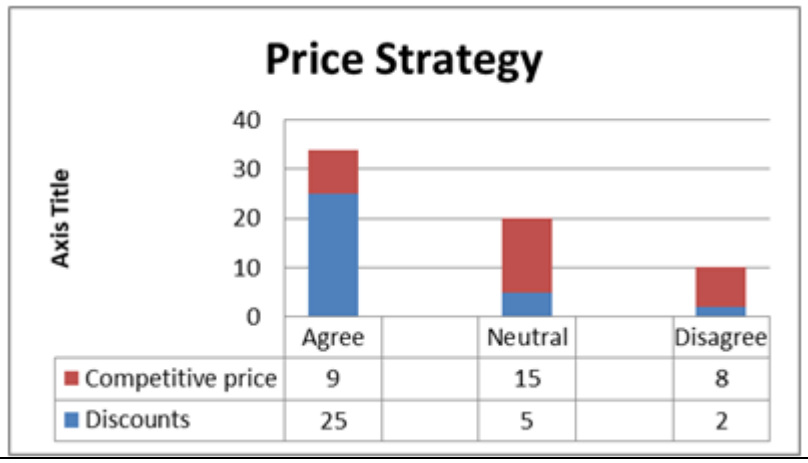
Table-1: Role of Product strategy in Development



Availability of Study Material, Compatibility of teaching hours and many specializations present. In which maximum respondents (22) agreed on study material should be available for students and least (7)about the teaching hours compatibility is necessary for the development of Management Institute..

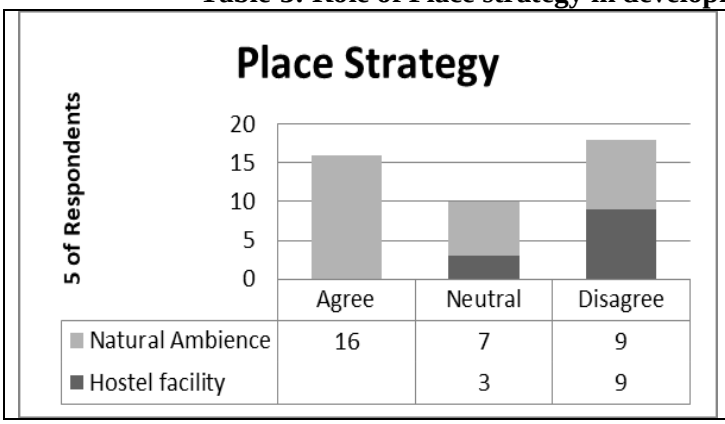
ISSN 2394 - 7780

Table-2: Role of Price strategy in development of Management Institute



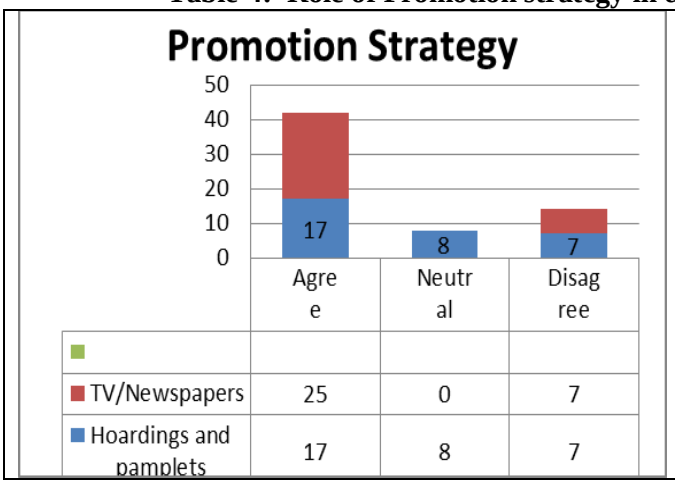
Competitive Price and Discounts are the Price strategy attributes which is used by the management Institute. Out of which Maximum Respondents (22) agreed on Discounts more effective in attracting students

Table-3: Role of Place strategy in development of Management Institute



Natural ambience and hostel Facility are the location strategy which is used by the management Institute. Out of which Maximum Respondents(20) agreed on hostel facility is more effective in attracting students.

Table-4: Role of Promotion strategy in development of Management Institute



TV/Newspapers and Hoardings and Pamphlets are the promotional tools which are used by Management Institutes. Out of which most of the respondents (25 out of 32) agreed TV and Newspapers which is more influential in attracting students

According to the survey conducted of 32 management Institutes the response has been categorized on the basis of 4 P's they are Product, Price, Place and Promotion Strategy.. The findings and Recommendations are as follows:-

FINDINGS AND RECOMMENDATIONS

There are various Recommendations to Management Institute which are as follows

- To attract Quality Students, it is suggested that Institutes should focus more on intangible factors like study material.
- The management Institute should emphasize more on Newspapers to update and for advertising purpose.
- Apart from good ambience the management Institute should focus more on Hostel Facility.
- Discounts also attract the students hence institute should focus on them. .

ISSN 2394 - 7780

CONCLUSION

The future of the management Institute is really frightening as more and more challenges are predicted in the course of time. The global Schools are real threat as they pull most of the bright students. Apart from this there are many short courses which are offered by many private agencies which pull major chunk of the target customers. Hence to get admissions and enrollment of the students that too with good quality of the students is not an easy task. Institutes are doing marketing and Branding but most important is that they move in the right direction. Just Placement and Infrastructure is not the only tool which will make them to fill the students. Institutes should not go behind 100 Percent Placement. They are the Institutes not the consultancies whose main aim is to get ready the students for future managerial role.

BIBLIOGRAPHY

- *AIMA Journal of Management & Research, November 2012, Volume 6, Issue 4/4, ISSN 0974-497 Copy right © 2012 AJMR-AIMA*
- Politis, D. A. (2009). 'Entrepreneurs Attitudes towards Failure: An Experimental
- Learning Approach '. *International Journal of Entrepreneurial Behaviour and Research*, 15(4), 364-383.
- Powell, S. G. (May -June 1995). 'The Teacher's Forum: Teaching the Art of Modeling to MBA Students'. *Interfaces,* 25(3), 88-94.
- Rubin, R. A. (2009). 'How Relevant is the MBA? ‘Assigning of the Alignment of the Required Curriculum and Required Managerial Competencies'. *Academy of Management Learning and Education,* 8(2), 208-224.
- Shepherd, D. A. (2008). 'MBA Admission Criteria and an Entrepreneurial Mind-Set:
- Evidence from Western Style of MBAs in India and Thailand '. *Academy of Management Learning and Education*, 7(2), 158-172.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

SOCIAL INSURANCE: SECURITY OR INSECURITY TO INDIAN LABOUR

Dr. Syeda Ruksana[1] and Prof. Badiuddin Ahmed[2]
Associate Professor[1], Deccan School of Management, Nampally, Hyderabad
Head[2], Department of Management Studies & Dean, School of Commerce &Business Management, MANUU, Gachibowli, Hyderabad

ABSTRACT
Social security is the protection given by the society to its members against contingencies of modern life such as sickness, unemployment, old age, invalidity, industrial accidents etc. In the present scenario social security is fast changing and social insurance and social assistance are moving closer to each other towards the common goal of a national system .Social insecurity means inability or lack of capacity of a person or individual to protect himself from the risks of unemployment, sickness, industrial accidents or disability ,old age and other contingencies. Industrial workers are under full of risks.In the early decades of 20th century, social security has become a fact of life for millions of people throughout the world..Social security is present understood as one of the dynamic concept of modern age which is influencing social as well as economic policy. The effective weapon of war is nuclear missile, social security is the most effective weapon of peace.

Keywords: Social, Security, Economic, Policy, Insurance.

INTRODUCTION
In the early times man lived with his family on fruits and honey in the heavenly gardens without doing any work. But now labour are striving to earn their bread, raiment and shelter .Because industrial workers are under full of risks. The basic purpose of social security is to protect people against contingencies of modern life .Each individual is unique and desires to live more independently with dignity .Being a part of society one cannot live in isolation. At every stage of development there have been people requiring medical aid and care, handicapped and old people unable for a living.

CONCEPT
In the early decades of 20th century, social security has become a fact of life for millions of people throughout the world. Social security measures have introduced an element of stability and protection in the midst of stress and strains of life. Social security is "an attack of five giants that effect workers wants, disease, ignorance, squalor, and idleness.it is not a burden but a kind of wise investment that offers good social dividends in long run." The underlying idea behind social security measures is that a citizen who has contributed to his country's welfare should be given protection against certain hazards.

Beveridge defined social security means "security of income to take the place of earnings when they are interrupted by unemployment, sickness to provide for retirement through age to provide against loss of support by the death of another person and to meet exceptional expenditure such as those concerned with birth, death and marriage".

The term social security is a combination of three separate trends:
1) An economic policy aimed at full employment.
2) Medical policy one of the equipment and organizations for the struggle against diseases, including preventive actions and best possible treatment.
3) A Policy of income distribution aimed at modifying the results of the blind interplay of economic forces and adapting the income of each individual and each family to those individuals having regard to all circumstances which may affect such income in the future

OBJECTIVES OF THE STUDY
To know whether social security is necessary for Indian labour

To understand the concept of social security

RESEARCH METHODOLOGY
Data has been gathered through secondary source , through journals, books ,websites.etc

SOCIAL INSURANCE AS A CONSTITUENT OF SOCIAL SECURITY
Social insurance and social assistance are the two pillars of social security. Social insurance involves collective efforts of beneficiaries. Because the beneficiary has to pay contribution before he is entitled to secure benefits

ISSN 2394 - 7780

.Thus the benefits are not gratuitous acts of the employer. They are systematically financed since it is subsidized by the state. Social insurance schemes specify certain contingencies in which benefits are provided to the persons specified. It provides security against risks. The main objective of social insurance is to serve society and its constituent individuals.

Besides social insurance schemes there are private insurance schemes which are in paid in such schemes and no medical benefits are provided. But in social insurance schemes a variety of benefits are provided to the beneficiary. An individual decides whether he wishes to have one or more number of risks covered.

SOCIAL INSURANCE

The ILO actively promotes polices and provides assistance to countries to help extend adequate levels of social protection to all members of the society these includes projects to help countries extend coverage at the national level and to strengthen community - community based social security organizations the preamble to the constitution of ILO contains the basic purposes for the attainment of which ILO has been established the ILO set forth a new fundamental principles at its 26th conference held in Philadelphia in 1994, known as Philadelphia declaration. It recognizes the obligation of the ILO to further among the nations of the world Programmes which would achieve

1. Full employment and the raising of standards of living
2. The extension of social security measures to provide a basic income to all in need of such protection and comprehensive medical care.
3. Adequate protection for life and health of workers in all occupations.
4. The effective recognition of the right of collective bargaining
5. Provision for child welfare and maternity protection
6. The provision of adequate nutrition, housing and facilitates for recreation and culture.

SOCIAL INSURANCE: INDIAN LABOUR LEGISLATION

A) E.S.I. ACT 1948: The Employee State Insurance Act,1948 is the most important comprehensive scheme for providing social security benefits. The scheme which was originally framed to cover perennial i.e.non seasonal factories using power and employing employees. It brings all the benefits medical benefits, sickness benefit, maternity benefit, dependents benefit, disablement benefit, and funeral benefit under one integrated scheme. All employees in factories and establishments covered under this act are to be insured. To claim the benefits under this act,in respect of both the employers and employees are to pay to the E.S.I Fund which is administered by the E.S.I Corporation. The rates of the contribution were 1.75% employees' wages payable by the employees and 4.75% employees' wages payable by the employers.Employees who are getting wages Rs 40/per day do not have to pay contributions, but they receive benefits as a matter of right. The state govt bear 1/8 of the expenditure on medical benefit.

B) PROVIDENT FUND LEGISLATION: In 1951 the labour ministers conference emphasized the urgency of enacting the employees provident funds and Miscellaneous provisions act in 1952.the objectives of the act are

Make provisions for the future of the industrial worker after retirement or for his dependents in case of his early deaths.

To inculcate among the workers the habit of regular savings

To encourage the stabilization of a steady labour force in the industrial centers.

A new scheme called employees deposit linked scheme came into force with effect from august 1st 1976.the employee members are required to contribute to this scheme but they are required to pay contribution at the rate of 0.5% employee wages. An amendment to employees provident fund act 1953 provided the employees family pension scheme in 1971 which was amended in 1995with the retrospective effect from 1st April 1993. Under the pension scheme neither the employer nor the employee is required to contribute any additional amount.

Social insurance: recommendations of the second national commission on labour

The second national commission on labour was appointed by the govt of India on October 15th 1999 under the chairmanship of Ravindra varma former minister of labour, government of India. The commission submitted its report on June 2002.The terms of reference of the commission were

ISSN 2394 - 7780

To suggest rationalization of the existing laws relating to labour .

To suggest an umbrella legislation for ensuring a minimum level of protection to the workers.

Provident funds, gratuity and unemployment insurance

A law to place all the provident funds under a common regime seemed to be desirable and EPF act be made applicable to classes of establishment.

Appropriate provisions has to be made in the EPF act to enable the organization to frame different schemes with different contributory and benefit packages .

The payment of gratuity act may be integrated with EPF act to convert in to a comprehensive social insurance scheme.

An Unemployment insurance scheme should be introduced to code with unaccepetable levels of unemployment resulting from the implementation of the structural adjustment programmes and other economic reforms.

CONCLUSION

In the present scenario social security is fast changing and social insurance are moving closer to each other towards the common goal of a national system of social security. Many believe that the social insurance schemes are preferable to other forms of protection like social assistance, employer liability and social allowance schemes .Today many countries have comprehensive social insurance schemes which cover a large majority of population and provide protection against a wide range of contingencies and India is not an exception.

REFERENCES

1. M.V. Moorthy: Principles of Labour Welfare (1982)
2. Govt. of India: Report on National Commission on Labour (1969)
3. V. George: Social Security: Beveridge and after (1968)
4. Govt. of India: Report on National Commission on Labour (1969)
5. W. Beveridge: Report on Social Insurance and allied services (1942)
6. I.L.O. : Approaches to Social Security : An International Survey (1942)
7. P. Laroeve: “From Social Insurance to social security” International Labour Review; vol 57 (1958)
8. I.L.O: Approaches to Social Security: An International Survey (1942)
9. Conventions and Recommendations of I.L.O (1949)
10. I.L.O.
11. Haber and Cohen: Social security programmes problems and policies. (1960)
12. Ibid
13. I.L.O.: The International Labour Code (1951)
14. Ibid
15. Sinha, and Shekhar : Industrial Relations, Trade Unions and Labour Legislations (2004)
16. Oberai, Sivananathiram, C.S. Venkata Ratnam: Perspectives on unorganized labour.(2000).
17. Ibid.
18. Govt. Of India: Report of National Commission on Labour. (2002).

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

"IS ART EVIL"? THE INTERVENTION OF CATEGORICAL IMPERATIVE IN COLERIDGE'S PHILOSOPHY TOWARDS THE END OF HIS CAREER

Tarun Tapas Mukherjee
Assistant Professor, P.G Department of English, Bhatter College, Paschim Medinipur, West Bengal, India
Email: ttm1974@gmail.com

ABSTRACT
Generally, the readers of Coleridge are baffled by the lack of secular creative writings towards the end of his career. While many ascribe this to the lack of creative inspiration and power, we find that the poet devoted himself to elaborate and complex philosophical and theological deliberations and did not lack intellectual power. Nor can it be ascribed to the effect of his opium addiction. The article makes an attempt at exploring whether Coleridge, towards the end of his life, considered the power of Imagination—previously glorified in an elevated manner, something evil and hence rejected art. There are some implicit traces of evidence associated with his acceptance of the Christian doctrine of faith and rejection of reason. This is very much evident in his appropriation of the Kantian concept of "Categorical Imperative", which can be found in his "Essay on Faith", Aids to Reflection and other writings.

INTRODUCTION

The year 1816 marked the beginning of a phase of "new life and new friends" in Coleridge's life when he started undergoing treatment under Mr. Gillman, a surgeon at Highgate. Robert Mitchel recounts,

… the recuperative residency with Or. Gillman, begun in the spring of 1816, was a way of trying to reconstellate his biography and this new volume of poetry, positioning them as the slatting points of a path that would allow Coleridge to regain his former reputation as a practicing and vital author. And by the fall of 1816, it was clear the arrangement was working: Gillman had been able to moderate Coleridge's use of opium, and Coleridge himself was again able to write. (Mitchel, 2013, p. 81)

After the successful therapy, he began to engage himself in higher-level philosophical and religious inquiries. McFarland pertinently commented: "Coleridge's later works signal a return to Kant after the ill-fated flirtation with the idealism of Schelling and Fichte in *Biographia Literaria*" (McFarland 1993, 198). After 1815 Coleridge would place "less emphasis on restorative power of the imagination" (Milnes 2008, 57). Instead, "the proper use of Reason serves to correct the errors of the Understanding" (Orsini 1969, 140). The period was marked by his return to the Christian faith. He wrote "Essay on Faith" (written in 1820 and published in 1838), *Aids to Reflection* (published in 1825) and *Confessions of an Inquiring Spirit* (published in 1840). In these writings, we can trace also a return to Kant, whom he read during 1790s after his first German visit. The Kantian concept of "Categorical Imperative" helped him resolve his doubts and find peace with the world and himself.

THE CONCEPT OF CATEGORICAL IMPERATIVE

Dissatisfied with the contemporary sense of morality Kant introduced the concept of Categorical Imperative in *Groundwork of the Metaphysic of Morals* in 1785 in order to evaluate motivations for action. Opposed to the Hypothetical Imperatives which involve wishing to attain certain ends, a categorical imperative denotes an absolute, unconditional requirement. This conception of a categorical imperative leads Kant to declare his own formulation of the categorical imperative:

Act only according to that maxim whereby you can at the same time will that it should become a universal law." (Kant, 1997).

The categorical imperative is both universal and impartial because all rational people would act in exactly the same way, and impartial because their actions are not influenced by their own prejudices but rather by respect for the autonomy and dignity of every human being and a refusal to put their own personal goals ahead of the respect that others deserve. (Pecorino, 2002)

From the perspective of Christianity, the Categorical Imperative is something to be understood as Calling, God's calling within the heart, that is, Conscience. In this connection what Gianni Vattimo and Santiago Zabala write about the Categorical Imperative in the postmodern context sounds pertinent:

It should not be forgotten that the categorical imperative of Kant in its most memorable formulations does little more than express in secular terms that Christian imperative of *caritas*. (Gianni Vattimo and Santiago Zabala, 2003, 403)

ISSN 2394 - 7780

THE KANTIAN SCHEME

The Kantian scheme of categories indeed fits squarely with Coleridge's personal exploration of the philosophical-epistemological psychology as the seventeenth or eighteenth centuries understood the discipline and as Kant's description of the system of categories was beginning to offer a new methodological approach towards the knowledge of the faculties and tendencies of the mind. Indeed, even as Kant describes a synchronized hierarchical system of faculties Coleridge was trying to understand and negotiate with the Kantian scheme, but interestingly he was also developing his own hermeneutics, based on a loose idea of a system but a very well-grounded notion of how the human faculties of perception were related to its transcendent callings. The Kantian scheme suggests an efflorescence of the human faculties of understanding, beginning with "understanding" or *Verstand* and transcending through the system of self-reflexively available perceptivities towards the sense of "reason" and the rational and counter-rational notion of Kant's categorical imperative. This same scheme applies to Coleridge's exegetical notion of the conscience as a calling. Then Coleridge posits the question of human art at this juncture. Why is art no longer relevant to human perceptions of the "conscience"? The fact that the conscience transcends the rational imaginative faculty of poetry or artistic representations symbolizes a crisis within Coleridge's religious psychology as opposed to the Kantian psychological scheme. Conscience is beyond human needs of reason -hence Coleridge asks if art is apostate, rational, or even evil? Kant does not negotiate with this question. His scheme does not recognize the notion of art.

In *Critique of Pure Reason* (1781), Kant said that understanding the world occurs through perception and Reason is derived from understanding. Human society, historical human achievements, civilizations owe to Reason. In *Critique of Judgement* (1790) Kant considered Judgement a higher form of Reason, which helps us in establishing justice, ethics, and discrimination. Kant thought that within the faculty of judgment, there is still something higher, which is Conscience. Conscience is derived from Reason, but it is opposite to Reason. Conscience is another polarity of Reason, still it is against Reason. Again, Reason is a plurality and multiplicity which takes many forms. Conscience tells humans that whatever Reason has done is meaningless as everything is a matter of God's Will. God's will is manifested neither in understanding or reason but in a refined faculty, 'Conscience'. Conscience is calling and Kant made a happy merging of philosophy with Christianity. The greatest example is Jesus Christ's sacrificing his life and following the CI by communicating God's message of Love through a process of self-emptying (of the mind) propagated by the orthodox church or Kenosis in Greek. Coleridge "implicitly affirms the doctrine of *kenosis*" (Haney, 2010, 91) when he writes in *Aids to Reflection*:

Fix thy thought on what Christ did, what Christ suffered, what Christ is—as if thou wouldst fill the hollowness of thy soul with Christ. If (Christ) emptied himself of glory to become Sin for thy salvation, must not thou be emptied of thy Self to become Righteousness in and through his agony and the effective merits of his Cross? (*Aids*, 243)

At that very moment when the CI starts 'calling' a human, s/he leaves the world of reason through a process of transcendence. Self-emptying is not possible as long as Reason has a hold on the person.

COLERIDGE AND THE CATEGORICAL IMPERATIVE

Coleridge could understand Kant only after 1815 and applied the Categorical Imperative to solving his moral dilemmas and finding out a solution to his intellectual struggle. Coleridge drew upon the concepts of Imagination also from Kant who discussed Imagination in detail in *Critique of Pure Reason and Observations on the Feeling of the Beautiful and Sublime* (1764). Coleridge followed the Kantian concept when he tried to understand the functions of imagination. Certain activities there like mental images, categories, memories, and assimilation are processed by the mind through the proactive Reason of the soul. This development needs to be understood as rational imagination. Society develops through this and creativity is possible.

Kant did not proceed with the Categorical Imperative further. Coleridge took up from where Kant left. In *Coleridge's Philosophy of Faith: Symbol, Allegory, and Hermeneutics*, Joel Harter summarizes this in the following manner:

Coleridge first appropriates Kant to affirm God transcendentally: we cannot experience anything at all unless we implicitly presuppose God. Our knowledge is active: the mind is prior to any experience or perception, and the mind organizes and gives unity a sensory manifold that otherwise would be complete chaos for us. The mind therefore must trust itself, and in this sense all of us must live by faith. (103-104)

Thomas McFarland argues that the distinction between understanding and reason "was the keystone in the arch of Coleridge's thought; it was the ultimate, the ne plus ultra, of all his mentation." (McFarland, 1993 168)

ISSN 2394 - 7780

THE CATEGORICAL IMPERATIVE IN COLERIDGE'S "ESSAY ON FAITH"

At the beginning of "Essay on Faith" Coleridge applies the Categorical Imperative in order to illustrate his formulation of Faith as "fidelity to our own being, so far as such being is not and cannot become an object of the senses" (Coleridge, 1839, 425:

That I am conscious of something within me peremptorily commanding me to do unto others as I would they should do unto me; in other words a categorical … imperative; that the maxim (regula maxima, or supreme rule) of my actions, both inward and outward, should be such as I could, without any contradiction arising therefrom, will to be the law of all moral and rational beings. (Faith, 425)

While Kant was concerned with ethics and the application of Reason in his formulation, Coleridge tries to use it from the Christian point of view and goes on to introduce 'conscience':

that consciousness of this fact is the root of all other consciousness, and the only practical contradistinction of man from the brutes, we name it the conscience, by the natural absence or presumed presence of which the law, both Divine and human, determines whether X Y Z be a thing or a person; the conscience being that which never to have had places the objects in the same order of things as the brutes, for example, idiots, and to have lost which implies either insanity or apostasy. (Faith, 426)

According to him, certain actions inspired by 'conscience' follow from "commands or dictates". Coleridge here seems to be taking a radically different position from the contemporary empiricist British philosophy in calling sense perception a passive affair:

In the senses we find our receptivity, and as far as our personal being is concerned, we are passive, but in the fact of the conscience we are not only agents, but it is by this alone that we know ourselves to be such…(Faith, 426-27)

The awareness of 'conscience' results in the "consciousness of responsibility". What follows from Coleridge in the next step towards fixing allegiance to 'conscience' is,

…the initiation of the process, the becoming conscious of a conscience -- partakes of the nature of an act. It is an act in and by which we take upon ourselves an allegiance, and consequently the obligation of fealty; and this fealty or fidelity implying the power of being unfaithful, it is the first and fundamental sense of faith. (Faith, 427-28)

Then Coleridge goes on to declare the final aspect about 'conscience' which is understood in Christianity as the "Voice of God" and "Calling".

The will of God is the last ground and final aim of all our duties, and to that the whole man is to be harmonised by subordination, subjugation, or suppression alike in commission and omission. But the will of God… is revealed to man through the conscience. But the conscience… is the consciousness of the subordination or insubordination, the harmony or discord, of the personal will of man to and with the representative of the will of God. (Faith, 437)

In this essay, Coleridge declares talks about the role of 'Reason' in the attainment of 'Conscience' in an elaborate manner and finally includes the intervention of 'Reason':

Faith subsists in the *synthesis* of the Reason and the individual Will. (Faith, 437-38)

This point is restated and reaffirmed in the following passage:

"*Faith must be light originating in the Logos, or the substantial reason, which is co-eternal and one with Holy Will, and which light is the same time the life of men*…[Faith is] the source and the sum, the energy and the principle of the fidelity of man to God, by the subordination of his human Will…to his Reason, as the sum of spiritual Truth, representing and manifesting the Will Divine." (Faith, 438)

But here we must remember that Coleridge was using the term 'Reason' in the Kantian sense and was following the Kantian scheme in which though 'Conscience' is derived from Reason, it is opposite of Reason, which is pluralistic and involves multiplicity. Conscience is another polarity of Reason, still it is against Reason. For Coleridge, Conscience is God's Voice. The intellectual tradition (and God's Voice) imparts that human creation will not last. So humans must surrender themselves to God in order to find the ultimate glory, not in mortal creation. In the creative acts, there is no God's Voice as God's Voice wants self-emptying.

ISSN 2394 - 7780

BEGINNING OF EXISTENTIALISM

Existentialism states that with the employment of Reason humans cannot understand everything and humans cannot leave Reason as long as they have bodily existence on this earth. It is impossible to go from Reason to Conscience. We can appropriately proceed with the discussion on the ground on which Kierkegaard rejected a "rational and philosophical" Christianity. He thought Christianity made a mistake by attempting to be rational when it should have been based on trust. Faith involves acting in a certain way that may not follow from rational thinking. In his well-known recounting of the biblical tale of Abraham and his son Isaac, Kierkegaard proved that Abraham was not justified in offering up his son merely because God commanded him to do so. Instead, he acted in faith by obeying his God's commands. Abraham's behaviour was unethical from an ethical standpoint, but it is valid from the ground of faith as it transcends reason and ethics. So humans can stay with either Reason or Faith; in either case the other becomes meaningless. These considerations lead to the first basic idea of existentialism: "Reason is an inadequate instrument with which to comprehend the depth, mystery, and meaning of life." (Messerly, 2017)

So following the rational philosophical system we cannot attain Faith through Reason. There is no bridge between Reason and Faith; there is only an 'abyss' beyond Reason. Coleridge elsewhere called this gap 'absurd' (*Aids to Reflection*). There is only a leap of Faith and Coleridge embraced this in his philosophy.

NOT TO CONCLUDE: ART IS EVIL?

Now we come to the vital part of the argument: did Coleridge in the last phase of his intellectual career, come to think of art as something evil? The philosophical equation that Coleridge made indirectly points to his withdrawal from artistic creativity. Choice has to be made by humans regarding the path to follow: the path of "human reason" or the path of faith, the voice of God which is 'Calling' under Grace. Following human reason, art is beautiful and art is imagination. But when there is the Voice of God calling, one leaves this beautiful world of art. Coleridge never explicitly said anything about the 'evil' nature of art. But even in the "Essay on Faith, there are some sentences that raise this suspicion. For instance,

We learn that there are many things *contrary to conscience*, and therefore *to be rejected and utterly excluded*, and many that can coexist with its supremacy only by being subjugated as beasts of burthen; and others again, as for instance *the social tendernesses and affections, and the faculties and excitations of the intellect, which must be at least subordinated*. (Faith, 430) [emphasis mine]

Coleridge wrote nothing 'creative' during his last years; his last years are said to be associated with his loss of creative power. Instead, he dedicated himself to the overstated discussions and correspondences about the questions of Reason, Understanding, Conscience and God etc. The huge body of prose works of lengthy deliberations proves that his intellectual faculties were not negatively affected by his illness and drug addiction. He merely changed his mode of thinking and channelized his energies to exploring the philosophical and theological questions of his times. But this change indirectly points to his acceptance of greater intellectual undertakings where producing creative art became less important. Indirectly or implicitly this hints at his rejection of art in favour of the former. So, this change can be ascribed to his understanding of the higher 'truths' about life and the world. We need to find out whether his development and adoption of the new faith where surrendering to the Will of God was ultimately the most beautiful aim (Conscience and Calling) rather than creating his own art (imagination) through Reason, the voice of the apostate as opposed to the voice of God.

REFERENCES

- Beer, John. 1974. Coleridge's Variety: Bicentenary Studies. United Kingdom: Palgrave Macmillan UK.
- Coleridge, S. T. 1843. *Aids to Reflection*. United Kingdom: W. Pickering.
- Coleridge, S. T. Letters of Samuel Taylor Coleridge. Ed. E.H. Coleridge. United States, Houghton, Mifflin, 1895.
- Coleridge, S. T. 1839. *The Literary Remains of Samuel Taylor Coleridge*. Edited by H. N. Coleridge. United Kingdom: W. Pickering.
- Coleridge, S. T. 1895. *Letters of Samuel Taylor Coleridge*. Edited by E.H. Coleridge. United States: Houghton, Mifflin.
- Gianni, Vattimo and Santiago Zabala. 2003. "Ethics without transcendence?," in *Common Knowledge*, 9 (2003), 403.

ISSN 2394 - 7780

- Haney, D. P. 2010. *The Challenge of Coleridge: Ethics and Interpretation in Romanticism and Modern Philosophy*. (n.p.): Pennsylvania State University Press.
- *Harter, Joel.* 2011. *Coleridge's Philosophy of Faith: Symbol, Allegory, and Hermeneutics (Religion in Philosophy and Theology)*. Mohr Siebeck.
- Kant, I. 1997. *The Moral Law: Groundwork of the Metaphysic of Morals*, Routledge, London
- McFarland, Thomas. 1993. "Aspects of Coleridge's Distinction Between Reason and Understanding," Coleridge's Visionary Languages: Essays in Honour of J.B. Beer, eds. Tim Fulford and Morton D. Paley. Cambridge: D.S. Brewer, 1993)
- Messerly, John. 2017. "Summary of Existentialism". Reason and Meaning. Website. https://reasonandmeaning.com/2017/12/11/the-basic-ideas-of-existentialism
- Milnes, Tim. 2008. "Coleridge's Logic". In *British Logic in the Nineteenth Century*, edited by Dov M. Gabbay, John Woods. Netherlands: Elsevier Science.
- Mitchell, R. 2013. Experimental Life: Vitalism in Romantic Science and Literature. United States: Johns Hopkins University Press.
- Mitchell, Robert. Experimental Life: Vitalism in Romantic Science and Literature. United States, Johns Hopkins University Press, 2013.
- Orsini, G.N.G. 1969. *Coleridge and German Idealism*. Southern Illinois University Press, 1969.
- Pecorino, P. A. 2002. "Ethical Traditions". https://www.qcc.cuny.edu/socialsciences/ppecorino/medical_ethics_text/Chapter_2_Ethical_Traditions/Categorical_Imperative.htm
- E.H. Coleridge included the letters written between 1816-1821 under the chapter title, "New Life and New Friends". (Coleridge, 1895, p. 657)

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

EFFECTIVE STRATEGIES TO PREVENT INDUSTRIAL WASTE IN REMOTE REGIONS: SPECIAL REFERENCE TO INDIA

Dr. Gulab Pathan
Head, Department of Sociology, Poona College of Arts, Science and Commerce, Camp, Pune
gulap.pathan@poonacollege.edu.in

ABSTRACT
This research paper aims to discuss effective ways to prevent industrial waste in remote regions, with a special focus on India. Industrial waste poses significant environmental and health challenges, particularly in remote areas where access to waste management infrastructure is limited. The paper explores various strategies to mitigate industrial waste generation and emphasizes the need for sustainable practices and regulatory measures. Additionally, it examines India's unique context and highlights specific initiatives and policies that have been implemented to address industrial waste in remote regions. The research findings underscore the importance of collaboration between stakeholders and the integration of technological advancements in waste management practices.

INTRODUCTION
Background: Industrial activities are crucial for economic growth and development, but they often generate significant amounts of waste that can have detrimental effects on the environment and human health. Remote regions, characterized by limited infrastructure and geographical isolation, face unique challenges in managing industrial waste effectively. These regions often lack proper waste management systems, leading to the accumulation of hazardous materials and pollutants.

India, with its diverse industrial sector and vast geographical spread, is a particularly relevant case study for examining the issue of industrial waste in remote regions. The country has experienced rapid industrialization, resulting in increased waste generation and pollution. The remote regions of India face additional hurdles in waste management due to limited resources, inadequate awareness, and a lack of regulatory oversight. Understanding the effective ways to prevent industrial waste in these areas is crucial for sustainable development and environmental preservation.

Problem Statement: The problem of industrial waste management in remote regions of India is multi-faceted. Challenges such as inadequate waste infrastructure, limited access to technology and resources, insufficient awareness among stakeholders, and a lack of effective regulatory frameworks contribute to the improper disposal and accumulation of industrial waste. This leads to environmental degradation, contamination of water bodies, soil pollution, and health hazards for the local population.

Addressing these challenges requires identifying and implementing effective strategies to prevent industrial waste generation, promote sustainable practices, and establish robust waste management systems in remote regions. It is essential to analyze the current state of industrial waste management in these areas, assess the existing policies and initiatives, and identify gaps that need to be addressed for a comprehensive and sustainable solution.

THE OBJECTIVES OF THIS RESEARCH PAPER ARE AS FOLLOWS:
1. To analyze the current state of industrial waste management in remote regions of India, taking into account the unique challenges and constraints they face.
2. To explore and discuss effective strategies for preventing industrial waste generation, emphasizing waste minimization, recycling, sustainable manufacturing practices, and effluent treatment.
3. To examine the regulatory framework and policy initiatives in India concerning industrial waste management, evaluating their effectiveness in remote regions.
4. To highlight technological innovations and advancements that can be leveraged for efficient waste management in remote areas.
5. To present case studies of successful waste management practices in remote regions, both from India and other parts of the world, and derive lessons and best practices.
6. To identify the key challenges and limitations in preventing industrial waste in remote regions and provide recommendations for overcoming them.

ISSN 2394 - 7780

7. To emphasize the importance of collaboration among stakeholders, including government bodies, industries, local communities, and non-governmental organizations, in implementing effective waste management practices.

By addressing these objectives, this research paper aims to contribute to the understanding of industrial waste management in remote regions, with a specific focus on India, and provide valuable insights for policymakers, industries, and communities to develop and implement sustainable waste management practices.

Definition and Classification of Industrial Waste: Industrial waste refers to any waste generated as a byproduct of industrial processes, manufacturing operations, or commercial activities. It includes various types of waste materials, such as solid waste, liquid waste, gaseous emissions, and hazardous substances. Industrial waste can originate from sectors such as manufacturing, mining, construction, energy production, and chemical processing.

Industrial waste can be classified into different categories based on its characteristics, composition, and potential hazards. Common classifications include:

1. **Solid Waste:** This includes non-liquid waste materials such as scrap metal, packaging materials, construction debris, and sludge.
2. **Hazardous Waste:** These are wastes that possess properties that make them potentially harmful to human health or the environment. Examples include toxic chemicals, heavy metals, and contaminated soils.
3. **E-waste:** Electronic waste comprises discarded electrical and electronic devices like computers, televisions, and mobile phones. It contains hazardous materials like lead, mercury, and cadmium.
4. **Wastewater and Effluents:** Liquid waste generated from industrial processes, containing pollutants and contaminants that can adversely impact water bodies and ecosystems.

Environmental and Health Implications: Industrial waste poses significant environmental and health implications, both locally and globally. Some key impacts include:

1. **Water Pollution:** Improper disposal or discharge of industrial wastewater can contaminate water bodies, affecting aquatic ecosystems and the availability of clean water for human consumption. It can lead to the accumulation of toxic chemicals, heavy metals, and pathogens in rivers, lakes, and groundwater.
2. **Soil Contamination:** Industrial waste, especially hazardous substances and chemicals, can contaminate soil, rendering it unsuitable for agriculture or other uses. Contaminated soil can pose risks to human health through direct exposure or the uptake of pollutants by plants.
3. **Air Pollution:** Industrial activities release various pollutants into the atmosphere, including greenhouse gases, particulate matter, and toxic emissions. These pollutants contribute to air pollution, leading to respiratory diseases, reduced air quality, and climate change.
4. **Ecological Disruption:** The discharge of industrial waste into natural habitats can disrupt ecosystems, causing the loss of biodiversity, habitat degradation, and adverse effects on flora and fauna.
5. **Human Health Risks:** Exposure to hazardous substances present in industrial waste can have severe health consequences for workers, local communities, and consumers. Health risks may include respiratory disorders, neurological effects, reproductive disorders, and cancer.

Challenges in Remote Regions: Remote regions face specific challenges in managing industrial waste effectively:

1. **Limited Infrastructure:** Remote areas often lack proper waste management infrastructure, such as waste treatment facilities, recycling centers, and disposal sites. The transportation of waste to distant facilities can be costly and logistically challenging.
2. **Geographical Isolation**: Remote regions are often located in geographically challenging terrains, such as mountains, islands, or forests. This makes waste management operations more difficult, as access to these areas may be restricted, and the availability of skilled personnel and equipment may be limited.
3. **Lack of Awareness and Education:** Remote communities may have limited awareness and understanding of proper waste management practices and the potential environmental and health impacts of industrial waste. Lack of education and awareness can lead to improper waste disposal and ineffective waste segregation.

ISSN 2394 - 7780

4. **Resource Constraints:** Limited financial resources and funding options can hinder the implementation of waste management infrastructure and initiatives in remote regions. These areas may also face challenges in accessing appropriate technology and expertise due to financial limitations.
5. **Regulatory Enforcement:** Remote regions may experience weaker regulatory enforcement compared to urban areas, making it easier for industries to neglect waste management obligations. A lack of monitoring and oversight can lead to non-compliance and improper waste disposal practices.

Waste Minimization and Source Reduction: One of the most effective strategies to prevent industrial waste is to minimize waste generation at the source. This can be achieved through various approaches, including:

- **Process Optimization:** Industries can optimize their production processes to minimize waste generation. This involves using raw materials efficiently, improving production techniques, and implementing cleaner production practices.
- **Material Substitution:** Identifying alternative materials or chemicals that are less hazardous or generate less waste can significantly reduce industrial waste. This approach involves researching and adopting eco-friendly alternatives without compromising product quality or performance.
- Inventory Management: Efficient inventory management practices can reduce waste by preventing overstocking or spoilage of raw materials and finished products. Implementing just-in-time production and inventory control systems can help minimize waste and optimize resource utilization.

Recycling and Resource Recovery: Recycling and resource recovery play a crucial role in minimizing the environmental impact of industrial waste. Key strategies include:

- **Implementing Recycling Programs:** Industries should establish comprehensive recycling programs to segregate and collect recyclable materials, such as paper, plastic, glass, and metals. Partnering with recycling companies or establishing in-house recycling facilities can promote resource recovery and reduce waste sent to landfills.
- **Waste-to-Energy Conversion:** Technologies such as waste-to-energy plants can convert non-recyclable waste into usable energy sources like electricity or heat. This approach not only minimizes waste but also reduces reliance on fossil fuels and mitigates greenhouse gas emissions.
- **Industrial Symbiosis:** Encouraging industrial symbiosis networks where waste from one industry becomes a resource for another can promote resource recovery and minimize waste generation. By-products or waste materials from one industry can be utilized as feedstock or raw materials by another industry, reducing overall waste generation.

Sustainable Manufacturing Practices: Implementing sustainable manufacturing practices can significantly reduce industrial waste. Some strategies to consider include:

- **Design for Environment (DfE):** Adopting DfE principles involves considering environmental factors during the product design stage. This approach focuses on using eco-friendly materials, reducing waste during production, and designing products that are easier to recycle or dispose of sustainably.
- **Lean Manufacturing:** Lean manufacturing principles aim to eliminate waste in production processes by identifying and minimizing non-value-added activities. This can reduce material waste, energy consumption, and environmental impact.
- **Circular Economy Approaches:** Embracing the principles of a circular economy, such as product life extension, repair and refurbishment, and remanufacturing, can minimize waste generation and promote resource efficiency. This approach encourages the reuse, recycling, and repurposing of products and materials.

Effluent Treatment and Water Conservation: Efficient treatment of industrial effluents and water conservation measures are essential in preventing water pollution and reducing water usage. Strategies include:

- **Implementing Effective Effluent Treatment Systems:** Industries must invest in proper effluent treatment systems to remove pollutants before discharging wastewater. Technologies like biological treatment, filtration, and advanced oxidation processes can be utilized.

ISSN 2394 - 7780

- **Water Recycling and Reuse:** Implementing water recycling systems within industries can help reduce freshwater consumption and minimize the discharge of industrial effluents. Treated wastewater can be reused for non-potable purposes such as irrigation, cooling, or cleaning.
- **Water Conservation Practices:** Industries should adopt water conservation practices such as leak detection and repair, process optimization to minimize water usage, and implementing water-efficient technologies and equipment.

Collaboration and Knowledge Sharing: Collaboration and knowledge sharing among stakeholders are vital for effective waste prevention. Strategies include:

- **Stakeholder Engagement:** Engaging relevant stakeholders, including industries, government agencies, local communities, and non-governmental organizations, fosters collective responsibility and participation in waste prevention efforts. Collaboration can lead to the exchange of ideas, best practices, and innovative solutions.
- **Training and Capacity Building:** Providing training and capacity-building programs for industries and waste management professionals in remote regions can enhance their knowledge and skills in waste prevention and management. This includes training on waste segregation, recycling practices, and sustainable manufacturing techniques.
- **Research and Development:** Encouraging research and development initiatives to identify innovative waste management technologies and practices specific to remote regions. This can include funding research projects, establishing research partnerships, and promoting technology transfer.
- **Information Sharing Platforms:** Creating platforms for sharing best practices, success stories, and lessons learned can facilitate knowledge exchange and inspire others to adopt effective waste prevention strategies. This can include online forums, conferences, workshops, and industry-specific networks.

Environmental Regulations and Compliance: In India, environmental regulations play a crucial role in managing industrial waste. The key regulatory framework includes:

- **The Water (Prevention and Control of Pollution) Act, 1974:** This act establishes provisions for preventing and controlling water pollution and requires industries to obtain consent for the discharge of wastewater. It also empowers the Central and State Pollution Control Boards to regulate and monitor industrial pollution.
- **The Air (Prevention and Control of Pollution) Act, 1981:** This act aims to prevent and control air pollution, including emissions from industrial processes. It sets emission standards for industries and mandates obtaining consent for the establishment and operation of industries.
- **The Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016:** These rules regulate the generation, collection, storage, treatment, and disposal of hazardous wastes. It outlines the responsibilities of industries and requires them to obtain authorization for hazardous waste management.
- **The Plastic Waste Management Rules, 2016:** These rules focus on the management and handling of plastic waste. They require industries to take measures for the collection, segregation, processing, and disposal of plastic waste. It also promotes the use of eco-friendly alternatives to plastics.

Compliance with these regulations is essential to ensure proper waste management practices and minimize environmental impact. Non-compliance can result in penalties, closure of operations, or legal action.

Extended Producer Responsibility (EPR): Extended Producer Responsibility (EPR) is a policy approach that holds manufacturers responsible for the environmental impact of their products throughout their lifecycle, including waste management. In India, the concept of EPR has been incorporated into several waste management rules, such as the E-Waste Management Rules, 2016, and the Plastic Waste Management Rules, 2016.

Under EPR, manufacturers are required to take responsibility for the collection, recycling, and safe disposal of their products' waste. They are also encouraged to adopt eco-design practices, promote recycling, and raise awareness among consumers. EPR initiatives help in reducing the burden on municipal waste management systems and promote sustainable waste management practices.

ISSN 2394 - 7780

Pollution Control Boards and Monitoring Mechanisms: In India, pollution control boards at the central and state levels play a vital role in regulating and monitoring industrial pollution, including industrial waste management. The Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) oversee the implementation of environmental regulations, issue consent and authorization for industries, and conduct periodic monitoring and inspections.

These boards are responsible for evaluating compliance with environmental standards, conducting environmental impact assessments, and taking enforcement actions against violators. They also provide technical guidance and support to industries for better waste management practices.

Monitoring mechanisms include regular inspections, ambient air quality monitoring, effluent quality monitoring, and stack emission monitoring. These mechanisms help identify non-compliance and ensure that industries adhere to environmental regulations.

Case Studies of Successful Policy Implementation: Several case studies highlight successful policy implementation in industrial waste management in India. Some notable examples include:

- **Common Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDFs):** TSDFs are centralized facilities established to treat, store, and dispose of hazardous waste. They provide a cost-effective and environmentally sound solution for industries in remote areas that lack individual waste treatment infrastructure. TSDFs, such as the one in Ankleshwar, Gujarat, have successfully facilitated the proper disposal of hazardous waste from industries.
- **E-Waste Management:** The E-Waste (Management) Rules, 2016, have encouraged the establishment of e-waste collection centers and recycling facilities across the country. The example of the "Karo Sambhav" initiative, a multi-stakeholder collaboration, showcases the success of implementing EPR and enabling effective collection, segregation, and recycling of e-waste.
- **Plastic Waste Management:** The Plastic Waste Management Rules, 2016, have led to the establishment of plastic waste collection and recycling systems. The example of the "Clean India Ventures," a social enterprise, demonstrates the successful implementation of plastic waste management through innovative collection, segregation, and recycling methods.

Advanced Waste Treatment Technologies: Technological innovations have played a significant role in improving waste management practices. Advanced waste treatment technologies offer efficient and sustainable solutions for industrial waste management. Some examples include:

- **Waste-to-Energy (WTE) Systems:** WTE technologies, such as incineration and gasification, convert solid waste into energy sources like electricity or heat. These technologies reduce the volume of waste, minimize landfill requirements, and contribute to renewable energy generation.
- **Advanced Biological Treatment:** Technologies like anaerobic digestion and composting can effectively treat organic waste, such as food waste and agricultural residues. These processes break down organic matter and produce biogas or nutrient-rich compost, reducing waste volume and generating renewable energy.
- **Thermal Treatment Technologies:** Advanced thermal treatment technologies, such as pyrolysis and plasma gasification, can convert various types of waste into valuable products like biofuels, syngas, and recovered materials. These technologies offer efficient and environmentally friendly alternatives to traditional waste disposal methods.

Internet of Things (IoT) and Remote Monitoring: The Internet of Things (IoT) has transformed waste management by enabling real-time monitoring, optimization, and control of waste management processes. IoT-enabled sensors and devices can provide valuable data on waste generation, bin levels, and collection routes. This data allows for better resource allocation, efficient waste collection, and improved operational decision-making. Remote monitoring systems also enable early detection of issues, preventive maintenance, and effective utilization of waste management resources.

Data Analytics and Predictive Modeling: Data analytics and predictive modeling techniques are being increasingly used in waste management to optimize waste collection, route planning, and resource allocation. By analyzing historical data and real-time inputs, predictive models can forecast waste generation patterns, identify peak demand periods, and optimize collection schedules. This helps in reducing collection costs, optimizing vehicle routes, and minimizing fuel consumption.

ISSN 2394 - 7780

Furthermore, data analytics can assist in identifying waste generation hotspots, determining waste composition, and identifying opportunities for waste reduction and recycling initiatives. Data-driven insights can inform policy decisions, resource allocation, and targeted interventions for effective waste management.

Decentralized Waste Management Systems: Decentralized waste management systems offer localized and community-based solutions for waste management in remote regions. These systems aim to minimize waste transportation and reliance on central waste management facilities. Innovations in decentralized waste management include:

- **On-Site Waste Treatment:** Technologies like small-scale composting units, biogas digesters, and vermiculture systems enable on-site treatment and recycling of organic waste at the source. This reduces the need for long-distance waste transportation and promotes circular economy practices.
- **Community-Based Recycling Centers:** Establishing community-based recycling centers encourages waste segregation and facilitates recycling activities within the local community. These centers can collect, sort, and process recyclable materials, reducing the burden on centralized recycling facilities.
- **Mobile Waste Management Solutions:** Mobile waste management solutions, such as compact waste collection and processing units, can be deployed in remote areas to enable efficient waste collection and treatment. These units can be transported to different locations as needed, providing flexibility in waste management operations.

Decentralized waste management systems promote local involvement, reduce transportation costs, and enable tailored waste management solutions for specific communities or industries in remote regions.

These technological innovations have the potential to revolutionize waste management practices, improve efficiency, and minimize environmental impact, especially in remote regions where traditional waste management infrastructure may be limited.

Case Study 1: Waste Management in Bhutan Bhutan, a small remote country located in the eastern Himalayas, has implemented effective waste management practices despite its challenging geographical terrain. The country has adopted innovative approaches to address waste management issues and promote sustainable waste practices.

In Bhutan, the National Environment Commission (NEC) has implemented several initiatives, including:

- **Waste Segregation:** Bhutan has implemented a comprehensive waste segregation system, categorizing waste into different streams such as organic waste, recyclables, and non-recyclables. This allows for efficient waste management and resource recovery.
- **Composting and Biogas Production:** To manage organic waste, Bhutan encourages the use of composting and biogas production. Community-based composting initiatives have been established, utilizing organic waste from households and institutions to produce high-quality compost. Biogas plants have also been installed, converting organic waste into biogas for cooking and heating purposes.
- **Plastic Waste Management:** Bhutan has implemented a ban on single-use plastic bags and promotes the use of reusable bags. Efforts are being made to raise awareness about the environmental impact of plastic waste and encourage alternatives like cloth bags and eco-friendly packaging materials.
- **Community Participation:** Bhutan emphasizes community participation in waste management. Local communities are actively involved in waste collection, segregation, and recycling activities. Community-based organizations and waste management cooperatives have been established to promote waste reduction and recycling practices.

These initiatives in Bhutan have led to improved waste management practices, reduced environmental impact, and increased awareness among the population about the importance of sustainable waste management.

Case Study 2: Waste Management in the Yukon Territory, Canada the Yukon Territory in Canada, known for its remote and sparsely populated regions, has implemented effective waste management practices to address its unique challenges. The territory has adopted innovative strategies to ensure proper waste management and environmental protection.

ISSN 2394 - 7780

Some key initiatives in waste management in the Yukon Territory include:

- **Remote Landfill Sites:** The territory has established remote landfill sites strategically located to serve remote communities. These landfills are designed to meet environmental regulations and have proper waste containment systems, including liners and leachate collection systems.
- **Waste Reduction and Recycling:** The Yukon Territory promotes waste reduction and recycling practices. Recycling programs are available in various communities, allowing residents to recycle paper, cardboard, plastic, glass, and metal. The territory also encourages composting and organics diversion to minimize the amount of waste going to landfills.
- **Waste Education and Awareness:** The Yukon Government conducts waste education and awareness campaigns to promote responsible waste management practices. This includes providing educational materials, organizing workshops, and engaging with schools, businesses, and communities to raise awareness about waste reduction, recycling, and proper disposal methods.
- **Hazardous Waste Management:** The territory has implemented programs for the proper management of hazardous waste, including household hazardous waste collection events and drop-off facilities. These initiatives ensure the safe handling, storage, and disposal of hazardous materials.

The waste management practices in the Yukon Territory showcase successful implementation of waste reduction, recycling, and proper disposal methods in remote regions, contributing to environmental sustainability and community well-being.

These case studies highlight the importance of tailored approaches and innovative strategies in waste management to address the specific challenges faced by remote regions. By implementing effective waste management practices, these regions can minimize environmental impact, conserve natural resources, and foster sustainable development.

Infrastructure and Financial Constraints:
Challenges: Remote regions often lack adequate waste management infrastructure, including collection systems, treatment facilities, and disposal sites. Limited financial resources pose a significant constraint in establishing and maintaining such infrastructure.

Recommendations:
- Governments and relevant stakeholders should allocate sufficient funds and resources to develop and upgrade waste management infrastructure in remote regions.
- Innovative and cost-effective solutions, such as mobile waste treatment units or decentralized systems, can be explored to overcome infrastructure challenges.
- Public-private partnerships can be established to attract private investment and expertise in developing waste management infrastructure.

Awareness and Education:

Challenges:
- Limited awareness and understanding of proper waste management practices among the population in remote regions can hinder effective waste management efforts.
- Cultural and behavioral factors may contribute to low participation in waste segregation, recycling, and other sustainable waste practices.

Recommendations:
- Conduct targeted awareness campaigns and educational programs to promote waste reduction, segregation, and recycling practices tailored to the specific cultural context of the region.
- Engage local communities, schools, and community-based organizations to raise awareness and build a culture of responsible waste management.
- Utilize various communication channels, including social media, community gatherings, and informational materials, to disseminate information and educate the public about waste management.

ISSN 2394 - 7780

Capacity Building and Skill Development:

Challenges:
- Limited technical expertise and skill sets in waste management among professionals and workers in remote regions can hinder effective waste management practices.
- Training opportunities and capacity-building programs may be lacking or inaccessible in these regions.

Recommendations:
- Establish training programs and capacity-building initiatives specifically targeting waste management professionals and workers in remote regions.
- Provide technical training on waste segregation, recycling technologies, composting, and other sustainable waste management practices.
- Foster partnerships with academic institutions, research organizations, and industry experts to deliver training and knowledge-sharing programs.

Policy Implementation and Enforcement:

Challenges:
- Inadequate implementation and enforcement of waste management policies and regulations in remote regions can lead to non-compliance and improper waste management practices.
- Limited resources for monitoring and enforcement may contribute to lax implementation.

Recommendations:
- Strengthen the enforcement mechanisms by providing sufficient resources to regulatory bodies responsible for waste management oversight.
- Develop monitoring systems, including remote monitoring technologies and data analytics, to ensure compliance with waste management regulations.
- Foster collaboration between government agencies, local authorities, and community organizations to enhance policy implementation and enforcement efforts.

Public-Private Partnerships:

Challenges:
- Limited involvement of the private sector in waste management activities in remote regions may hinder the development and implementation of effective waste management strategies.
- Financial and logistical challenges may deter private sector engagement in waste management initiatives.

Recommendations:
- Foster public-private partnerships to leverage the expertise and resources of the private sector in waste management projects.
- Provide incentives and support to attract private investment in waste management infrastructure, recycling facilities, and waste-to-energy projects.
- Facilitate collaborations between the public and private sectors through contractual agreements, joint initiatives, and knowledge-sharing platforms to drive sustainable waste management practices.

These challenges and implementing the recommended strategies can contribute to effective waste management in remote regions, promote sustainable practices, and mitigate the environmental and health impacts associated with industrial waste. It requires a multi-stakeholder approach, including active participation from governments, industries, local communities, and civil society organizations.

CONCLUSION:

In conclusion, preventing and managing industrial waste in remote regions, with a special reference to India, requires a comprehensive approach that addresses the unique challenges faced in these areas. This research paper discussed several effective strategies to prevent industrial waste and highlighted the importance of sustainable waste management practices.

Waste minimization and source reduction techniques can significantly reduce the amount of waste generated by industries. Recycling and resource recovery initiatives enable the reuse of materials, promoting a circular economy. Implementing sustainable manufacturing practices ensures that industries operate in an

ISSN 2394 - 7780

environmentally responsible manner. Effluent treatment and water conservation measures are crucial for preserving water resources and minimizing pollution. Collaboration and knowledge sharing among stakeholders foster innovation and best practices in waste management.

The regulatory framework and policy initiatives play a vital role in ensuring compliance and promoting sustainable waste management practices. Environmental regulations, extended producer responsibility programs, and pollution control boards contribute to effective waste management. Case studies from India and other remote regions have demonstrated successful policy implementation and the positive impact of community involvement.

Technological innovations, such as advanced waste treatment technologies, IoT, data analytics, and decentralized waste management systems, offer promising solutions for waste management in remote regions. These innovations enhance efficiency, monitoring, and decision-making processes.

However, several challenges must be addressed to achieve effective waste management in remote regions. Infrastructure and financial constraints need to be overcome through adequate investment and innovative solutions. Awareness and education campaigns are essential to foster a culture of responsible waste management. Capacity building programs must be implemented to develop the necessary skills and expertise in waste management. Strong policy implementation and enforcement mechanisms are crucial to ensure compliance. Public-private partnerships can harness the strengths of both sectors and drive sustainable waste management practices.

Implementing these strategies and addressing the associated challenges, industrial waste in remote regions, including India, can be effectively prevented and managed. This will lead to environmental sustainability, protection of public health, and the promotion of a circular economy, ultimately contributing to the overall development and well-being of these regions.

REVERENCES:

1. Ministry of Environment, Forest and Climate Change, Government of India. (2016). Guidelines for environmentally sound management of e-waste. Retrieved from http://www.moef.nic.in/divisions/icmw/e-waste/guidelines.
2. Pandey, V., & Patel, D. Waste to wealth: A comprehensive review on municipal solid waste management. Sustainable Cities and Society, 57, 102105.
3. Ramachandra, T. V., & Bhattacharya, S. (2017). Solid waste management in India: Environmental, policy and cost perspectives. Springer.
4. Rajagopal, K., & Surya Prakash, B. S. (2019). E-waste management in India: An overview. Waste Management & Research, 37(5), 459-471.
5. United Nations Industrial Development Organization (UNIDO). (2017). Global best practices on industrial waste management. Retrieved from https://www.unido.org/sites/default/files/2017-09/Global_best_practices_industrial_waste_management.pdf
6. Yadav, A. K., & Gaur, R. K. (2017). Industrial waste management: An overview. International Journal of Advanced Research in Computer Science, 8(5), 1892-1895.
7. Maczulak, Anne Elizabeth (2010). Pollution: Treating Environmental Toxins. New York: Infobase Publishing. p. 120. ISBN 9781438126333.
8. "Industrial Waste Management: Waste Stream Statistics". Recover Inc. 2017-02-28. Retrieved 2019-04-23.
9. Introduction to the National Pretreatment Program (Report). Washington, D.C.: U.S. Environmental Protection Agency (EPA). 2011. pp. 1–1, 1–2. EPA 833-B-11-001.
10. Ghobadi, M.; Ahmadipari, M.; Pazoki, M. (2020). "Assessment of Disposal Scenarios for Solid Waste Management Using Fuzzy Rapid Impact Assessment Matrix; a Case Study of Khorramabad Industrial Estate". Pollution. 6 (3): 531–541. doi:10.22059/POLL.2020.295451.735.
11. Wastes in Marine Environments. Washington, DC: U.S. Congress, Office of Technology Assessment. 1987. p. 22.
12. Gyawali at al. (2012). "Effects of Industrial Waste Disposal on the Surface Water Quality of U-tapao River, Thailand" (PDF). 2012 International Conference on Environment Science and Engineering. 32: 5.

ISSN 2394 - 7780

13. Goel, P.K. (2006). Water Pollution - Causes, Effects and Control. New Delhi: New Age International. ISBN 978-81-224-1839-2.
14. "Defining Hazardous Waste: Listed, Characteristic and Mixed Radiological Wastes". EPA. 2020-07-16.
15. United States. Resource Conservation and Recovery Act. Pub. L. 94–580 Approved 21 October 1976.
16. Laws, Edward A. (2017). Aquatic Pollution: An Introductory Text (4th ed.). Hoboken, NJ: John Wiley & Sons. ISBN 9781119304500.
17. Denchak, Melissa (2018-05-14). "Water Pollution: Everything You Need to Know". Our Stories. New York: Natural Resources Defense Council.
18. Jiaranaikhajorn, Taweechai. "Waste and Hazardous Substances Management Bureau" (PDF). Pollution Control Department, Thailand. Archived from the original (PDF) on 17 June 2020. Retrieved 22 November 2014.
19. "Pollution Control Department Statement, Thailand". Ministry of Natural Resources and Environment. Archived from the original on 2014-11-11.
20. Visvanathan, C. "Hazardous and Industrial Solid Waste Management in Thailand - an Overview" (PDF). www.faculty.ait.ac.th/visu/. Asian Institute of Technology Thailand. Archived from the original (PDF) on 11 November 2014. Retrieved 22 November 2014.
21. "Genco Background". General Environment Conservation Public Company Limited (GENCO). Retrieved 22 November 2014.
22. "About SGS". SGS (Thailand) Limited. Archived from the original on 11 November 2014. Retrieved 22 November 2014.
23. "About Waste Management Siam Ltd.(WMS)". Waste Management Siam Ltd. Retrieved 22 November 2014.
24. "About BGW". Better World Green Public Company Limited (BWG). Retrieved 22 November 2014.
25. US EPA, OMS (2014-11-10). "Regulatory and Guidance Information by Topic: Waste". www.epa.gov. Retrieved 2021-11-21.

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

SOLVENT EXTRACTION OF RHODIUM (III) FROM HYDROCHLORIC ACID MEDIA AND ITS SPECTROPHOTOMETRIC DETERMINATION USING *O*-METHYLPHENYL THIOUREA

Yogesh S. Shelar
Department of Chemistry, S.I.C.E. Society's Degree College of Arts Science and Commerce, Ambernath (W.), Dist. Thane, Maharashtra, India

ABSTRACT
The rhodium metal was extracted from hydrochloric acid media at 5.3 Mol L^{-1} and determined spectrophotometrically in the form of 1:2 rhodium O-methylphenyl thiourea (OMPT) complex. The extracted complex obeys Beer's law up to 7.0 µg/ml. It has Sandell's sensitivity 0.0046 µg cm^{-2} of rhodium(III). The complex exhibits maximum absorption at 340 nm with its molar absorptivity of 2.243 × 10^4 L mol^{-1} cm^{-1}. The developed method is free of interferences from majority of cations and anions. The developed method is very simple, selective and reproducible. Separation and determination of rhodium(III) from synthetic mixtures is studied for mixtures corresponding to alloys, catalyst and thermocouple wire.

Keywords: *Rhodium, O-methylphenyl thiourea, Hydrochloric acid media, Synthetic mixtures.*

1. INTRODUCTION
Rhodium belongs to platinum group metals and is a precious element usually found with platinum, palladium, silver and gold. Rhodium is used mostly in electrical and electronic apparatus and also in catalysis. Abundance of rhodium in earths crust is very trace 0.001 ppm.

As the trace availability and good applications of rhodium with anticorrosion property gains the attraction for the extraction of rhodium from its ores and its determination and utilization for various purposes. Extraction and separation of rhodium becomes the need of time and the need to have a simple, efficient, selective and quantitative extraction and determination of Rhodium at trace level and from its associated elements present in its ores. Hence trace abundance, anticorrosion property, cost for its purchase, wide range of applications, demands the need of a novel method for quantitative extraction and determination of rhodium from its natural occurance.

PAN reagent and rhodium by laser induced thermal lense spectrometry (LI-TLS) was used using the surfactant but the phase separation at 50 ^oC is its demerits in determination of rhodium[1] (Shokoufi and shemirani, 2007). Also PAN was used and Rhodium(II) was complexed with 1-(2-pyridylazo)-2-napthol(PAN) in range of pH 3.2 - 4.7, further was adsorbed on nanomaterial the modified multiwalled carbon nanotubes (MMWCNT's) and determined by FAAS (Ghaseminezad et al., 1999). Rhodium along with platinum and gold was determined from archaeological specimens by ICPMS after fire assay treatment[3] (Pillai and Punyadeera, 2001). 2-(5-bromo-2-pyridylazo)-5-diethylaminophenol was used for determination of rhodium(III) with FAAS, method needs preconcentration of sample[4] (Molaakbari et al., 2011). High performance liquid chromatography was applied for separation of platinum, palladium and rhodium (Quinfen et al., 2005) but it requires long time. Rhodium(III) was determined from road dust and water samples by FAAS but method needs preconcentration of rhodium(III), suffers from interferences by large number of cations (Afzali et al., 2011). Various analytical techniques are available for determination of rhodium. Most of the techniques have drawbacks. Comparitively solvent extraction accompanied with spectrophotometric determination is most efficient for separation and determination with simplicity, speed and applicability to tracer as well as macro level.

N-n-octylaniline is used for quantitative extraction of rhodium(III) from sodium malonate media (Anuse and Kolekar, 2002). Extraction of rhodium(III) was carried out from bromide media in presence of stannous chloride using cyanex -471y and cyanex 923 (Duche et al., 2002). N,N'dimethylN,N'diphenyltetradecylmalonamide (DMDPHTDMA) extracts rhodium(III) in presence of tin (Malik and Ana paula, 2008). Rhodium(III) was separated from iridium(III) and ruthenium(III) using different concentrations of alamine 336 in kerosene using hydrochloric acid media (Goralsa et al, 2007).

Only spectrophotometric methods without extraction are reported for determination of rhodium like water soluble porypyrin 5, 10, 15, 20–tetrakis(4methylpyridyl)Porphine(TMPYM) in acetate buffer at pH 3.9 in presence of ethanol after heating at 100 ^oC for 15 min (Kunio et al., 2006).

The present investigation reports a novel method for extractive spectrophotometric determination of rhodium(III) in hydrochloric acid media, using *o*-methylphenyl thiourea and chloroform solvent. The developed method is simple, selective. Many other methods are reported for extractive spectrophotometric determination

ISSN 2394 - 7780

of rhodium and each of them has its own limitations and drawbacks (Table 01) like the method using Diphenylcarbazide + -picoline (Sarmaha and Das,1985) requires Isobutl methyl ketone with 2 hrs and has interference by large number of cations. Using 2-(5- bromo-2-pyridylazo)-5-diethylaminophenol)-tetraphenylborate) (Puri and Patric, 1999) is a Second derivative spectrophotometry uses molten naphthalene: dimethylformamide at pH 5.0-6.5. Rhodium is extracted and determined using Isonitro-p-methylacwtophenone but needs 30 min heating time is its drawback (Mahajan and Patil, 1992). Rhodium is determined by 3-hydroxy-2-methyl-1,4-napthoquinone monoxime[16] (Sharma and Shindwani, 1988) this method has Interference by thiourea, thiosulphate, ruthenium, platinum. Determination of rhodium using N-hydroxy-N,N'-diphenylbenzamidine + 5-Br-PADAP has Low beer's range Selective and sensitive[17] (Thakur, et al., 2005). Determination using 25,26,27,28-tetrahydroxy-5,11,17,23-tetra1-[4-(N-hydroxy-3-phenylprop-2-(nimidamido)phenylazo)calyx[4]arene is Synergestic extraction of rhodium (Kumar et al., 2008). When Cyclohexylthioglycolates are used it reports the need of 2.5 min heating at 60 – 70 oC and the complex has less stablility19 (Avasarala et al., 1986). Developed method is compared with reported methods for determination of Rhodium (III) and found to have merits compared to reported methods (Table 01).

2. EXPERIMENTAL

2.1. Apparatus

The spectrophotometer used was elico make uv-visible spectrophotometer model SL-159 with matched 10 mm quartz cells used for absorbance measurement. All the apparatus and glasswares used were calibrated which were used for the measurements. Equilibriation of two phases was carried out using wrist action shaker.

2.2. Reagents

Analytical reagent grade reagents were used. Throughout the experimental work double distilled water was used.

o-Methylphenyl thiourea (OMPT) was synthesized as per the method reported by Frank and Smith (Frank and Smith, 1995) (Figure 01 and Figure 02). *O*-methylphenyl thiourea (OMPT) was dissolved in chloroform and used at the concentration of 1.40×10^{-2} mol dm^{-3} was required for quantitative extraction.

A standard stock solution of rhodium(III) was prepared by dissolving 1.0 g of rhodium chloride ($RhCl_3.4H_2O$) (Loba.Chemie.Pvt.Ltd.India) in 15-20 ml, 1.0 M hydrochloric acid, diluted up to mark in a 250 ml standard volumetric flask with distilled water and the exact concentration of this stock solution was determined gravimetrically (Beamish and van loon, 1977). The working standard solution of rhodium(III), 20 µg/ml was prepared by further dilution from standard stock solution with distilled water.

Hydrochloric acid media was maintained at 5.3 Mol L^{-1} for quantitative extraction and was freshly prepared whenever required from the concentrated acid further standardized and used.

Interferring ions solutions were standard solutions used for different metal ions were prepared by dissolving weighed quantity of their respective salts in double distilled water or dilute hydrochloric acid and diluted with double distilled water. Standardized solutions of anions were used. Anion solutions were prepared by dissolving their respective alkaline metal salts in distilled water and diluted with double distilled water.

2.3. General procedure for extraction spectrophotometric determination of rhodium(III)

To an aliquot containing 20 µg rhodium(III) is transferred in a 25 ml standard volumetric flask and made up to mark maintaining concentration of hydrochloric acid maintained 5.3 Mol L^{-1} after volume make up of 25 ml for quantitative extraction. The aqueous phase containing Rhodium(III) is equilibrated for 2.0 minutes with 10 ml chloroform, used at the concentration of 1.40×10^{-2} mol L^{-1} OMPT. The yellow colored rhodium(III)-OMPT complex is extracted in organic layer was allowded to separate and the yellow colored rhodium(III)-OMPT complex is dried over 1.0 g anhydrous sodium sulphate. Rhodium(III)-OMPT complex in chloroform is transferred in 10 ml volumetric flask. The absorbance of rhodium(III)-OMPT complex is measured at 340 nm against the reagent blank in chloroform.

The Percentage extraction (%E) and distribution ratio (D) was calculated using below equations

$$\% E = \frac{[M]_{org}}{[M]_{aq.\ init}} \times 100 \qquad D = \frac{[V_a / V_o] \times \% E}{100 - \% E}$$

The $[M]_{aq.\ init}$ and $[M]_{org}$ and represents initial concentration and concentration of rhodium(III) in organic phase after equilibrium. The terms V_o and V_a represents the volume of organic phase and aqueous phase respectively.

ISSN 2394 - 7780

3. RESULTS AND DISCUSSION

3.1. Absorption spectra

In hydrochloric acid media Rhodium(III) forms yellow colored rhodium(III)-OMPT complex in HCl concentration 5.3 Mol L^{-1}. The absorption spectra of rhodium(III)-OMPT complex against reagent blank in chloroform is shown in Figure 3. The spectra explains rhodium(III)-OMPT complex in chloroform have maximum absorbance at 340 nm. The wavelength 340 nm was fixed for determination of rhodium(III) after extraction from 5.3 Mol L^{-1} hydrochloric acid media. All further absorbance measurements were made at 340 nm against reagent blank for spectrophotometric determination of rhodium(III).

3.2. Effect of Hydrochloric Acid Concentration

The complete complexation of rhodium(III)-OMPT complex occurs in hydrochloric acid media after concentration of HCl 4.2 mol L-1 below 4.2 mol L-1 there is no complex formation and no extraction of rhodium from aqueous phase to organic phase. The complex formation was studied from 0.5 to 8.0 mol L-1 hydrochloric acid concentration. The rhodium(III)-OMPT complex shows maximum absorbance in the range of 4.2 to 6.6 mol L-1. Above concentration 6.6 mol L-1 hydrochloric acid concentration there is rapid decrease in absorbance (Figure 4). Thus hydrochloric acid concentration 5.3 mol l-1 was fixed for further study.

3.3. Effect of reagent concentration

The recommended procedure was followed and the OMPT concentration in chloroform was varied rom 0.1×10^{-2} mol L^{-1} OMPT to 3.0×10^{-2} mol L^{-1} OMPT for maximum color development. The effect of reagent concentration shows the absorbance increases with OMPT concentration from 0.1×10^{-2} mol L^{-1} to 1.2×10^{-2} Mol L^{-1} OMPT and further it remained constant with highest absorbance up to 3.0×10^{-2} Mol L^{-1}. Hence 1.4×10^{-2} Mol L^{-1} OMPT was fixed for quantitative extraction and spectrophotometric determination of rhodium(III) (Table 2, Figure 5).

3.4. Stability of complex

The rhodium(IIII)-OMPT complex was stable. The measurements of absorbance was done in interval of one hour each for more than 48 hours. The results obtained shows, rodium(III)-OMPT complex is stable for more than 48 hours. This was sufficient for the analysis of rhodium in any other laboratory conditions and time lapse in analysis has no effect on the measurements.

3.5. Study of extraction solvent

Different extraction solvents were studied for extraction of rhodium(IIII)-OMPT complex from hydrochloric acid media viz. toluene, methyl isobutyl ketone, carbontetrachloride, benzene, xylene, n-butyl acetate, isoamyl alcohol, 1,2-dichloroethane, and chloroform. Complete extraction with maximum absorbance was in chloroform solvent with quantitative extraction from hydrochloric acid media (Figure 6).

3.7. Composition of extracted species

The log-log plot was used for determination of composition of rhodium(IIII)-OMPT complex was determined from log-log plot as log of *o*-methylphenyl thiourea concentration versus log of distribution ratio of rhodium(III) at hydrochloric acid concentration of 5.3 Mol L^{-1} gave a slope 1.96 respectively. It confirms that probable composition of extracted species is 1: 2 (Rh(III) : OMPT) (Figure 7).

3.8. Beer's law, molar absorptivity, sandell's sensitivity and correlation coefficient

The Beer's law was studied and found to be obeyed in the concentration range up to 7.0 µg for rhodium(IIII)-OMPT complex (Figure 8). The Values of Molar absorptivity and sandell's sensitivity are 2.243×10^4 L mol^{-1} cm^{-1} and 0.0046 µg cm^{-2} respectively. Ringbom's plot was applied as a standard method for determination of the optimum range of concentration obeying Beer's law (Ringbom, 1939). It was drawn as log C of the concentration of rhodium(III) against (1-T) (Figure 9). It was found the ringbom's plot has sigmoid shape with linear segment for absorbance values from 1.0 to 6.0 µg/ml. The ratio between the relative error in concentration and photometric error is 2.324. The correlation coefficient values of rhodium(III)-OMPT complex with the independent variable as concentration in µg/ml and the dependent variable considering the absorbance was 0.99, it clear indicates the linearity between these two values. For the best fitted line the slope and intercept are 0.08613 and 0.0083. The content of rhodium(III) in the real samples can be determined using the straight line equation $Y = 0.08613\ X + 0.0083$.

3.9 Precision, accuracy and detection limit

To results reproducibility and accuracy of method was studied from the absorbance measurements with ten identical solutions containing 20 µg rhodium(III). The mean of ten readings and standard deviation was determined, standard deviation was found to be 0.001 and relative standard deviation was 0.289 % respectively.

ISSN 2394 - 7780

It is evidence to say the method is precise and accurate. The detection limit of rhodium(III) as thrice the standard deviation of blank value is 0.019 µg/ml.

3.10. Effect of foreign ions

The effects of various foreign ions was studied to determine their tolerance limits in extraction spectrophotometric determination study of rhodium(III). The interference from Cd(II), Cr(III), Zn(II), Mn(II), Fe(III), Ni(II), Bi(III), Cu(II), Al(III), Mo(VI), Co(III) and Ce(IV) was removed by masking these ions with EDTA. The interference from gallium(III), indium(III) and thallium(III) was removed by masking with tartrate (Table 3).

4. Applications

4.1. Analysis of synthetic mixtures corresponding to alloys, catalyst and thermocouple wire

The method developed for extraction and spectrophotometric determination of rhodium(III) was studied and applied for determination of rhodium from synthetic mixtures corresponding to Iridium alloy, Osmoiridium alloy, Pt-Pd-Rh catalyst and Pt - Rh thermocouple wire. The composition of synthetic mixtures were prepared in laboratory and the amount of rhodium(III) was determined by recommended procedure. The results are in agreement with the results obtained by direct atomic absorption spectrometry (Table 4).

5. CONCLUSIONS

The developed method of extraction spectrophotometric determination of rhodium(III) using *o*-Methylphenyl thiourea (OMPT) has been proved to be a sensitive and selective at trace level for determination of rhodium(III). The developed method is easy and rapid with good sensitivity and selectivity. The obtained results proves the aplicablity of developed method for analysis of rhodium from synthetic mixtures with quantitative extraction and determination in single step and no multiple steps and multiple extractions required. Interferences of majority of associated metal ions is overcomed and the developed method has good detection limit in presence of associated metal ions. Method is free of interferences from large number cations and anions. The rhodium(III)-OMPT complex is stable for more than 48 hours. Analysis of synthetic compositions corresponding to iridium alloy, osmoiridium alloy, platinum-palladium catalyst and thermocouple proves ths applicablity of developed method with good statistical results.

ACKNOWLEDGEMENT

The author is thankful to Management, S.I.C.E. Society, Ambernath and Principal of S.I.C.E.S. Degree College of Arts Science and Commer, Ambernath for providing necessary facilities at the department.

REFERENCES

- Afzali, D., Ali, G., Hassan, S., 2011.Quim. Nova. XY (00), 1-5.
- Anuse, M. A., Kolekar, S. S., 2002. Talanta. 58(4), 761-771.
- Avasarala, L. J. Rao., Gupta, U., Puri, B. K., 1986. Analyst. 111, 1401-1404.
- Beamish, F. E., Van loon, J. C., pp 139, 1977. Analysis of noble metals : Overview and selected methods, Newyork : Academic press.
- Duche, S. N., Chavan, D. V., Dhadke, P. M., 2002. J. Chin. Chem. Soc. 49, 165-172.
- Frank, R. L., Smith, P. V., 1995. Org. Synth. 3, 735.
- Ghaseminezad, S., Afzali, D., Taher, M.A., 1999. Anal. Sci. 15(6), 575.
- Goralsa, E., Coll, M. T., Fortuny, A., Kedari, C. S., Sastre, A. M., 2007. Solvent. Ext. Ion. Exch. 25(1), 65-77.
- Kumar, A., Sharma, P., Chandel, L, K., Bhagwan, L. K., Sandor, K. M., 2008. J. Incl. Phenom. Macrocycl. Chem. 62, 285-292.
- Krystna, B., Urzula, K., 1984. Anal. Chim. Acta. 156, 323-327.
- Kunio, K., Shukuro, I., Takao, Y., 2006. Can. J. Anal. Sci. Spectros. 51(4), 200-206.
- Mahajan, H. A., Patil, M.R., 1992. Anal. Chem. 37(2), 239-243.
- Malik, P., Ana paula, P. A., 2008. Solvent. Ext. Ion. Exch. 26(1), 25-40.
- Molaakbari, E., Moslafavi, A., Afzali, D., 2011. J. Hazard. Mater. 185(2-3), 647-652.

ISSN 2394 - 7780

- Pillai, A. E., Punyadeera, C., 2001. J. Trace. Microprobe. Tech. 19(2), 243-250.
- Puri, B, K., Patric, P, P., 1999. Anal. Sci. 15,575-580.
- Quinfen, Hu., Xiangjun, Yang., Zangjie, Huang., Ling, Chen., Gaungyu, Yang., 2005. J. Chromatogr. A. 1094(1-2), 77-82.
- Ringbom, A., 1939. Z. Anal. Chem. 115, 332.
- Sandell, E. B., 1962. pps 519. Colorimetric determination of traces of metals. 3rd edition, Newyork: Interscience publishers Inc.
- Saramah, K., Das, H, K., 1985. J. Indian. Chem. Soc. 62(8), 631-632.
- Sharma, R. K., Sindhwani, S. K., 1988. Fresnius. J. Anal. Chem. 332, 819.
- Shelar, Y. S., Aher, H. R., Kuchekar S.R., 2011.Bulgarian Chem. Commu. Accepted.
- Shokoufi, N., Shemirani, F., 2007. Talanta. 73(4), 662-667.
- Sidney, P. C., Nathan, O. K., 1955. page 138. Methods in enzymology, volume I, New York : Academic press Inc.
- Thakur, M., Khande, P., Deb, M. K., 2005. J. Indian. Chem. Soc. 82(4), 285-289.

ISSN 2394 - 7780

Table 1 Comparison of present method with other extractive spectrophotometric determination methods of rhodium (III)

Reagents	λ_{max} (nm)	Condition	Beer's Law validity range (ppm)	Solvent	Molar Absorptivity ($L\ mol^{-1}\ cm^{-1}$)	Remark	References
Cyclohexylthioglycolates	345	pH 9.0-12.5	0.2 - 4.1	chloroform	1.60×10^4	2.5 min heating at 60 – 70 ^oC	Avasarala et al., 1986.
Diphenylcarbazide + -picoline	560	1.0 ml, 0.5 % picoline	1.0 – 3.0	Isobutl methyl ketone	4.01×10^4	Complex stabliLy less than 2 hrs, interference by large number of cations	Sarmaha and Das,1985
1,5- diphenylcarbazide	------	pH 5.0	0.56-2.8	isobutanol	----------	Low beer's range, complexation at 70 ^oC	Krystyna and Urszula, 1984.
25,26,27,28-tetrahydroxy-5,11,17,23-tetra1-[4-(N-hydroxy-3-phenylprop-2-(nimidamido)phenylazo)calyx[4]arene	------	3.0 M HNO_3	1.2-10.0	30%, 1,2 dichloroethane in dimethylformamide	9.8×10^3	Synergestic extraction	Kumar et al., 2008.
Isonitro-p-methylacwtophenone	370	pH 4.5 acetate buffer	0.05-6.0	carbontetrachloride	$2.47 \times 1\ 0^4$	30 min heating	Mahajan and Patil, 1992.
2-(5- bromo-2-pyridylazo)-5-diethylaminophenol)-tetraphenylborate)	------	pH 5.0-6.5	0.03-2.5	molten naphthalene: dimethylformamide	----------	Second derivative spectrophotometry	Puri and Patric, 1999.
3-hydroxy-2-methyl-1,4-napthoquinone monoxime	430	pH 5.5-7.0	6.06	molten naphthalene: dimethylformamide	2.15×10^4	Interference by thiourea, thiosulphate, ruthenium, platinum	Sharma and Shindwani, 1988.
N-hydroxy-N,N'-diphenylbenzamidine + 5-Br-PADAP	460	pH 5.8-6.5	0.6	Dichloromethane	2.8×10^4	Low beer's range	Thakur, et al., 2005.
o-Methyl phenyl thiourea(OMPT)	340	5.3 Mol L^{-1} HCl	7.0	chloroform	2.243×10^4	Selective and sensitive	Present Method

ISSN 2394 - 7780

Table 2 Effect of reagent concentration

Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, OMPT 0.1×10^{-2} mol L^{-1} to 3.0×10^{-2} mol L^{-1} OMPT, shaking time 2.0 minutes, λ_{max} 340 nm

Reagent concentration (mol L^{-1})	Extraction (%)	Distribution ratio (D)
0.001	24.27	0.801
0.003	48.55	2.359
0.005	73.12	6.800
0.007	93.06	33.52
0.009	97.68	105.25
0.01	99.13	284.85
0.012	99.26	335.33
.013	99.99	24997.5
0.014	99.99	24997.5
0.016	99.99	24997.5
0.018	99.99	24997.5
0.02	99.99	24997.5
0.022	99.99	24997.5
0.024	99.99	24997.5
0.026	99.99	24997.5
0.028	99.99	24997.5
0.03	99.99	24997.5

Table 3 Effect of foreign ions

Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, OMPT 1.40×10^{-2} mol L^{-1}, shaking time 2.0 minutes, λ_{max} 340 nm.

Foreign Ion	Added as	Tolerance limit(mg)	Foreign Ion	Added as	Tolerance limit(mg)
Mn(II)[a]	$Mncl_2.6H_2o$	7	Os(VIII)	OsO_4	0.6
Cd(II)[a]	$Cdcl_2.2H_2o$	12	Ir(III)	$IrCl_3$	1.1
Fe(III)[a]	$(NH_4)Fe(SO_4)_2.12H_2O$	6.0	Ru(III)	$RuCL_3.6H_2O$	0.2
Hg(II)	$Hgcl_2$	1	Pt(IV)	$H_2PtCl_6.H_2O$	0.4
Bi(III)[a]	$BiCl_3$	4	Ce(IV)[a]	$Ce(SO_4)_2.4H_2O$	3.3
Ni(II)[a]	$NiCl_2.6H_2O$	6.5	Pb(II)	$PbCl_2$	2.6
Cu(II)[a]	$CuSO_4.5H_2O$	3.0	V(V)	V_2O_5	14
Al(III)[a]	$AlCl_3.6H_2O$	2.6	U(VI)	$UO_2(CH_3COO)_2$	12
Cr(III)[a]	$CrCl_3$	1.6	Co(II)[a]	$CoCl_2.6H_2O$	4
Zn(II)[a]	$ZnSO_4.7H_2O$	9	Ba(II)	$BaCl_2.6H_2O$	13
Se(IV)	SeO_2	1.5	Ca(II)	$CaCl_2.2H_2O$	11
La(III)	$LaCl_3.7\ H_2O$	1.2	Sr(III)	$SrCl_3.6H_2O$	17

ISSN 2394 - 7780

Li(I)	LiCl	8.3	Tl(III)[b]	Tl_2O_3	6.1
Ti(III)	$(Ti_2SO_4)_3$	1.2	Bromide	KBr	100
Pd(II)	$Pdcl_2$	0.3	Fluoride	NaF	100
Mg(II)	$MgCl_2.6H_2O$	15	Phosphate	Na_3PO_4	70
Sn(II)	$SnCl_2.2H_2O$	0.3	Sulphate	K_2SO_4	94
Ga(III)[b]	$GaCl_3$	3.2	Succinate	$(CH_3COONa)_2.6H_2O$	200
Au(III)	$HAuClO_4.H_2O$	0.6	Citrate	$C_6H_8O_7.H_2O$	200
Mo(VI)[a]	$(NH_4)_5MO_7.2H_2O$	2.5	Malonate	$CH_2(COONa)_2$	200
Sb(III)	Sb_2O_3	10	Tartrate	$(CHOH:COOH)_2$	200
Be(II)	$BeSO_4.4H_2O$	0.26	Oxalate	$(COOH)_2.2H_2O$	200
In(III)[b]	$InCl_3.4H_2O$	3.4	E.D.T.A.	Na_2EDTA	200

[a]masked with 75 mg EDTA

[b]masked with 100 mg tartrate

Table 4 *Separation of rhodium(III) from synthetic mixtures corresponding to alloys, catalyst and thermocouple wire*

Composition of alloy, catalyst and thermocouple wire	Amount of rhodium(III)			S.D	R.S.D(%)
	Taken (µg)	Found (µg)			
		AAS	PM*		
Iridium alloy Rh 7. 0, Pd 3.5, Cu[a] 8. 01, Pt 55. 51, Fe[a] 3. 51, Ir 8. 01	20	19.96	19.93	0.0190	0.095
Osmoiridium alloy Rh 110, Os 325, Pt 100, Ru 80, Ir 450, Au 10	20	19.96	19.91	0.0129	0.064
Pt-Pd-Rh catalyst Rh 0. 005 - 0. 05, Pd 0.03-0.15, Pt 0. 03 - 0. 20	20	19.94	19.92	0.0260	0.130
Pt - Rh thermocouple wire Rh 13, Pt 87	20	19.95	19.95	0.0081	0.040

[a]masked with 75 mg EDTA

PM* Present method, average of four determinations.

ISSN 2394 - 7780

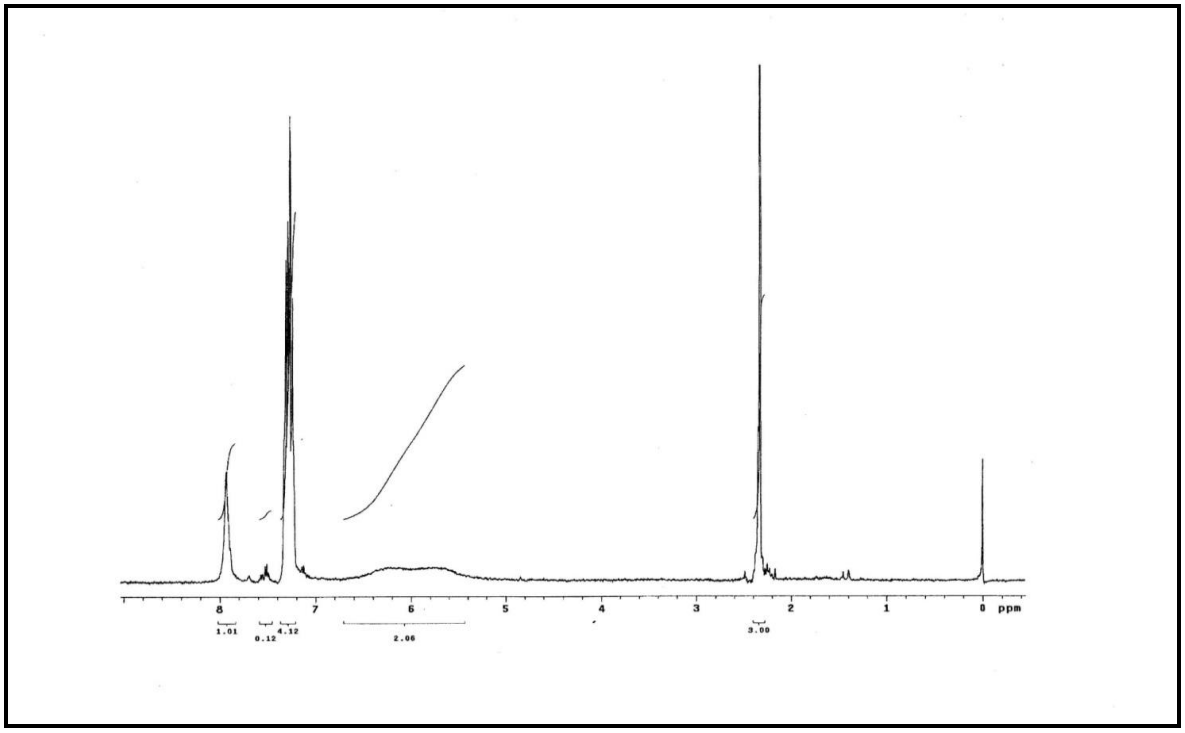


Figure 1. ^{1}H NMR Spectrum of *o*-Methylphenyl thiourea (OMPT)

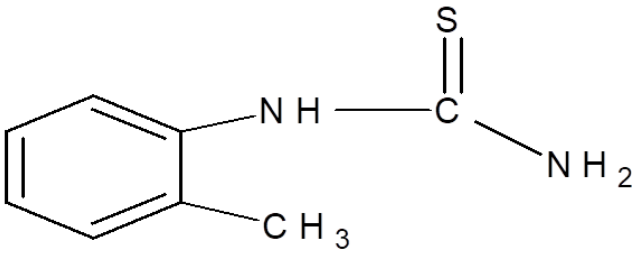


Figure 2. Structural formula of OMPT

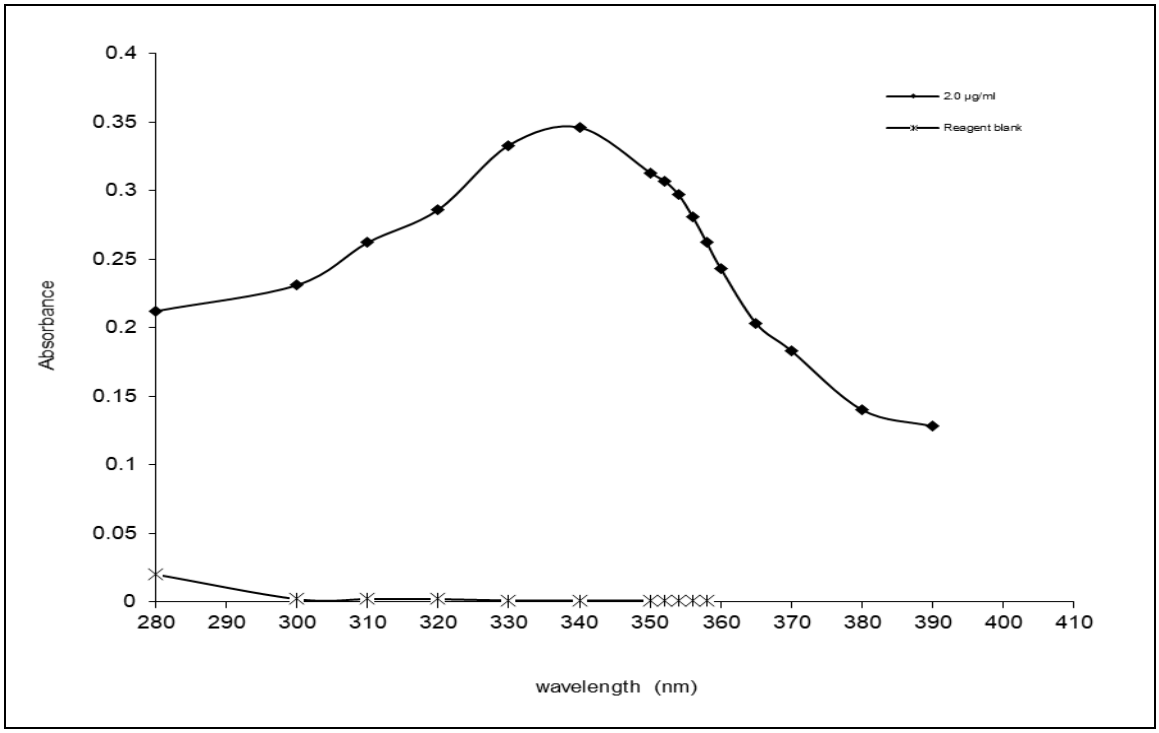


Figure 3 Absorption spectra of Rh(III)-OMPT Complex Vs OMPT reagent blank
Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, OMPT 1.40×10^{-2} mol L^{-1}, shaking time 2.0 minutes.

ISSN 2394 - 7780

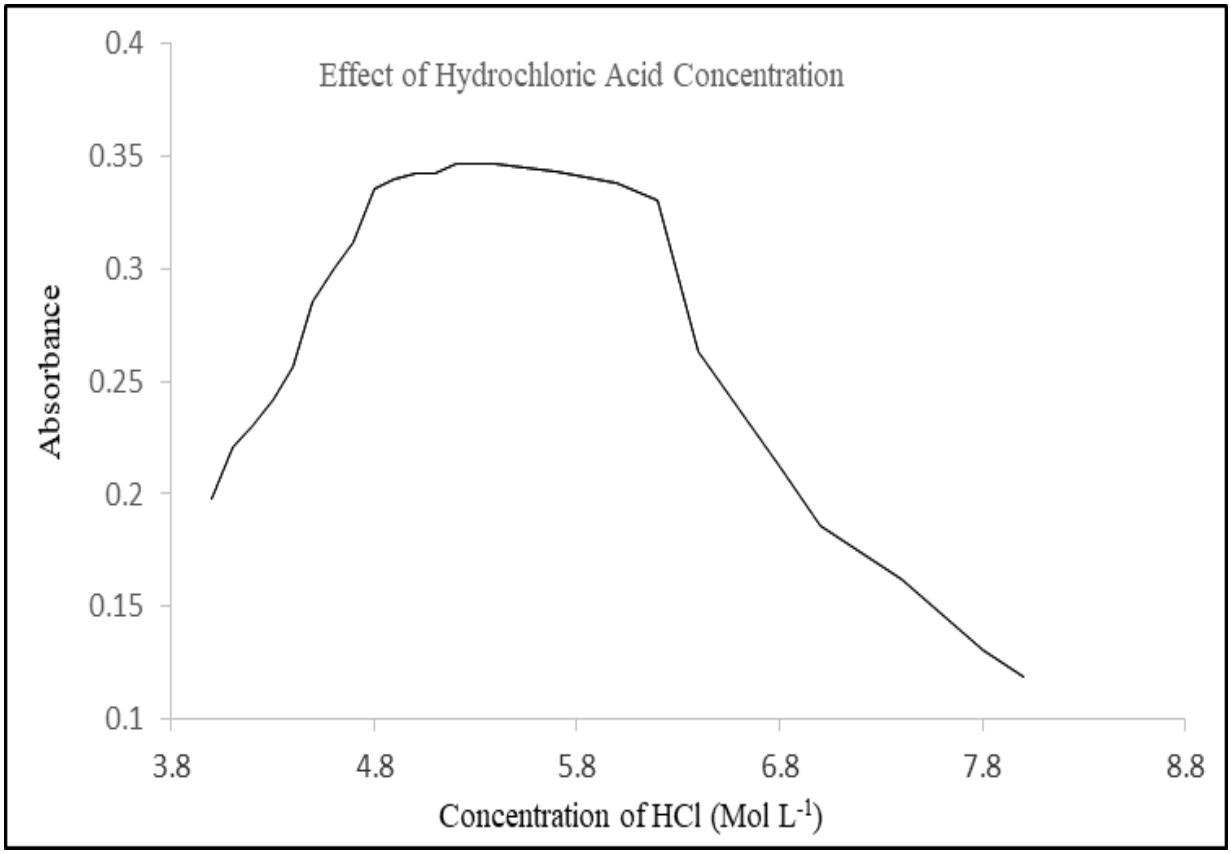


Figure 4 Effect of HCl concentration on extraction of Rh(III)-OMPT Complex
Rh(III) 2.0 µg/ml, HCl 4.0 to 8.0 mol L^{-1}, OMPT 1.40×10^{-2} mol L^{-1},
shaking time 2.0 minutes, λ_{max} 340 nm.

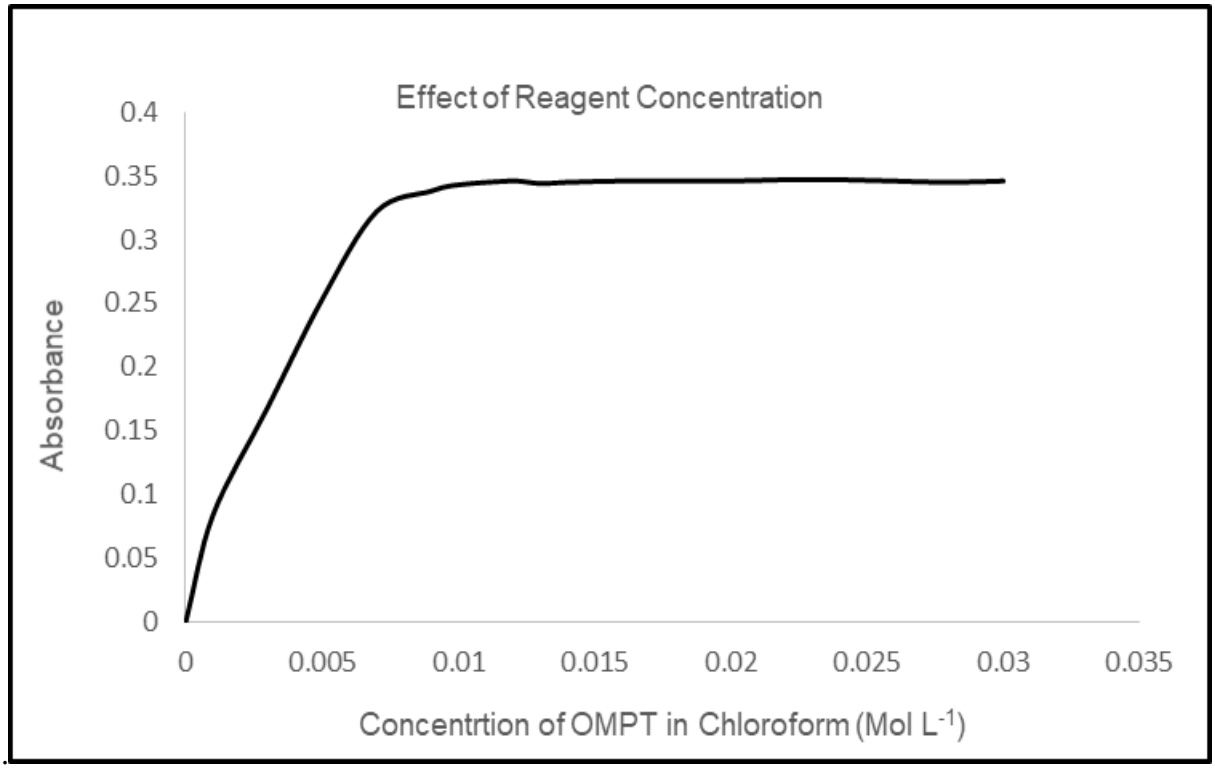


Figure 5 Effect of reagent concentration on formation of rhodium(III)-OMPT complex
Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, OMPT 0.1×10^{-2} to 3.0×10^{-2} mol L^{-1},
shaking time 2.0 minutes, λ_{max} 340 nm.

ISSN 2394 - 7780

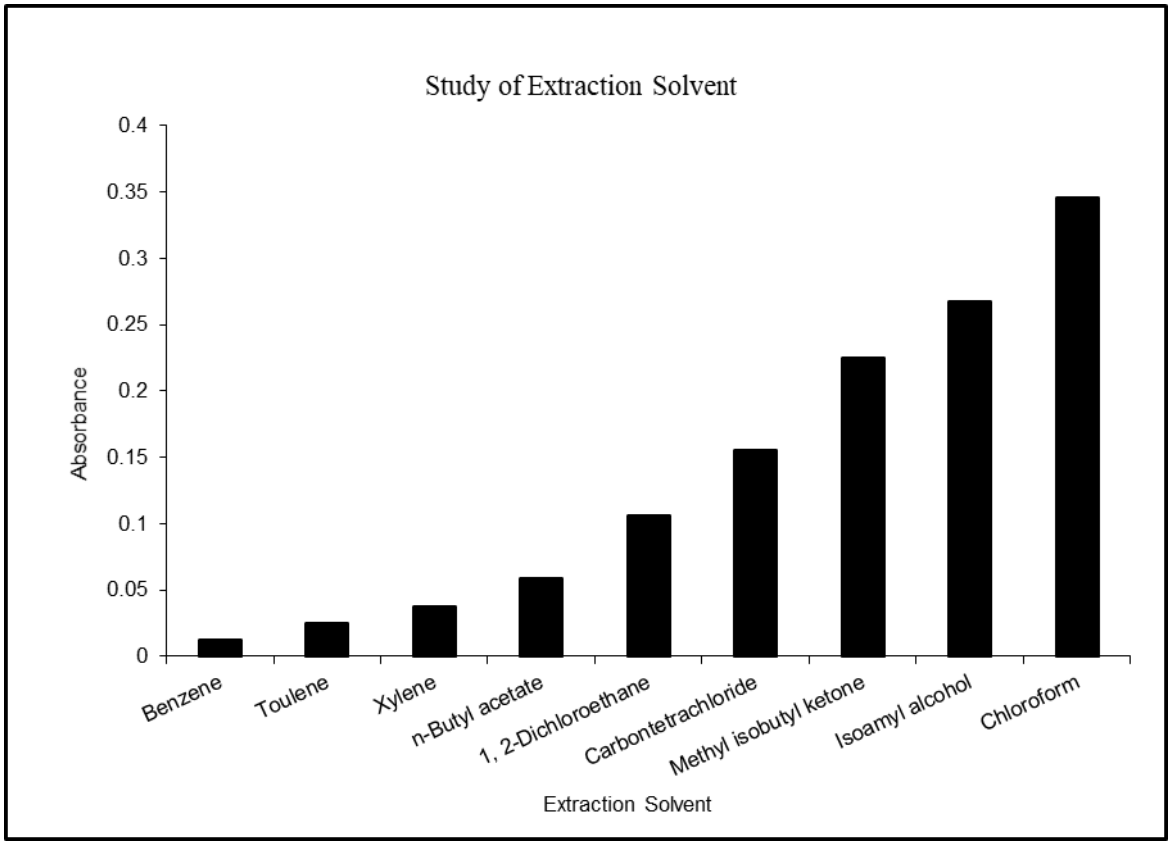


Figure 6 Effect of extracting solvent on extraction of rhodium(III)-OMPT complex

Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, OMPT 1.40×10^{-2} mol L^{-1}, shaking time 2.0 minutes, λ_{max} 340 nm.

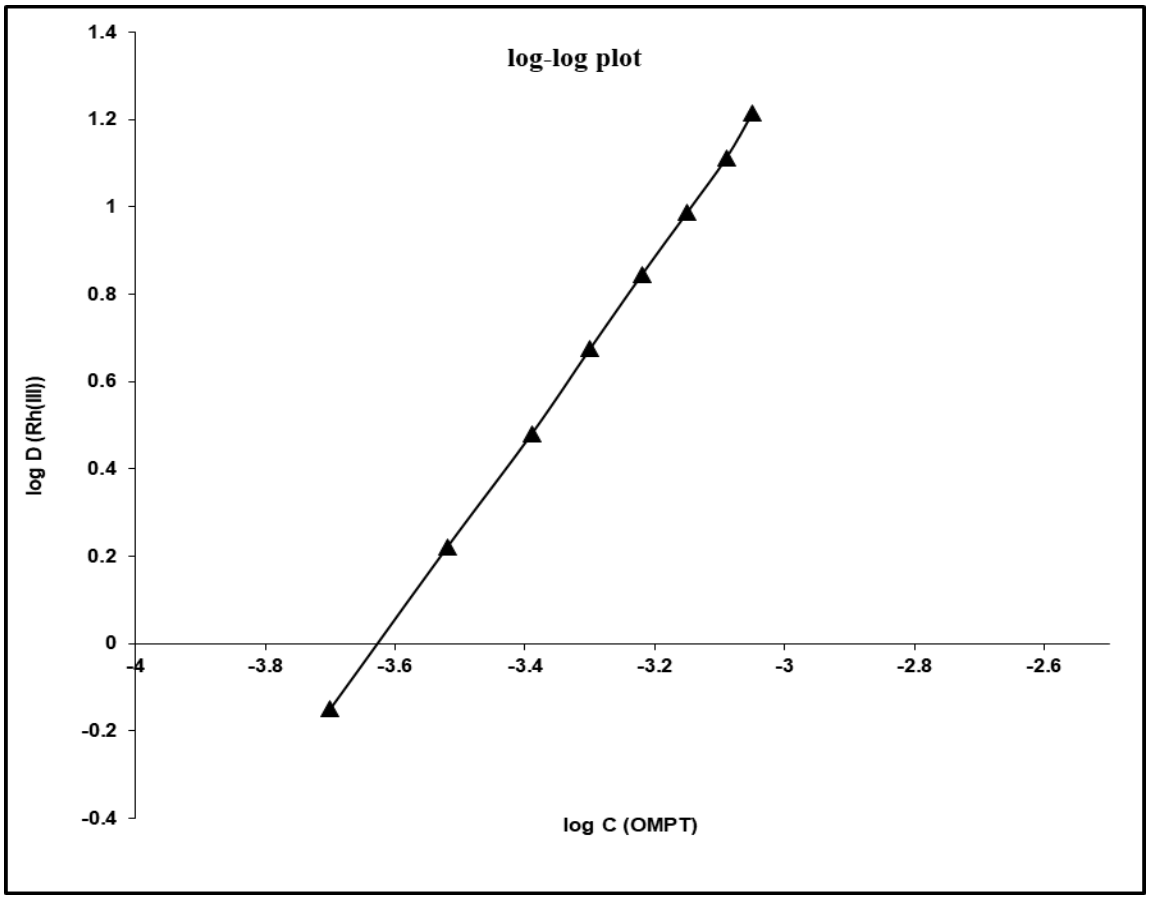


Figure 7 Plot of log $D_{Rh(III)}$ Vs log $C_{(OMPT)}$

Rh(III) 2.0 µg/ml, HCl 5.3 mol L^{-1}, shaking time 2.0 minutes, λ_{max} 340 nm

ISSN 2394 - 7780

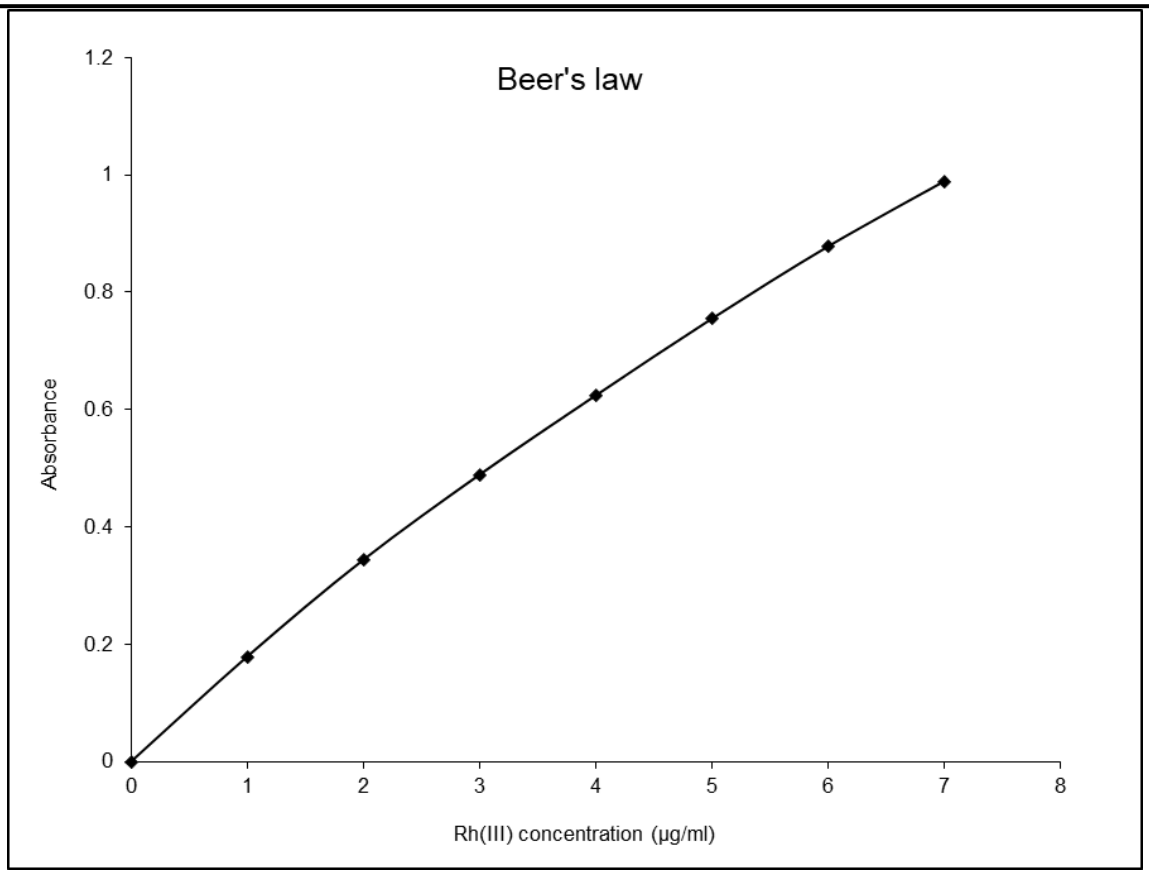


Figure 8 Applicability of beer's law to Rhodium(III)-OMPT complex

Rh(III) 1.0 to 7.0 µg/ml, HCl 5.3 mol L^{-1}, shaking time 2.0 minutes, λ_{max} 340 nm

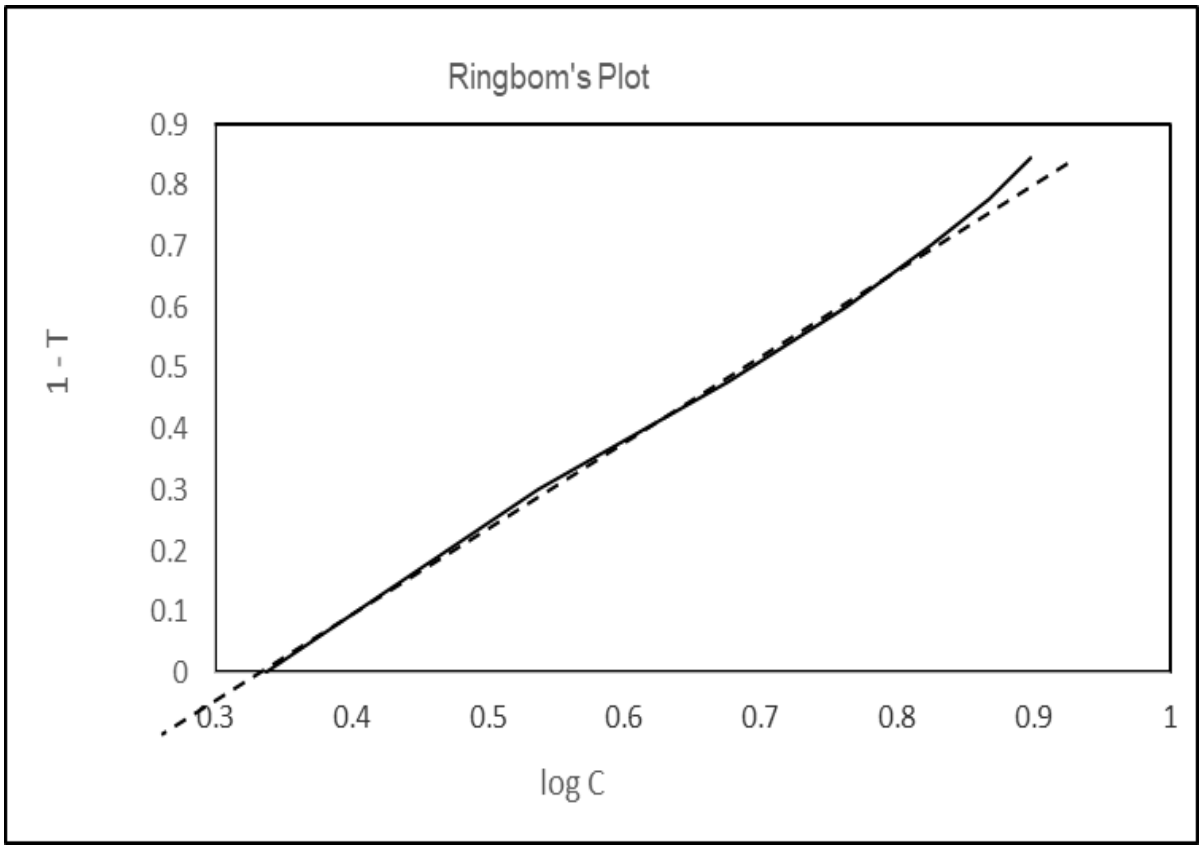


Figure 9 Ringbom's plot

Rh(III) 1.0 to 7.0 µg/ml, HCl 5.3 mol L^{-1}, shaking time 2.0 minutes, λ_{max} 340 nm

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

THE PORTRAYAL OF MASCULINITY IN HINDI CINEMA: A STUDY OF KI & KA ANDDREAM GIRL

Priya Sahani
Faculty of Journalism and Communication, Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India

ABSTRACT
This study is working around the portrayal of Masculinity in Hindi cinema. Basically, this studyis trying to trace the manner in which various aspects of masculinity have been represented inthe Hindi films selected. This study is dealing with content analysis of two Hindi films 'Ki and Ka' (2016) and 'Dream Girl' (2019) which revolve around the male lead character reversing their gender roles. The theoretical framework for the study is 'Gender performativity theory' which explains how gender roles are performed and how gender identities are constructed and developed. The observations from this study throw light on how this representation of gender roles in selected Hindi films reinforces gender stereotypes. In conclusion, this study opens debates on whether contemporary Hindi cinema has been successful in redefining masculinity at large.

Keywords: *Hindi Cinema, Men, Masculinity, Gender roles, Gender stereotypes.*

INTRODUCTION

Cinema is the most popular medium of communication that impacts society at large. The way male actors and female actors are represented in cinema shapes our perception of men and women. Mulvey (1995) in her 'Male Gaze theory' stated that women in cinema are visually positioned as an object of the male gaze. Mulvey (1995) stated that 'men do the looking, and women are to be looked at'. This means that men play a dominant role in the films while womenare submissive to the gaze of the men.

It has been argued by many scholars that the narratives of Hindi cinema are centered around a male actor which produces images of masculinity. Since the beginning, male actors in Hindi cinema have generally been portrayed as physically and mentally strong while female actors as weak and dependent on men. The famous dialogue *'Mard ko dard nahi hota'* from the film *'Mard* (1985)*'* laid emphasis on how an ideal man should be. Hindi cinema has showcased men from many different perspectives such as 'angry young men, 'macho men', 'saviours of women', 'metrosexual men', and so on. The roles of men in Hindi cinema are ever-changing.

The era of the 1970s known as the era of 'Angry young man' defined masculinity with high aggression. The trend of men fighting off a large group of villains began in *Amitabh Bachchan's* films like '*Zanjeer* (1973)*', 'Deewar* (1975)*', 'Sholay* (1975)*'* and so on. Then theportrayal of masculinity moved to showing men as 'Saviors of women' where men are depictedas heroic who fight with enemies in order to save the women. For example, films like *'Gadar* (2001)*' and 'Veer Zara* (2004)*'* showed men crossing borders in order to save the female actor.[1] This trend is also to be seen in many action films like '*Bodyguard* (2011)' *'Commando* (2013)*', 'Baaghi* (2016)*'* and so on. These action films witnessed men ripping their shirts off and flaunting their muscles which created a body image of men. This idea transferred to men dancing while showcasing their manscaped and chiseled bodies which is to be seen in films like *'Om Shanti Om* (2007)*', 'Desi Boys* (2011)*',* and many more. Hindi cinema has also portrayed men keeping extramarital affairs through films like '*Biwi no. 1* (1999)', '*Pati Patni Aur Woh* (2019)*'* and so on.

The era of the 2000s witnessed a change in the representation of men through films like '*Vicky donor* (2012)*'* which showed men as sperm donors, a film like *'Tumhari Sulu* (2017)' which showed men as supportive husbands, *'Angrezi medium* (2020)*'* which showed men as supportive fathers, films like '*Dum Laga k Haisha* (2015)' and '*Bala* (2019)' which portrayed men as vulnerable. Homosexual masculinity also came into light through films like '*Aligarh* (2015)*',* '*Kapoor and Sons* (2016)*'* and *'Shubh Mangal Zyada Savdhaan* (2020)*'.*

With time, the way men are being represented in Hindi cinema is turning more complex and different issues of masculinity are being addressed. Men changing their gender roles is yet another subject that is welcoming in Hindi cinema. Hindi cinema is now unfolding different narratives in a new normal way. This present study attempts to examine this changing gender role pattern with respect to masculinity in Hindi cinema.

Masculinity: Definition and Types

"Masculinity consists of those behaviours, languages, and practices, existing in specific cultural and organizational locations, which are commonly associated with males and thus culturally defined as not feminine. So, masculinity exists as both a positive, in as much as theyoffer some means of identity signification for males,

ISSN 2394 - 7780

and as a negative, in as much as they are not the 'Other' (Feminine)". [2] As Connell (2005) also argued that "Masculinity does not existexcept in contrast with femininity" (p.68).

Connell identified four categories of masculinities as follows:

1. Hegemonic masculinities are a type of masculinity that ensure men's dominance and women's subordination in society. It examines why and how men claim and maintain leadership roles in society. This style of masculinity is most apparent. Men who have physical power and do not show their emotions demonstrate this style of masculinity.
2. Marginalised masculinities are a type of masculinity in which men exhibit features of hegemonic masculinities but are classified as different based on class or status such as disabled or non-white.
3. Subordinate masculinities are a type of masculinity in which males lack numerous characteristics of hegemonic masculinity or exhibit characteristics that are opposed to hegemonic masculinity such as men that are not physically powerful, are overly emotional, act femininely, and are homosexual. This type of masculinity is regarded as inferior.
4. Complicit masculinities are a type of masculinity in which men neither confront nor accept hegemonic standards. They do not exploit women, respect women and share household chores with them.

RATIONALE OF THE STUDY

The problem put forward in this study concerns the portrayal of masculinity in Hindi cinema. As the representations of men and women in the cinema play a vital role in the socialization process of young boys and girls and in strengthening the gender roles in society. It becomes important to look at how Hindi cinema has addressed men and their gender roles. Attempts have been made by many researchers to understand the portrayal of masculinity in Hindi cinema from many different perspectives. While this study is dealing with men changing theirgender roles which will bring out an important and new dimension in the study of masculinity.

RESEARCH OBJECTIVE

The objective of the research is to analyze the various aspects of masculinity portrayed in selectHindi films.

METHODOLOGY

Content analysis of a total of two Hindi films released between 2015 to 2020 (five years) is done by the researcher to understand the portrayal of masculinity in select Hindi films.

LIMITATIONS OF THE STUDY

The limitations of this study are as follows:

1. This study is only extended to Hindi Cinema.
2. This study only covered films released between 2015 to 2020.
3. This study examined only two films.

REVIEW OF LITERATURE

Gehlawat (2012) argued that the era of 'angry young man' had been replaced by the metrosexual male protagonist which is defined by male appearances, physical fitness and grooming in films like *'Desi Boys'* and ' *'Ladies vs Ricky Bahl'* which depicts male actors showing off their chiselled and manscaped bodies rather than his physical strength. The authorthus claimed that both male and female actors in Hindi cinema are now sharing the equal burdenof sexual objectification.

Shandilyaa (2014) stated that the genre of action films in Bollywood relies on the idea of the muscular hero demolishing the enemy through his physical strength or gun. The ripping of theshirt is also common in action masala films and the muscular male body becomes the gaze.

Amrutha, Babu and Priyamvada (2018) analyze the representation of males in two female-oriented films *'Parched* (2015)' and *'Lipstick under my Burkha* (2016)*'* and finds out that both the films highly portray the brutal side of male characters which reinforces that being violent, and aggressive, dominating, and having high sexual desire are the symbols of masculinity.

Benjamin (2020) explores masculinities in two Hindi films *'Kabir Singh'* and *'Dream Girl'* from Carl Jung's concept of Archetypes, Hegemonic Masculinity, and Cultural liberalism. Theauthor points out that, in the film *'Kabir Singh'*, *Kabir* showcases hegemonic masculinity as he is dominating and in control of *Preeti;* the archetype of shadow and negative liberalism as he gets addicted to alcoholism and drug abuse; and the archetype of self as he realizes his mistakes and makes a decision to cut on the consumption of alcohol; in the

ISSN 2394 - 7780

film, *'Dream Girl'Karam*, showcases this archetype of anima or animus as he showcases the feminine traits by talking in a womanly voice; positive liberalism by showing empathy towards his callers in the call centre. The author thus concluded that men's protective and possessive behavior is portrayed in Hindi cinema, however, it is also highlighted along with their shortcomings.

The theoretical framework of the study

The current study is based on Judith Butler's "Gender Performativity Theory." According to the notion, "gender is performative in nature" (Butler,1999). Gender is simply an acting or a performance that includes how a person dresses talks and behaves in their daily life. Butler (1999) asserted that gender is socially and culturally formed rather than physiologically defined(p.9). According to Butler (1999), "gender is just cultural meanings that sex bodies take" (p.10). "Gender is to culture and sex is to nature" (Butler, 1999, p. 11). As soon as a child is born, he or she is conditioned to behave in ways that are considered appropriate for them. Butler (1999) asserts that Gender is a verb (doing) that refers to what a person does, whereas Sex is a noun (being) that refers to what a person is. Gender is a set of roles that people play on a regular basis. Males and females have different sets of roles that constitute their gender identity. According to Butler (1999), "gender is real only to the extent that it is performed." Men and women are bound to play specific established gender roles and performances that define whatit means to be a normal male or female. Gender is not a stable identity. For example, if men begin dressing like women or women begin dressing like men and continue this performance for years, our perception of what is proper for a specific gender will shift with time. Butler (1999) contends that the way men and women behave is either accepted or rejected by society,and that this influences the norms of what is normal or challenging. As a result, the definition of "true gender" is difficult to grasp (Butler, 1999).

The current study intends to investigate the portrayal of masculinity in Hindi films using the Gender Performativity theory as a framework as it will provide a critical insight into how gender roles are socially established and performed, and how gender identity is formed.

Content Analysis

The portrayal of masculinity has been studied in the context of 'Gender Performativity' concept given by Judith Butler. The content analysis has been divided into themes like Gender Role, Characteristics, Relationship between male and the female leads and Gender roles and stigma.

Analysis of the film 'Ki and Ka'

The story revolves around a married couple *Kia (Kareena Kapoor)*, an ambitious woman who aspires to become successful in her career, and *Kabir (Arjun Kapoor)*, a son of a reputed businessman, who wish to stay away from ambitions. They form an unusual relationship where*Kabir* is the house-husband while *Kia* is the breadwinner thus contradicting their gender rolesas placed upon a man and woman in Indian Society.

Gender roles

The film shows *Kabir* performing all the roles that are ascribed to housewives or women in general such as waking up early than his partner in the morning, buying groceries, cleaning thehouse, cleaning the dishes, and cooking for *Kia* and his mother-in-law.

The scene [0:34:43] portrays *Kabir* putting on the Mangal Sutra which has been an identity ofmarried women. Here, as *Kabir* changes his gender role, putting on the mangal sutra for him becomes important.

In scene [0:37:17] *Kia* says to *Kabir*, "*First-day se hi apne kartavyo ka itna seriously paalan kar rahe ho." (You are obeying your duties so seriously from the first day itself)*. Here, it showsthat since *Kabir* changes his gender role, looking after the home becomes his responsibility ashousehold work is seen to be a women's duty.

Kabir is financially dependent on *Kia*. He used to take money from *Kia* to buy groceries. Even,when they used to go out to a restaurant for dinners, *Kabir* used to pass the bills to *Kia*. Even when *Kabir* starts earning, he performs the roles of a breadwinner and househusband simultaneously. Domestic duties were not equally divided between both but instead fulfilled solely by *Kabir*.

ISSN 2394 - 7780

In scene [1:20:05], when *Kia* comes home late and tired, *Kabir* takes out her footwear. Womentouching the feet of their husbands has been a practice for centuries. Here, even when *Kabir* changes his gender role, it still legitimizes the patriarchal notion that women are inferior and more submissive than men.

When a few men start eve-teasing, *Kia*. *Kabir* fight with the villains thereby supporting the masculine role of being a protector of woman.

- **Characteristics**

The film portrays *Kabir* as soft-hearted, emotional, caring, unaggressive, passive, calm, and overtly vulnerable. His characteristics are described in the song "*Most Wanted Munda*" lyrics of which go like *"Thoda Sushil hai. Thoda Sundar hai. Thoda homely hai. Sambhaale sabko Ghar ka kaam kare. Hai Man of family" (He is gentle, handsome, homely, does domestic choresand is the man of family)*. This describes *Kabir* with all the qualities that are associated to females. Lyrics further go like" *Iske toh seene me kudiyo wala heart" (he carries a soft heart like that of a woman)*. Thus, the song legitimizes the notion that household work is done by the weak gender.

- **Relationship between male and the female leads**

Kia who is the breadwinner is portrayed as dominant and aggressive in the relationship. In theirrelationship, *Kia* who is here the male gender is shown abusing *Kabir* while *Kabir* who is herethe female gender does not speak a word. Thus, it justifies that the partner who earns has the power to exploit in the relationship and *Kabir* must stay quiet as he was not earning. As the gender role changes, *Kia* becomes controlling in their relationship. It can be reflected when sherestricts *Kabir* from giving speeches in seminars and interviews. *Kia* is shown as superior in decision-making. It justifies that the earning member gets the major power to take decisions and to be controlling in the relationship.

- **Gender roles and stigma**

In scene [0:8:22] When *Kia* sees *Kabir* crying. *Kabir* tells *Kia*, "*Ek ladki ko ek ladke ko live rote hue dekhne ka sunehra mauka mil gaya" (A girl got the golden chance to see a man cryinglive).* It indicates the fact that a man crying is not normalized in society.

In scene [0:29:34] When *Kia* introduces *Kabir* to her mother. She says that *"husband nahi, yemeri wife banana chahta hai*" *(He wants to become my wife and not my husband)*. It indicates that staying at home is only a wife thing and when a man takes on a feminine role, he is seen as a female itself.

In scene [0:29:49] *Kia's* mother says to *Kabir, "Matlab free me khana khaoge?" (Means you will eat for free)*. It shows that if a man chooses to stay away from his breadwinner role, then it is believed that he is living off pity.

In scene [0:31:54] Kabir's father says *"Aurat ki Kamai pe jiyoge? Mard ho tum." (Will you live on a woman's money? You are a man)*. He further tells that when a man becomes a woman's responsibility and stays with her as a househusband, people call him a "*naamard"*.

In scene [0:39:48] *Kia* says*, "Kaisa pati hai tu. Ek abla Nari ko is zalim Duniya me rozi roti kamate bhejte hue Sharam nahi aati?" (What kind of husband are you? Don't you feel ashamedof sending a helpless woman every day to earn in this cruel world?)* referring to that it is meantto be a matter of shame for a husband to send his wife out to earn. In the above argument, '*ablanari'* emphasizes that women are helpless and they are dependent on their male counterpart.

In scene [0:43:53] *Kabir* says *"Kharcha karna padta hai. Housewives free me nahi aati" (You have to spend money. Housewives don't come for free).* This suggests that a man must earn inorder to get himself a wife.

In scene [0:53:14] Kabir's father says that *"Kuch sharam kar. Daal chawal Bana Kar apni jawani mat waste kar." (You should be ashamed. Don't waste your manliness in cooking Riceand Lentils).* It proves the point that

ISSN 2394 - 7780

if a man chooses to not adhere to his masculinity accomplishments, he is not considered manly enough or a real man.

In scene [1:33:15] *Kia* says, *"Tujhe kaam nahi Karna toh baakiyo ko kyu nikamma bana Raha hai?" (If you don't want to work then why are you making others useless).* indicating that if a man chooses not to work, he is considered 'nikamma' or useless.

In scene [1:47:10] *Kia* says, *"Meri Kamai pe Ji Raha hai aur Duniya ko dikha Raha hai Tu Kitna mahaan hai*." *(You are living on my money and showing to the world that you are so great).* This indicates that if a man is financially dependent on a woman, then he does not deserve any fame.

DISCUSSION

In the film *'Ki and Ka'*, it can be seen that when both the partners change their gender roles, power dynamics in a relationship do not remain equal. Here, *Kia* who is portrayed as the male gender gets the power to oppress *Kabir* who is portrayed as the female gender. Here, two types of masculinities come into the picture. When considering *Kia* as the man, *Kia* showcases hegemonic masculinity which is the type of masculinity that legitimizes the dominance of men and subordination of women. When considering *Kabir* as the man, *Kabir* showcases complicit masculinity wherein men do not engage in hegemonic practices, do not oppress women, respect women, and share the housework with them. Here, *Kia* who performs as the male gender is shown as dominant, aggressive, and strong as these are considered masculine traits while *Kabir* who performs as the female gender is shown as submissive, unaggressive, and weak as these are considered feminine traits.

ANALYSIS OF FILM 'DREAM GIRL'

The film revolves around *Karam (Ayushmann Khurana)* who works at a call centre and earns by impersonating a woman named *Pooja (a fictional character)* and talks in her voice. Thus, he is performing both gender roles at the same time.

- **Gender roles**

Due to *Karam's* ability to talk in a female voice, he used to play female lead roles in mythological plays.

Karam performs as a phone sex worker named Pooja in a call centre; a profession solely considered for women. His job was of talking to men in a sweet and loving tone to give them companionship.

In scene [1:48:02] *Karam* says *"Pooja Ek Mard hai." (Pooja is a man).* It shows that *Pooja* has to be a man in order to protect a woman. In other words, men are considered protectors of women.

In scene [1:46:28] *Karam* says that '*Karam hi pooja hai aur Pooja hi karam hai' (Karam is Pooja and Pooja is Karam).* Thus, he keeps fluctuating between two different gender performances in which *Karam* is the actual identity masked under the performance of *Pooja*. In scene [1:46:31] *Karam* says that '*Pooja Karam k Bina reh nahi Sakti' (Pooja cannot live without Karam)* by which he is referring that there are feminine sides of a male character and masculine sides of a female character.

In scene [1:58:00] *Karam* says that "*Pooja koi gender Nahi hai*" *(Pooja has no gender)* by which he is referring that gender is not biologically decided and anybody irrespective of their gender can be *Pooja*.

ISSN 2394 - 7780

In scene [1:56:33] *Karam* says that '*Jo paida kar sakta hai, wo maar bhi sakta hai' (one who can give birth can kill it to)* by which he is referring that if he can give birth to *Pooja* then he can kill it too. Here, it is shown how gender is merely a performance.

- **Characteristics**

The film portrays *Karam* as soft, gentle, emotional, caring, loving, gentle, loyal, unaggressive,and calm. *Karam* does not merely do the job to make money but understood his caller's emotions, used to listen to them and console them. He does not stick to the notion that men should not be open to their emotions.

- **Relationship between male and the female leads**

The film shows both the male and the female leads as equally supportive in a relationship. Theytake a stand for each other in all the situations that occur. Though *Karam* initially hides his profession from her fiancé *Mahi* out of embarrassment and shame. When he plans on leaving his job, he confesses everything to her. *Mahi* after knowing about the truth supports him.

Gender roles and stigma

Karam's father was always unhappy with Karam earning money by playing female characters in mythological plays. It can be reflected when he says that, *"Tumhari Maa ne kitni upvaas kar k ek ladka paida kiya hai aur tum ladki bante fir rahe ho." (Your mother has fasted to give birth to a man and you keep acting like a woman)*. This shows that *Karam* earning by playing woman roles in the play does not meet his father's expectations. It is expected from men to perform the roles ascribed for men and not vice versa. If men choose a profession in which he has to showcase feminine behaviours, then it is considered as shameful. Another such example is when Karam's father says (employer of the call centre) that, *"Ladka ho kar ladki ki tarah awaz nikalna koi achi baat thodi hai" (It is not good for a man to talk in the voice of a woman)*. This indicates to the fact that a man is supposed to have a deep voice and speaking in a tender voice for a man is not seen as good.

DISCUSSION

In the film *'Dream Girl',* it can be seen that *Karam* gives care and affection to other men by impersonating a female. Here, the character of *Karam* showcase subordinate masculinity wherein a man showcases qualities opposite to hegemonic masculinity such as acting in a feminine way. This type of masculinity is seen as inferior. When *Karam* changes his gender role, he has to display characteristics and behaviours that are considered appropriate to being afemale such as talking in a sweet voice and being sensitive. *Karam* has to be *Pooja* in order todisplay any feminine qualities. *Karam* cannot talk in a womanly voice just by being a man.

CONCLUSION

The present study aimed to analyze the portrayal of masculinity in select Hindi films *'Ki and Ka'* and *'Dream Girl'* using the Gender Performativity theory. The observations from the content analysis of both films legitimize that men and women have to adhere to socially constructed gender norms to position themselves as male or female. Thus, it can be concludedthat both films strengthen the deep-rooted notions of masculinity and feminity and sustain gender stereotypes.

BIBLIOGRAPHY

- Benjamin, A. (2020). Exploring masculinity in millenial Hindi cinema through film kabir singh and Dream girl.
- Butler, J. (1999). *Gender Trouble.* New york, London: Routedge. Connell, R. (2005). *Masculinities.* university of california press.
- *Film Enquiry.* (2015, october 27). Retrieved from https://www.filminquiry.com/film-theory-basics- laura-mulvey-male-gaze-theory/#:~:text=Mulvey%20states%20that%20%E2%80%9Cthe%20gender,and%20that%20this%20problem%20stems
- Gehlawat, A. (2010). 'Aadat Se Majboor'/'Helpless by habbit: metrosexual masculinity in contemporary Bollywood. *Studies in South Asian Film & Media, 4*. doi:10.1386/safm.4.1.61_1
- *Gender Representation in films.* (2008, November). Retrieved from UK Essays: https://www.ukessays.com/essays/international-relations/women-power-and-politics.php
- *Masculinitiies.* (n.d.). Retrieved from Council of Europe: https://www.coe.int/en/web/gender-matters/masculinities

ISSN 2394 - 7780

- Mehra, M. (2019, October 16). Retrieved from Feminism India: https://feminisminindia.com/2019/10/16/many-masculinities-bollywood-60s-present/
- P.P. Amrutha, R. P. (2018). Male Representation in Female Oriented Movies a study focused on Parched and Liptick under my. *International Journal of Pure and Applied Mathematics, 119*.
- Paul, A. (2016). Masculinity and the Other Gaze: A study on modern bollywood films.
- Shandilya, K. (2014). Of enraged shirts, gyrating gangsters and farting bullets: Salman Khan and the new bollywood action films. *South asian popular culture, 12*(4).
- *Study.com*. (n.d.). Retrieved from https://study.com/academy/lesson/complicit-masculinity- definition-example.html#:~:text=Complicit%20masculinity%20refers%20to%20a,%2C%20physical%20strength%2C%20and%20whiteness.
- Ton, J. (2018). Judith Butler notion of gender performativity.
- Accessed from https://feminisminindia.com/2019/10/16/many-masculinities-bollywood-60s-present/
- Accessed from https://www.coe.int/en/web/gender-matters/masculinities

International Journal of Advance and Innovative Research
Volume 6, Issue 2 (I): April - June, 2019
ISSN 2394 - 7780

IMPACT OF WATER ELEMENTS ON URBAN FORMS IN INDIAN CONTEXT

Mrs. Sangita Vaghasia
Lecturer, Architectural Assistantship Department, Government Polytechnic for Girls, Surat, Gujarat

ABSTRACT
Urban form, often seen as the defining characteristic of a city's personality, is shaped by a combination of natural and man-made elements. This paper focuses on the significant impact of water elements—rivers, lakes, and coastal areas—on the urban forms in the Indian context. Numerous illustrations from Indian cities are provided to support this theme. Natural elements such as water bodies, ridge valley regions, and coastal belts have a profound influence on settlement features, land use, and other urban activities. This environmental significance has been recognized historically in the planning and development of towns in India, as evidenced in ancient cities. The paper examines the roles of various natural environmental elements, particularly water, and their impacts on urban form and the urban transformation process.

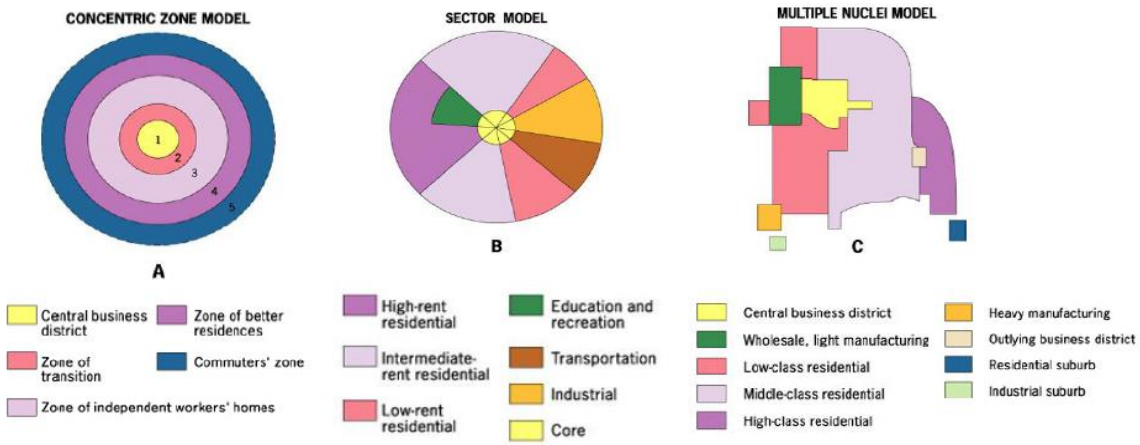
Keywords: Urban form, urban transformation, water elements, Environmental elements, Land use.

1. INTRODUCTION
Urbanization significantly shapes cities, affecting their form, land use, and infrastructure. This process influences urban dynamics and economics by altering physical layouts and activities. Urban form reflects the forces of environmental and human activities within broader contexts—environmental, political, social, economic, and religious—where natural elements play a crucial role.

Understanding the interplay between natural elements and urban form is essential for developing effective planning strategies that support urban growth and development. The impact of environmental elements on habitats is crucial in integrating the cityscape with other elements of urban form. While cities may appear similar on the ground, their distinct urban forms, influenced by natural elements, become evident from a broader perspective. These natural elements provide the foundational base for planning human settlements, and their role cannot be ignored or underestimated in shaping urban form.

In the Indian context, water elements have played a pivotal role in shaping urban forms. This paper explores the multifaceted impact of rivers, lakes, and coastal areas on the development, structure, and functionality of Indian cities. By examining historical precedents, cultural influences, economic drivers, environmental considerations, and contemporary challenges, this study provides a comprehensive understanding of how water elements influence urban design and planning in India. Through this exploration, the paper aims to highlight the critical importance of water elements in urban development and the need for thoughtful integration of these elements in planning strategies.

2. URBAN FORM: CONCEPT AND TYPOLOGY
Urban form is understood as the spatial pattern of human activities at a given point in time. However, a precise definition of urban form is elusive due to the multitude of influencing factors. A. E. J. Morris categorized city forms as organic, planned, or a combination of both. Some planners define urban form based on the number of activity centers, describing it as mono-nuclear or multi-nuclear. Land use growth theories, such as those proposed by Burgess, Hoyt, and McKenzie, characterize urban form as concentric, sector-based, or multi-nuclear, respectively (Fig.1).



ISSN 2394 - 7780

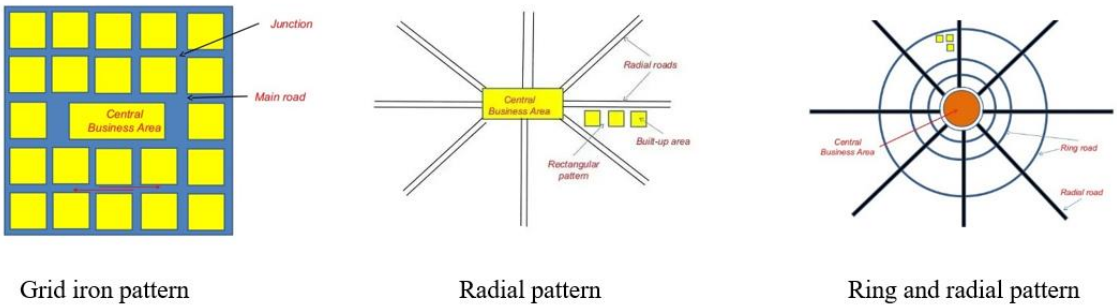
Figure: 1. Models of Landuse growth theory

Urban forms evolve over time, transitioning from core city typologies to radial, concentric, or dispersed models. The growth of urban agglomerations led Patrick Geddes to introduce the concept of "conurbation," which describes the amalgamation of multiple municipalities into a metropolitan region.

Determinants of urban form can be broadly categorized into natural and man-made elements. Natural elements include water bodies, climate, topographical features such as ridges and valleys, and vegetation. Man-made determinants encompass historical, cultural, and religious activities, urban circulation systems, and predominant city functions. These man-made elements are more numerous and continue to proliferate as cities expand.

The primary motivating forces behind urban form include socio-economic, political, cultural, and religious characteristics, which are closely linked to human settlement behavior. Thus, the influence of royal palaces, historical fortifications, and large-scale cultural institutions on urban form is significant and expected. Additionally, development control regulations play a crucial role in shaping city forms.

Urban form can be analyzed on various geographical scales, such as small cities, metropolitan areas, or specific parts of a city like town planning schemes and neighborhoods. Key elements such as shape, density, and circulation often dictate the type of urban form. Patterns like grid layouts, radial roads, ring and radial patterns, and linear corridors are significant features that help classify urban form types.



Grid iron pattern | Radial pattern | Ring and radial pattern

Figure: 2

3. WATER ELEMENTS AND URBAN SETTLEMENTS

Water systems, topographical features, vegetation regions, climatology etc. are the main components of natural systems which are closely related to urban forms. This paper explores the roles of various natural environmental elements, with a particular focus on water, and their impacts on urban form and the process of urban transformation.

➢ Water Bodies

Examples of settlements with such background of natural elements are briefed below.

- **River**

Rivers have historically played a crucial role in shaping the urban form and landscape of capital cities around the world. Notable examples include Paris, London, and Beijing, where rivers such as the Seine, Thames, and Yongding have provided picturesque river landscapes and served as vital arteries for transport, commerce, and recreation. These cities have effectively integrated their riverbanks into the urban fabric, creating vibrant public spaces, cultural landmarks, and economic hubs.

Similarly, in India, a significant number of towns and cities have developed along riverbanks, leveraging the perennial water sources these rivers provide. Cities such as Allahabad (Prayagraj), Delhi, Haridwar, Tiruchirappalli, Bharuch, and Surat have thrived due to their strategic locations on the banks of major rivers like the Ganges, Yamuna, and Narmada. These rivers have not only supplied essential water resources but also influenced the cultural, economic, and social dynamics of these urban areas.

Understanding the role of floodplains is also critical when examining the impact of rivers on urban form. Floodplains, the flat areas adjacent to rivers that are subject to periodic flooding, significantly affect land use planning and urban development. They provide fertile soil for agriculture, space for recreational activities, and natural buffers that can mitigate flood risks. However, they also pose challenges for urban planners, who must balance the benefits of proximity to water with the need to protect communities from flood hazards.

In Indian cities, the historical and ongoing relationship between urban settlements and rivers illustrates the complex interplay between natural landscapes and human development. For instance, Allahabad is renowned

ISSN 2394 - 7780

for its confluence of the Ganges, Yamuna, and the mythical Saraswati, making it a prominent religious and cultural center. Delhi's development has been closely tied to the Yamuna River, which has influenced the city's layout, infrastructure, and historical sites. Haridwar's location on the Ganges has made it a pivotal pilgrimage site, while Tiruchirappalli's position on the Kaveri River has shaped its agricultural and commercial activities.

Bharuch and Surat, situated on the Narmada and Tapti rivers respectively, highlight the economic advantages of riverine locations, particularly in terms of trade and industry. These cities have harnessed their rivers for transportation, irrigation, and as catalysts for urban expansion.

This paper delves into the multifaceted impact of rivers on urban form, drawing parallels between international examples and the Indian context. It underscores the importance of rivers in urban planning and development, emphasizing the need for sustainable management of river landscapes to enhance urban resilience and quality of life. By examining both historical and contemporary examples, the study aims to provide a comprehensive understanding of how rivers influence urban transformation and the strategies that can be employed to integrate them effectively into the urban environment.

Picture: 1
Areial view of Delhi with
Yamuna River

Picture: 2
Growth of Surat along
Tapi River

- **Lakes**

Lakes, varying in size and character, constitute another significant category of water bodies that profoundly influence urban form. In India, numerous examples illustrate how lakes have shaped the development, structure, and function of cities. These water bodies not only provide essential ecological services but also enhance the aesthetic and recreational value of urban environments, contributing to the unique identity of cities.

Major Lake-Influenced Urban Forms

Several notable Indian cities are defined by their prominent lakes, creating distinctive urban landscapes and influencing land use patterns and urban activities.

Srinagar, Kashmir: The city is renowned for its iconic Dal Lake, which dominates the urban form and provides a scenic backdrop. These lakes are central to the city's tourism industry, supporting houseboats and shikara rides, and they play a crucial role in the local economy.

Picture: 3. Lake based city Srinagar

ISSN 2394 - 7780

Bhopal, Madhya Pradesh: Known as the "City of Lakes," Bhopal features the Upper Lake and Lower Lake, which are integral to its urban fabric. These lakes support various recreational activities and are surrounded by significant urban developments, including residential areas, parks, and cultural sites.

Picture: 4 - Circular road has emerged due to Upper Lake in Bhopal

Udaipur, Rajasthan: Often called the "City of Lakes," Udaipur's urban form is heavily influenced by Lake Pichola and Fateh Sagar Lake (Picture:5). These lakes not only provide a picturesque setting but also support tourism and local livelihoods through boating, fishing, and lakeside commerce.

Nainital, Uttarakhand: The city is centered around Naini Lake (Picture:6), which is a focal point for both residents and tourists. The lake's presence has shaped the city's development, with promenades, markets, and recreational areas enhancing the urban experience.

Picture: 7.
Built environment along Pichola Lake in Udaipur

Picture:8
Dense settlement around the Lake Naini

Hyderabad, Telangana: Husain Sagar Lake, a large artificial lake, significantly impacts Hyderabad's urban form. The lake supports various recreational and cultural activities and has become a landmark, fostering economic activities along its shores.

Medium-Sized Lakes and Urban Influence

In addition to major lakes, several medium-sized lakes across India also play a crucial role in shaping urban forms and influencing land use and urban activities.

Vadodara, Gujarat: The presence of lakes like Sursagar influences the city's layout, providing green spaces and recreational areas for the local population.

Jaisalmer and Jaipur, Rajasthan: These cities feature lakes such as Gadsisar Lake and Man Sagar Lake, respectively, which contribute to their historical and cultural landscapes, attracting tourists and supporting local economies.

Amritsar, Punjab: The sacred Amrit Sarovar, around which the Golden Temple is built, defines the city's religious and cultural identity, drawing millions of pilgrims and tourists annually.

ISSN 2394 - 7780

Tirupati-Thirumala, Andhra Pradesh: The temple town includes water bodies that enhance its spiritual significance and support the influx of pilgrims.

Bangalore, Karnataka: Ulsoor Lake is a prominent feature in the city, providing recreational opportunities and enhancing the urban environment.

Kodaikanal, Tamil Nadu: Koda Lake is central to the hill station's appeal, shaping its urban form and supporting tourism-related activities.

Mysore, Karnataka: Kukkarahalli Lake influences the city's land use patterns and provides a habitat for various species, supporting biodiversity within the urban setting.

By examining both prominent and medium-sized lakes, the study underscores the importance of integrating natural water bodies into urban planning and development strategies. Effective management and sustainable utilization of lakes can enhance urban resilience, promote environmental sustainability, and improve the quality of life for urban residents.

- **Deltas**

Large deltas are integral components of water systems that significantly shape urban forms. In India, notable examples include cities like Calcutta (Kolkata) and Vijayawada, while internationally, Randstad in Holland is a prime example. These deltas provide fertile land, facilitate agriculture, and support dense urban populations due to their strategic locations and abundant resources.

- Kolkata, West Bengal: Located on the Hooghly River delta, Kolkata's urban form is deeply influenced by its proximity to this significant water system. The delta provides fertile soil, supporting agriculture and contributing to the city's economic growth. The river also facilitates transport and trade, making Kolkata a vital commercial hub.
- Vijayawada, Andhra Pradesh: Situated on the Krishna River delta, Vijayawada benefits from the fertile plains and ample water supply, which support extensive agricultural activities. The delta's strategic location has spurred urban growth, making Vijayawada an important economic and cultural center in the region.

Harbor Forms and Coastal Cities

Harbor forms located at river mouths and along seashores play a crucial role in shaping urban settlements. These locations are ideal for trade and commerce due to their access to waterways, which facilitate the movement of goods and people.

- Khambhat, Gujarat: Positioned at the mouth of the Sabarmati River, Khambhat has historically been a significant port city. Its strategic location along the Gulf of Khambhat has made it a vital trade and commercial center, influencing the city's urban form and economic activities.

These examples highlight the profound impact of deltas and harbor forms on urban development. The strategic advantages offered by these water bodies have historically driven the growth and prosperity of cities, shaping their economic, cultural, and social landscapes. Understanding these influences is crucial for urban planners and designers in creating sustainable and resilient urban environments that capitalize on their natural resources.

- **Sea shores**

Many of these coastal cities have developed distinctive patterns, such as the finger pattern form, characterized by linear extensions of urban areas along natural or artificial features. This form maximizes access to the coastline, facilitating trade, transportation, and economic activities linked to the sea.

Mangalore, Karnataka: As a major port city on the Arabian Sea, Mangalore's urban form extends along the coastline, with significant port infrastructure and industrial zones. The city's layout supports maritime trade and fisheries, contributing to its economic vitality.

Karwar, Karnataka: Located on the western coast, Karwar's urban form is shaped by its natural harbor. The city's finger-like extensions along the coast facilitate easy access to the sea, promoting fishing, tourism, and naval activities.

Panaji, Goa: The capital of Goa, Panaji is situated on the banks of the Mandovi River near its mouth, blending riverine and coastal influences. The city's urban form extends along the coastline and the river, enhancing its appeal as a tourist destination with vibrant waterfront areas.

ISSN 2394 - 7780

Jagannath Puri, Odisha: Known for its religious significance and the Jagannath Temple, Puri's urban form is influenced by its coastal location. The city extends along the Bay of Bengal, attracting millions of pilgrims and tourists, which in turn drives local commerce and hospitality industries.

Visakhapatnam, Andhra Pradesh: As a major port and industrial city, Visakhapatnam's urban form stretches along the eastern coast. The city's development includes port facilities, industrial zones, and residential areas, all oriented towards the coastline to optimize maritime activities.

Diu, Gujarat: Situated on a small island off the coast of Gujarat, Diu's urban form is defined by its coastal geography. The city's layout features narrow extensions along the coastline, supporting fishing, tourism, and cultural activities.

4. WATER ELEMENTS IMPACT AND URBAN TRANSFORMATION

The urban forms associated with the water elements have profound impact on urban activities and thereby urban transformation as under.

➢ **Function Domination: tourism**

- The various water elements cited above have considerable bearing on city forms. Often such cities are tagged with water elements as adjectives such as river cities, lake cities, seashore cities or bay cities in broader classification. In India Delhi, Allahabad, Varanasi, Dibrugardh, Shrirangapattanam, etc. are few best examples of river cities. Some cities like Dibrugardh on bank of Brahmaputra and Bharuch on the bank of the Narmada are typical examples of negative impact due to severe flooding. Few river cities such as Varanasi, Allahabad and Hardwar-Rushikesh on the bank of river Ganga function as pilgrimage centres since ancient time. River Narmada in Gujarat is linked with number of Ishwar temple in small settlements to emerge as places of pilgrimage.
- Similarly there are good number of lake cities in India to influence on urban forms and consequently on landuse activities. Popular cities in this regard are Srinagar (Dal Lake), Bhopal (Upper Lake), Udaipur (Pichola Lake), Hyderabad (Husainsagar), Mount Abu (Nakhi Lake), Nainital (Naini lake) and Bangalore (Ulsoor Lake). These cities with lakes have significant impact on urban activities and few of them function as tourist cities.
- The river banks have become hub of boat clubs, refreshment and water games. The international repute hotel like hotel 'Lake Palace' is in Udaipur Lake. Similarly numbers of palace complexes, forts, are also established along the water body. Jag Mandir in Udaipur Pichola Lake provides a beautiful floating scene.

Picture: 9 Pichola Lake with palaces in Udaipur

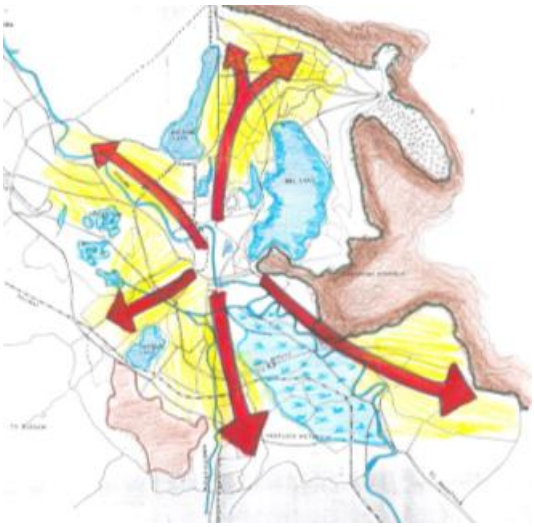
➢ **Growth, density and building forms**

- The urban form has been shaped in the case of Kandla in Gujarat, Vasko in Goa, Karwar and Maglore in Karnataka with seashore elements having port activities.
- Dense residential settlements are observed along the riverbanks or the lakes of the cities. Concentration of activities is maximum along the water bodies and the city growth declines if one moves from the water bodies. Often the city grows faster on particular bank only depending upon the transportation access prevailing. This phenomenon has been observed in the case of Surat, Varanasi, Patna etc. The growth is predominant on one bank of the river only.
- Compact building forms with low rise structure and narrow lanes are normally found here. The history base and traffic situation at that point of time have reflected in narrow roads.

ISSN 2394 - 7780

➢ **Landuses**

The number of lakes in Srinagar have provided for scope of wedges for residential development in radial form. (Picture: 8)



Picture: 10 - Residential wedges at Srinagar

➢ **Circulation Corridors**

The North-south linear transportation system has clearly emerged along Hugly River in Calcutta. Similarly the linear transportation corridor is in Mumbai for its island structure. Circular rings and semi rings corridors are outcome of big lakes in city like Bhopal, Udaipur, Srinagar, Nainital and Mount Abu. Straight corridors along the seashore are in Bombay, Chennai, Cochin etc.

➢ **Environment**

The water bodies and other natural elements are equally important to express the environmental aspects of urban form. All water bodies not only provide water and cool breeze but also provide the massive oxygen air blocks and act as lungs. Surat city is one of the best examples for the environmental effect of river Tapti in providing cool breeze and support of massive oxygen block for the dense settled walled city areas for its large width and length.

- Dense core area on left Bank
- River acts as Lung for the dense area

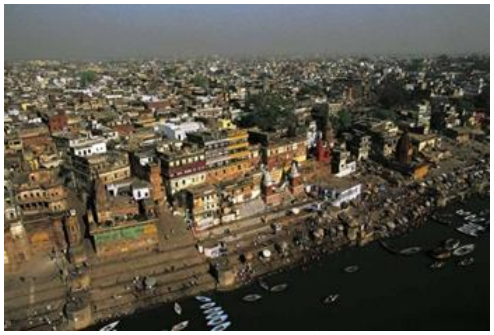
Picture: 11
Growth of the Surat city at riverbank of Tapi

➢ **Culture and heritage**

- There are other good number of cities with lakes and developed riverbanks and act as pilgrimage centres.
- River city Varanasi with good number of ghats, holy city Hardwar and Prayag, in vicinity of sangam are attracting thousands of pilgrims from all over the country since ages and they are the centre of Indian culture and heritage. So also Ujjain on bank of Shripa River and Omkareshwar on Narmada River are the attracting centres for several devotees by the presence of Jyotirlinga. The prevailing ghats and the activities of devotees on bank of Ganga in Varanasi, Ujjain, Hardwar, etc. reflect on our heritage. (Picture: 12)

ISSN 2394 - 7780

Dense residential area on River belt



Ghat built environment

Picture: 12. Varanasi Map and view of Varanasi Ghats

- Holy lake in Tirupati-Thirumalai in Andhra Pradesh, Pushkar in Rajasthan and holy lake in front of Gurudwara in Amritsar are the sacred lakes for the devotees. Dwarka and Somanath in Suarastra, Jaganathpuri in Orrissa and Kanya Kumari in Tamilnadu are on seashore with magnificent temples and act as pilgrimage points

➢ Illustration of few Indian cities and their association of water elements in shaping the urban form are briefed in table-1

Table 1: Few Indian cities with urban forms related to water elements

City	***Dominating Water elements***
Mumbai Pandharpur Nasik, (Maharashtra)	Sea shore, Powai Lake (2.1 sq.km) Bhima River Godavari River
Bangalore, Shrirangpattun, Manglore (Karnataka)	Ulsoor Lake Kaveri River Sea shore
Hyderabad, (AndhraPradesh)	Husainsagar & Usman sagar Lakes
Ahmedabad, Vadodara, Surat, (Gujarat)	River Sabarmati, Kankaria Lake Sursagar Lake River Tapti
Chennai, (Tamilnadu)	Sea Shore
Kolkata, (West Bengal)	Hugli River delta region and Ravindra Sarovar
Bhopal, Ujjain (Madhya Pradesh)	Upper Lake Kshipra River
Varanasi, Allahabad (Uttar Pradesh)	Ganga river banks River bank
Srinagar, (Jammu & Kashmir)	Dal Lake and other chain of lakes
Udaipur, (Rajasthan)	Pichola Lake
Haridwar, (Uttarakhand)	River Ganges
Amritsar (Punjab)	Lake of Gurudwara

➢ **Negative impacts:**

No doubt the urban communities are benefitted maximum by these water elements and associated urban forms, but there are certain negative impacts too in few cases such as

- Constraints on accessibility and mobility
- Differential growths on both banks as they act as transport barriers
- Derouting and longer movements result in increase of transportation cost
- Possible destruction during high flood etc.

ISSN 2394 - 7780

- Haphazard growth of shanty slums on riverbanks
- Act as constrain for urban expansion

Some of the rivers and lakes are highly polluted and have resulted in environmental degradation. The haphazard industrial growth, poor regulations and inefficient control are the main root causes for such situations and creating harmful environment. Planners have to be more cautions against such damaging activities. Other negative impacts can be narrow down or completely arrested through effective regulations and control.

5. CONCLUDING REMARKS

Since ages the water has been the major source of settlements at both global and Indian level. In view of this good number of urban settlements are on river banks. Equal consideration has been on other water bodies like lakes and water bunds and all these are attraction points for the tourists and pilgrims. Certain lakes are sacred parts of known temples. One has to appreciate to consider such artificial lakes or river banks as mass bathing centres, during the festivals. These and other water bodies such as large delta areas, bays and vast sea shore belts have encouraged the settlement pattern for the trade activities. These water elements play the role of air lungs for the highly dense settlements and have improved the surrounding physical environment. They have impact on landuse, circulation, and building form and pattern. However, these environmental based urban forms need appropriate planned supporting infrastructures to exploit nature's gift further and derive the maximum benefits by the communities.

REFERENCE:

1. On analysing changes in urban form – some theoretical and methodological issues Marcus Adolphson and Folke Snickars
2. Procession and urban form in a sri lan village By William bechhoefer
3. Breheny, M. Sustainable Development and Urban Form, *Pion, London* (ed) (1992)
4. Agarwal, A., & Narain, S. (2001). Dying Wisdom: Rise, Fall, and Potential of India's Traditional Water Harvesting Systems. Centre for Science and Environment.
5. Jain, A. K., & Prakash, P. (2005). Urbanization and Development in India. Rawat Publications.
6. Singh, R. B., & Kumar, P. (2006). Sustainable Urban Development in India: Challenges and Prospects. Environment and Urbanization Asia, 17(2), 123-137.
7. Naison D, A New Role for Urban Planning in a Changing Environmental Climate *Mutizwa-Mangiza* , London, 17-9 June (2009).

MANUSCRIPT SUBMISSION

GUIDELINES FOR CONTRIBUTORS

1. Manuscripts should be submitted preferably through email and the research article / paper should preferably not exceed 8 – 10 pages in all.
2. Book review must contain the name of the author and the book reviewed, the place of publication and publisher, date of publication, number of pages and price.
3. Manuscripts should be typed in 12 font-size, Times New Roman, single spaced with 1" margin on a standard A4 size paper. Manuscripts should be organized in the following order: title, name(s) of author(s) and his/her (their) complete affiliation(s) including zip code(s), Abstract (not exceeding 350 words), Introduction, Main body of paper, Conclusion and References.
4. The title of the paper should be in capital letters, bold, size 16" and centered at the top of the first page. The author(s) and affiliations(s) should be centered, bold, size 14" and single-spaced, beginning from the second line below the title.

First Author Name1, Second Author Name2, Third Author Name3

1Author Designation, Department, Organization, City, email id

2Author Designation, Department, Organization, City, email id

3Author Designation, Department, Organization, City, email id

5. The abstract should summarize the context, content and conclusions of the paper in less than 350 words in 12 points italic Times New Roman. The abstract should have about five key words in alphabetical order separated by comma of 12 points italic Times New Roman.
6. Figures and tables should be centered, separately numbered, self explained. Please note that table titles must be above the table and sources of data should be mentioned below the table. The authors should ensure that tables and figures are referred to from the main text.

EXAMPLES OF REFERENCES

All references must be arranged first alphabetically and then it may be further sorted chronologically also.

- **Single author journal article:**

Fox, S. (1984). Empowerment as a catalyst for change: an example for the food industry. *Supply Chain Management*, *2*(3), 29–33.

Bateson, C. D.,(2006), 'Doing Business after the Fall: The Virtue of Moral Hypocrisy', Journal of Business Ethics, 66: 321 – 335

- **Multiple author journal article:**

Khan, M. R., Islam, A. F. M. M., & Das, D. (1886). A Factor Analytic Study on the Validity of a Union Commitment Scale. *Journal of Applied Psychology*, *12*(1), 129-136.

Liu, W.B, Wongcha A, & Peng, K.C. (2012), "Adopting Super-Efficiency And Tobit Model On Analyzing the Efficiency of Teacher's Colleges In Thailand", International Journal on New Trends In Education and Their Implications, Vol.3.3, 108 – 114.

- **Text Book:**

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2007). *Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies* (3rd ed.). New York: McGraw-Hill.

S. Neelamegham," Marketing in India, Cases and Reading, Vikas Publishing House Pvt. Ltd, III Edition, 2000.

- **Edited book having one editor:**

Raine, A. (Ed.). (2006). *Crime and schizophrenia: Causes and cures.* New York: Nova Science.

- **Edited book having more than one editor:**

Greenspan, E. L., & Rosenberg, M. (Eds.). (2009). *Martin's annual criminal code:Student edition 2010.* Aurora, ON: Canada Law Book.

- **Chapter in edited book having one editor:**

Bessley, M., & Wilson, P. (1984). Public policy and small firms in Britain. In Levicki, C. (Ed.), *Small Business Theory and Policy* (pp. 111–126). London: Croom Helm.

- **Chapter in edited book having more than one editor:**

Young, M. E., & Wasserman, E. A. (2005). Theories of learning. In K. Lamberts, & R. L. Goldstone (Eds.), *Handbook of cognition* (pp. 161-182). Thousand Oaks, CA: Sage.

- **Electronic sources should include the URL of the website at which they may be found, as shown:**

Sillick, T. J., & Schutte, N. S. (2006). Emotional intelligence and self-esteem mediate between perceived early parental love and adult happiness. *E-Journal of Applied Psychology, 2*(2), 38-48. Retrieved from http://ojs.lib.swin.edu.au/index.php/ejap

- **Unpublished dissertation/ paper:**

Uddin, K. (2000). A Study of Corporate Governance in a Developing Country: A Case of Bangladesh (Unpublished Dissertation). Lingnan University, Hong Kong.

- **Article in newspaper:**

Yunus, M. (2005, March 23). Micro Credit and Poverty Alleviation in Bangladesh. *The Bangladesh Observer*, p. 9.

- **Article in magazine:**

Holloway, M. (2005, August 6). When extinct isn't. *Scientific American, 293*, 22-23.

- **Website of any institution:**

Central Bank of India (2005). *Income Recognition Norms Definition of NPA.* Retrieved August 10, 2005, from http://www.centralbankofindia.co.in/ home/index1.htm, viewed on

7. The submission implies that the work has not been published earlier elsewhere and is not under consideration to be published anywhere else if selected for publication in the journal of Indian Academicians and Researchers Association.

8. Decision of the Editorial Board regarding selection/rejection of the articles will be final.

Indian Academicians and Researchers Association
www.iaraedu.com