

Analysis of fire risk and fire management facility in residential apartments in urban area in Chhattisgarh State, India

A.S.Majumdar¹, Richa Sharma²

¹Associate Professor and Head, Department of Civil Engineering,
Dr. C.V.Raman University, Bilaspur (Chhattisgarh)

²Assistant Professor, Department of Civil Engineering,
Dr. C.V.Raman University, Bilaspur (Chhattisgarh)

Abstract:

The aim of this paper is to examine fire safety measures and their viability in building especially of residential apartments. The required measures are technology based. Building /Apartments should be designed in such a way that occupants can escape by themselves in case of fire. However, case-studies shows that occupants often are found incapable to escape in time and often undermine precautional measures required to avoid or escape fire. Fire Service Bureau , Ministry of Public Security data says that thousands of people reported deaths and injuries and millions Rupees directly property loses .The study methodologies is based on incident evaluation and real life experiments .In general little information is known about actual human behavior in an event of fire outbreak. Therefore, it is better to let the fire safety of residential buildings be based upon actual human behavior in fire. It is important to enlighten occupants on safety measures to be taken during fire outbreak and around their buildings and other fire prevention methods adopt for their safety. The research recommends suitable fire safety measures in accordance to best practices after due evaluation of existing fire safety measures as it applies to users and the effectiveness of these measures.

Index Terms: Safety measures, residential buildings, fire service bureau.

I. INTRODUCTION

Fire is one of mankind's greatest discoveries but can also be a great source of danger in accidents. India recorded 16 lacs fires and 27027 deaths according to a 195 nation analysis by Global Disease Burden published in the BMJ Injury prevention journal recently [1]. The risk has fortunately been addressed by Governments which have continuously adjusted fire safety strategies. Buildings notably represent an important part of the places where fire has fatal consequences. Therefore, numerous national and regional fire safety regulations have been put in place targeting building specifically. Plastics are used in wide and growing range of buildings and construction applications, from durable pipes and window frames to state of the art insulations solutions [2]. The most crucial aspect of a building's safety in the face of fire is the possibility of safe escape. An important precondition is that fire safety facilities enable independent and adequate fire response performances by the building's occupant. In practice, it appears that the measures currently required by law do not always provide the support people need in burning buildings, consequently, understanding how individuals behave in an event of fire. Fire evacuation is essential if we are to bring fire safety measures into line with occupants needs during an incident. So far as building safety is

concerned, the study highlights that some of the assumptions about the existing paradigm of fire safety in buildings are not consistent with the knowledge set out in the literature. Fire safety has always been and continuous to be a major objective for the plastic industry and an integral part of product design and manufacturing. Over the years, our industry has increased the efforts to develop plastic materials, products and construction solutions with lower ignitability and limited impact on fire spread that have contributed to the ongoing reduction of fatalities, injuries and property damages due to fire.

II. FIRE SAFETY NEEDS

To provide an adequate level of fire safety in buildings of residential area, and other structures consideration needs to be given to a whole range of connected design and aspects. Prevention of fires is an important component of this system and it relies for its effectiveness on the safe installation and use of heat producing and energy consuming devices as well as the safe conduct of operations which may involve hazard of ignition. An important aspect of fire prevention is concerned with the human responsibility in ensuring that accidental fires are not allowed to start. Training and education at all levels plays an important part in this and the management responsible for a building has a responsibility to ensure that people in the building understand the risk attached to various activities they undertake.

If a fire does occur it is essential that occupants become aware of it as soon as possible and have awareness of the actions they need to take to move to a place of safety. This requires a knowledge of the safety provisions which have been made and an easy identification of the route to follow to reach safety outside the building. In large and complex buildings these may be progressive process through areas of increasing safety [3]. It is not normally expected that the occupants will use on-site facilities to control a fire but where these are available it is possible that

use can be made of them to tackle a small fire and extinguish it. Un-aided evacuation of occupants may not be possible under all cases and provision may need to be made for rescue services to give assistance particularly where the occupant mobility is below normal.

In addition to the safety of occupants within a building where a fire occurs, the safety of others in adjacent buildings is also important. The adjacent building may be physically attached to the building on fire or it may be located a short distance away. The separation of buildings be such that there is little chance of fire in one of the building spreading to the next. This consideration also requires attention to be paid to the hazard that may be created when high rise buildings are involved in a fire. The maintenance of the stability of the building can be critical and these demands higher standards to be applied compared with similar occupancies in low rise buildings. The stability of a structure is dependent on the likely severity of a fire within the building. This is controlled not only by the amount of the fuel or the fire load but also its burning characteristics and the availability of air for combustion. A simple system divides building into categories on the basis of their use and adds factors of safety to take account of the size of the building. A single building can sometimes have areas with differing potential fire severities and where these can be clearly identified. It is necessary to separate them by structures of adequate fire resistant.

Ideally if a fire starting in one part of a building can be contained, the hazard becomes controllable. In practice this may not be possible due to demands in connection with the use of space. However, in all buildings certain parts because of their importance must be separated by the fire barriers to either prevent fire entering those areas or a fire within those areas spreading to other parts. This termed as essential compartmentalization. In addition also, it is necessary to reduce the risk due to large space and impose additional requirements for compartment sizes, where required compartments should have well defined boundaries, preferably following the normal divisions in a

building. The maintenance of the integrity of such compartment boundaries is critical and strict control is needed to ensure that these are not breached by inadequate separation. This is particularly the case where pipes, ducts and other services penetrate compartment boundaries. It is normally assumed that adequate levels of fire safety are achieved by the construction of the building and facilities provided within the building. However, in buildings of a large size where large number of people may be present in the fire service rescue facilities can play an important role in preventing disasters [4]. It is therefore necessary to make suitable provisions for the fire brigade access to and within the building.

Achievement of fire safety requires an integrated approach to the provision of safety measures and their maintenance in good order. Constant vigilance is needed to ensure that fire does not become a problem for the occupants of a building.

III. CONCLUSION

Fire is crucial for the development of human society, and it has become an important part of human civilization. Among different types of disasters, fire constitutes a significant threat to life and property in urban and rural areas. A growing concern in the state is how to take appropriate fire risk management measures in buildings, prevent and control potential fire accidents, reduce the casualties and losses of accidents and ensure building fire safety.

The definition of risk management used in the paper has been adopted from ISO 31000 : 2009.

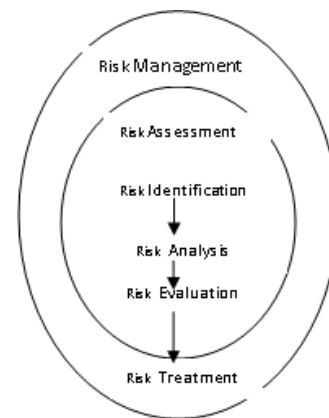
Fire risk assessment in building comprises three steps of:

- (1) Fire Risk Identification,
- (2) Fire Risk Analysis and
- (3) Fire Risk Evaluation.

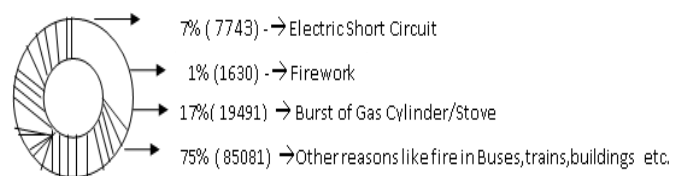
Fire risk identification is the systematic process to understand how, when and why fire could happen.

Fire risk analysis is expressed either in qualitative, mixed or quantitative terms depending on the type of risk , the purpose of risk analysis , how detailed the analysis to be and the information resources available.

Fire risk evaluation then involves applying the developed risk criteria and making a decision about the level of fire risk. Fire risk treatment is the process of improving existing risk controlling measures and implementing these measures to reduce fire risk [5-6]. Therefore , first risk analysis is only one part of the fire risk management process shown in flow diagram and it serves as the foundation regulatory decision making on whether to take actions reduce risk or choose appropriate risk treatment measures or not.



20% Drop in fire accidents Number of Deaths due to Fire Accident by cause.



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Issues and Perspectives of Pilgrimage Tourism Development in Chhattisgarh

¹S. Jabir Hussain, ²Dr. Swati Jain

¹Research Scholar (Commerce), Department of Commerce & Management

Dr. C. V. Raman University, Kargiroad, Kota, Bilaspur (C.G)

*Email: jabir.hussain12@gmail.com

²Assistant Professor, Department of Commerce & Management

Dr. C. V. Raman University, Kargiroad, Kota, Bilaspur (C.G)

*Email: swati.jainbsp@gmail.com

Abstract:

Pilgrimage tourism is the type of tourism that entirely or powerfully motivates tourists for the achievement of religious attitude and practices. One of the oldest types of visiting the attractions and a global experience in the olden times of spiritual growth, it can be differentiated into different forms. The temporary religious sightseeing is well-known by excursions to close by pilgrimage centers or religious conferences. The durable implies visits of quite a few days or weeks to nationwide and worldwide pilgrimage sites or conferences. This paper investigates the issues and challenges of pilgrimage tourism and also its civilizing significance in Chhattisgarh. The scope of socio-economic enlargement during pilgrimage tourism and analysis of the communications issues pertaining to the pilgrimage location of Chhattisgarh is dealt through in this study. The levels of inspiration and prospect of religious tourists are recognized as type factors in emergent pilgrimage tourism in the State. The data for this study was collected from crowd citizens occupied in pilgrimage tourism actions. The quantity of involvement of pilgrimage tourists in pilgrimage tourism development of Chhattisgarh is elucidated in this study. This study is generally based on primary data; secondary data

necessary for this study was composed since unusual dependable sources.

Index Terms: Pilgrimage Tourism, Culture, Infrastructure, Socio-economic Development.

I. INTRODUCTION

A pilgrim is dissimilar from a tourist. For a visitor journey is stop in itself. For a pilgrim, journey is a way to an end. Pilgrimage tourism is one of the highest emergent tourism segments in the planet. Not only has it turned into a significant issue of the Indian existence method [1], other than it also has had a philosophical crash on other peoples of the planet and the environments in which they live. Pilgrimage tourism offers fabulous opportunities for generating revenues, earning foreign exchange, and providing employment in “delightful Chhattisgarh.” At present all countries of the planet are determined to develop pilgrimage tourism in a huge way (American Geographical Society). Pilgrimage tourism earns over 3.5 trillion world wide. India’s current contribution to globe tourist inflow is only 0.37%. In addition financial, the social and ecological gains of tourism are also important

[2]. It is measured as are presentative of peace and world wide brotherhood [3]. Tourism brings improved accepting among unusual nations and civilizations. Similarly, it helps in defensive surroundings, old monuments and cultural manifestations this manuscript will discover the incident of pilgrimage tourism in the view point of Chhattisgarh. The plan of this study was to establish, what pilgrimage tourism is, how it is dissimilar from new forms of tourism, and the opportunities, issues, and challenges in pilgrimage tourism in Chhattisgarh. The infrastructural issues in pilgrimage spot of Chhattisgarh are dealt with in this manuscript, and it moreover covers the rising challenges in pilgrimage tourism encouragement in Chhattisgarh.

A. Pilgrim Tourism

The state encourages development of pilgrimage centers. Rajim, Champaranya, Dongargarh, Shivrinarayan, Girodhpuri, Dantewada, Ratanpur, Sirpur and others are popular and main destination for pilgrim tourism. The Tribal Tourism Circuit comprises Jashpur – Kunkuri - Mainpat - Ambikapur Maheshpur - Ratanpur - Kurdar-Sarodadadar Gangrel – Kondagaon –Nathya Nawagaon Jagdalpur Chitrakoot - Tirthgarh in Chhattisgarh under Swadesh Darshan Scheme. The state needs to be positioned properly and in this endeavor the support of travel agents, tour operators, travel writers, representatives of travel and hospitality industry association, experts in the tourists and cultural sectors, diplomats, journalists and other opinion leaders is crucial. Effective positioning depends on a number of factors that together determine the attractiveness of the tourist destination. Positioning must promise the benefit the customer will receive, create the expectation and offer a solution to the customer's problem.

B. History of Chhattisgarh

The state encourages development of pilgrimage centers. Rajim, Champaranya, Raipur, Bilaspur, Dongargarh, Shivrinarayan, Girodhpuri, Dantewada, Ratanpur, Sirpur and others are popular and main destination for pilgrim

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C. Tourism in Chhattisgarh: An overview

Chhattisgarh, situated in the heart of India, is endowed with a rich cultural heritage and attractive natural diversity. The state is full of ancient monuments, rare wildlife, exquisitely carved temples, Buddhist sites, palaces, waterfalls, caves, rock paintings and hill plateaus. Most of these sites are untouched and unexplored and offer a unique and alternate experience to tourists, compared to traditional destinations which have become overcrowded. The green state of Chhattisgarh has 41.33% of its area under forests and is one of the richest biodiversity areas in the country. Tourism in Chhattisgarh can be a major source of revenue and economic sustenance for not only the state but for the country too. Popularly known as the rice bowl of India the state is famous for its rich mineral deposits, unexplored tourist circuits, dense forest cover with rich biodiversity habitat covering 80% of the state. It can boast of having 3 national parks, 11 wild life sanctuaries and 30 plus significant waterfalls and abundant caves. The state is covered with nearly 41.33% of the forests and 32% of tribal population; therefore, it offers immense opportunities for Eco-Ethno, Adventure and Cultural tourism. Recognizing the importance of Tourism as an instrument for socio- economic development,

Chhattisgarh Tourism Board was established on 18th January 2002. As nodal agency the Chhattisgarh Tourism Board is responsible for infrastructural and institutional development, investment in facilities & hotels, wayside amenities and above all aggressive marketing & promotion for the comprehensive development. CTB is also focusing on manpower training and employment generation to create a manpower pool for travel trade and hospitality industry of this state.

D. Objectives of the study

- To examine the potentials and prospects of pilgrimage tourism in Chhattisgarh
- To study the socio-economic impacts of pilgrimage tourism
- To analyze the status of infrastructure facilities in the major pilgrimage site of Chhattisgarh
- Future strategy for the promotion of pilgrimage tourism in the study region.

E. Hypotheses

H01: No significant differences of experience of sample tourist respond entsa cross the duration of stay on the key destination selection determinants.

H02: No significant associations are established between the services across the category of accommodations, key communication network and key amenities and selection of hotel and frequency of visit.

H03: There is no association between, accommodation, transport, and restaurant during their stay.

H04: There is a significant association between; reception on arrival was very smooth and comfortable in the hotel.

H05: There is a significant association between; reservation procedure in the hotel does not take much time.

H06: There is a significant association between staff in the front office was very prompt in settling bills.

H07: There is no significant association between staff is well- groomed, well-behaved, and helpful.

H08: There is no significant association between the room and food services seem to be expensive.

II. METHODOLOGY

The present study is based on primary and secondary sources. The data for this study was collected from the host population engaged in pilgrimage tourism activities in the religious site of Chhattisgarh. Pilgrimage tourists were identified as playing a key role in developing pilgrimage tour is among local communities. Primary data collected from (500) samples (questionnaire) collected from Chhattisgarh. As the study investigates into the rise and growth of pilgrimage tourism in Chhattisgarh, the historical method is applied to collect primary and secondary sources from various repositories. The search approach takes the paper through empirical literature review which follows Government Publications /Records in State Central Library- Chhattisgarh, Census Reports, District Gazetteers, State Tourism Department Statistical Report, Periodicals, Press Reports on Chhattisgarh district temples, which are covered by Chhattisgarh temple literature, Deccan Chronicle was consulted for this study. This research is mainly based on secondary data derived from sources such as government publications, PR Department, brochures, and the internet.

III. LITERATURE REVIEW

Pilgrimage tourism seems to be a newer academic concept, but it is certainly not a new phenomenon [4]. Based on review of literature, [5], this research defines pilgrimage tourist as someone who visits a specific place out of the usual environment, with the intention of pilgrimage - meaning and/or growth, without any overt

religious compulsion, which could be religious or non-religious in nature, but within the divine context, regardless of the main reason for travelling. In tourism marketing, almost all authors agree that pilgrimage tourists play the most significant role; hence, marketers always try to learn the attitude and behavior of pilgrimage tourists to effectively design and offer their tourism packages [6]. The researchers have identified several characteristics of pilgrimage tourists', notably, the preference of travelling alone or in groups; and the influence of reference groups and opinion leaders in making travel decisions [7]. These inputs are the two vital ones that are most relevant to this paper and are frequently taken into account. It has also been observed by various authors that pilgrimage tourism in general has recently become an important subject of research in social and business areas [8]. The interest in pilgrimage tourism has affected a number of industries around the world [8], including the tourism industry. A widely followed theory of marketing argues that every market consists of groups or "segments" of customers with different needs and demands [9]. It should be noted here that segments are unlikely to be mutually exclusive, and this would also apply to pilgrimage tourism. To further identify the pilgrimage tourists and analyze his/her purchasing behavior, there is a need to build a typology of pilgrims and tourists. Typology comes from the Greek word "Typus" and describes various types of persons based on his/her behavior and attitudes [10-12]. The definitive study of typology would help to understand the characteristics and motives of different types of pilgrims and tourists.

IV. RESULTS

- The mean differences on the accommodation services between the two groups of sample tourist respondents are significantly different in case of selection of accommodation and restaurant, whereas the hypothesis is not rejected in case of other elements of accommodation services such as reception on arrival, reservation procedures, front office staff, personal

hygiene and room, and food services.

- The hypothesis titled – no mean differences exist between those pilgrims who visit once and more than once while transportation services are taken into consideration is not rejected in case of the components of transport services, such as well-connected by road transport, operation of government/private bus services regularly, reasonable bus fare, improvement of rail connectivity, regular buses from Chhattisgarh, and over congestion of buses.
- The hypothesis that is – two groups of sample tourist respondents do not significantly differ, while experiencing the basic services as one of the preferences for destination selection is rejected in respect of banks and ATM services with 0.004 and not rejected in case of other core parts of the basic services such as road condition, road maintenance, approach roads, parking space, traffic arrangement, and health services.
- The hypothesis that is entitled as there are no significant mean differences between sample tourist respondents who visit once or more than once when they find the standard of key amenities is not rejected in case of all the key aspects of amenities determining the experience of the pilgrims at the religious sites. The elements which are rejected include purified drinking water facilities, provision of rest shed, toilet and washrooms, cloakrooms, shopping centers, hygienic and clean, safety and security, police outpost, pleasant place, and peaceful place.
- The hypothesis is titled as religious duties as the major driving motivational forces stimulating the religiously oriented people to undertake travel, the mean experience of sample respondents is not significantly different on each element representing their religious obligations. The significance of the test has rejected all the indicators signifying the fulfillment of religious obligations. These elements include hospitable and helpful people, rituals as per the tradition and custom,

no obstruction of wearing any modern dress, colorful and eventful festivals, more enjoyment during festivals and delightful local cuisine or food.

- The hypothesis that is titled as there are no significant differences between the three groups of sample tourist respondents on experiencing the basic infrastructure is rejected with 0.05% degree of significance. The elements which are rejected with 0.045, 0.001, 0.012, 0.000, and 0.002 include road condition, maintenance, banks and ATM services, approach roads parking areas, and traffic management. One element health services are not rejected with the significance level of 0.663.
- The hypothesis is stated as there are no significant differences across the sample respondents on the amenities provided to the pilgrims for comfortable and this hypothesis is rejected in case of all the element of selected amenities at the three respective religious sites, excepting cloakroom, and shopping center facilities.
- The hypothesis is stated as there are no significant differences across the sample respondents on the amenities provided to the pilgrims for comfortable and this hypothesis is rejected in case of the element of selected amenities such as purified drinking water, rest shed, toilet and washrooms and hygienic and clean at the three respective religious sites, excepting cloak room, and shopping center facilities.
- The hypothesis is titled as – significant differences of the three groups of sample respondents do not exist on the criterion of law and order as the key destination selection determinants. The hypothesis is rejected in case of all the related elements representing the law and order situations at the religious sites, whereas the hypothesis is rejected the statement – I do not face any difficulty in moving alone or with family members.
- Differences of experiences between the sample respondents are not significant, while taking religious obligations as one of the criterion for the destination

selection. The hypothesis is rejected with 0.000, 0.003, 0.002, 0.012, and 0.004 in case of rituals, no obstruction, festivals and coincidence with festivals, whereas the hypothesis is not rejected in case of hospitable and helpful people with 390 significance level.

- The experiences on the communication network that were derived by the pilgrims/tourists while visiting the pilgrim tourism site are not significantly different. This hypothesis is rejected with 0.000, 0.026, 0.000, 0.009, and 0.000 in case of operation of Government and private bus services, reasonable bus fare, train connection, connectivity of bus services from Chhattisgarh, and over congestion and is not rejected in case of well-connectivity

V. FINDINGS

- As many as 368 male tourist respondents were interviewed for the study as against 132 female respondents. Across the three groups of respondents on the basis of age consisted of 168 (33.6%) of below 25 years, 251 (50.2%) of 26-50 years and 81 (16.2%) (Table1).
- Out of the sample respondents, majority of the respondents 341 (68.2%) were married, followed by 111 (22.2%) were unmarried and 48 (9.6%) were bachelor and spinster respectively (Table2).
- Monthly income of the three categories of respondents clearly reflected that 223 (44.6%) had sum of Rs. 10,000 as monthly income, followed by 166 (33.2%) with a range of Rs. 10,001 and Rs. 20,000 monthly income and 111 (22.2%) with a monthly income of Rs. 20,001 and above (Table 3).
- Across the three categories of sample respondents, majority of them 266 (53.2%) made an expenditure of Rs. 5,000 and less during their visit to their respective pilgrim site, that is followed by 142 (28.4%) with an expenditure of Rs.5001-Rs. 10,000 and 35 (7%) with an expenditure of Rs. 15,001 and above (Table4).

- Majority of the respondents 260 (52.0%) visited their respective holy sites with family and friends, that is followed by 142 (28.4%) and 98 (19.6%) number of respondents paid their visit with their affinity groups (Table 5).
- A little more than 40% of the respondents 216 (43.2%) stayed in the lodges and guesthouses as against a little more than one-fourth of the respondents 144 (28.8%) preferred to stay in the hotel. On the other hand, one-fourth of the respondents 126 (25.2%) sojourned at the paying guest place and an insignificant number of respondents 14 (2.8%) could stay with their friends and relatives during their visit (Table 6).
- Across the three groups on the basis of duration of stay, a little less than half of the sample respondents 241 (48.2%) could stay at their religious site for 1-3 days as compared to other two groups. A little more than one-fourth 141 (28.2%) could stay 1-6 days and a little less than one-fourth 118 (23.6%) could stay for 1 week and more respectively (Table 7).
- A little more than half of the sample respondents 266 (53.2%) visited their respective religious sites once as against 234 (46.8%) of them visited more than once. Respondents belonging to the age group between 26 and 50 are 130 or 55.6% and similarly, 59.5% belonging to the age group of 25 and less visited for the

firsttime.

- Out of the 73.6% or 368 male sample respondents, 53.5% or 197 visited for the first time and 52.3% of the female respondents also visited firsttime.
- Out of 68.2% or 341 sample respondents who are married, half of them visited more than once and once, whereas out of 22.2% of the unmarried sample respondents, 58.6% (65) visited once.
- As many as 341 (68.2%) were the Hindu devotees, followed by 111 (22.2%) were the Christians and there remaining 48 (9.6%) were Muslims. Out of 341 (68.2%) Hindu pilgrims visited Chhattisgarh 195 (57.2%) are first-time visitors. Similarly, it is reported that the number of first-time pilgrims has outstripped the number of repeat visit in case of pilgrims belonging to other two religions.
- The majority of the sample respondents 223 (44.6%) with having income Rs.10,000 and less could visit their religious sites. Out of which, more than half of them 129 (57.8%) had the income of Rs. 10,000 and less.
- Out of 266 (53.2%) of the sample tourist respondents who visited once and more than once, 151 (56.8%) of them could spend Rs. 5,000 or less. Similarly, a little more than half 266 (53.2%) of the first time visitors who spent from Rs.5,000 or less to Rs. 15,001 or more during their sojourn.

Table I: Category of age versus gender

Category of age	Count	Gender (%)		Total (%)
		Male	Female	
Below 25	% within age groups	116 (69.0)	52 (31.0)	168 (100.0)
	% within gender	116 (31.5)	52 (39.4)	168 (33.6)
26-50	% within age groups	185 (73.7)	66 (26.3)	251 (100.0)
	% within gender	185 (50.3)	66 (50.0)	251 (50.2)
51 and above	% within age groups	67 (82.7)	14 (17.3)	81 (100.0)
	% within gender	67 (18.2)	14 (10.6)	81 (16.2)
Total		368 (73.6)	132 (26.4)	500 (100.0)

Table II: Category of age versus marital status

Category of age	Count	Marital status (%)			Total (%)
		Married	Unmarried	Bachelor	
Below 25	% within age groups	59 (35.1)	83 (49.4)	26 (15.5)	168 (100.0)
	% within marital status	59 (17.3)	83 (74.8)	26 (54.2)	168 (33.6)
26-50	% within age groups	208 (82.9)	26 (10.4)	17 (6.8)	251 (100.0)
	% within marital status	208 (61.0)	26 (23.4)	17 (35.4)	251 (50.2)
51 and above	% within age groups	74 (91.4)	2 (2.5)	5 (6.2)	81 (100.0)
	% within marital status	74 (21.7)	2 (1.8)	5 (10.4)	81 (16.2)
Total		341 (68.2)	111 (22.2)	48 (9.6)	500 (100.0)

Table III: Category of age versus monthly income

Category of age	Count	Monthly income (%)			Total (%)
		Below 10,000	10,001-20,000	20,001 and above	
Below 25	% within age groups	108 (64.3)	43 (25.6)	17 (10.1)	168 (100.0)
	% within monthly income	108 (48.4)	43 (25.9)	17 (15.3)	168 (33.6)
26-50	% within age groups	95 (37.8)	99 (39.4)	57 (22.7)	251 (100.0)
	% within monthly income	95 (42.6)	99 (59.6)	57 (51.4)	251 (50.2)
51 and above	% within age groups	20 (24.7)	24 (29.6)	37 (45.7)	81 (100.0)
	% within monthly income	20 (9.0)	24 (14.5)	37 (33.3)	81 (16.2)
Total		223 (44.6)	166 (33.2)	111 (22.2)	500 (100.0)

Table IV: Category of age versus tentative expenditures

Category of age	Count	Expenditure (%)				Total (%)
		Less than 5,000	5,001-10,000	10,001-15,000	15,001 and above	
Below 25	% within age groups	125 (74.4)	28 (16.7)	7 (4.2)	8 (4.8)	168 (100.0)
	% within expenditure	125 (47.0)	28 (19.7)	7 (12.3)	8 (22.9)	168 (33.6)
26-50	% within age groups	119 (47.4)	86 (34.3)	32 (12.7)	14 (5.6)	251 (100.0)
	% within expenditure	119 (44.7)	86 (60.6)	32 (56.1)	14 (40.0)	251 (50.2)
51 and above	% within age groups	22 (27.2)	28 (34.6)	18 (22.2)	13 (16.0)	81 (100.0)
	% within expenditure	22 (8.3)	28 (19.7)	18 (31.6)	13 (37.1)	81 (16.2)
Total		266 (53.2)	142 (28.4)	57 (11.4)	35 (7.0)	500 (100.0)

Table V: Category of age versus accompanying members

Category of age	Count	Accompanying members (%)			Total
		Alone	With family and friends	With affinity groups	
Below 25	% within age groups	51 (30.4)	93 (55.4)	24 (14.3)	168 (100.0)
	% within accompanying members	51 (35.9)	93 (35.8)	24 (24.5)	168 (33.6)
26-50	% within age groups	73 (29.1)	125 (49.8)	53 (21.1)	251 (100.0)
	% within accompanying members	73 (51.4)	125 (48.1)	53 (54.1)	251 (50.2)
51 and above	% within age groups	18 (22.2)	42 (51.9)	21 (25.9)	81 (100.0)
	% within accompanying members	18 (12.7)	42 (16.2)	21 (21.4)	81 (16.2)
Total		142 (28.4)	260 (52.0)	98 (19.6)	500 (100.0)

Table VI: Category of age versus category of accommodation

Age	Count	Category of accommodation (%)				Total
		Hotel	Lodge and guesthouse	Payin g guest	Friends and relatives	
Below 25	% within age groups	51 (30.4)	79 (47.0)	35 (20.8)	3 (1.8)	168 (100.0)
	% within category of accommodation	51 (35.4)	79 (36.6)	35 (27.8)	3 (21.4)	168 (33.6)
26-50	% within age groups	70 (27.9)	109 (43.4)	63 (25.1)	9 (3.6)	251 (100.0)
	% within category of accommodation	70 (48.6)	109 (50.5)	63 (50.0)	9 (64.3)	251 (50.2)
51 and above	% within age groups	23 (28.4)	28 (34.6)	28 (34.6)	2 (2.5)	81 (100.0)
	% within category of accommodation	23 (16.0)	28 (13.0)	28 (22.2)	2 (14.3)	81 (16.2)
Total		144 (28.8)	216 (43.2)	126 (25.2)	14 (2.8)	500 (100.0)

Table VII: Category of age versus duration of stay

Category of age	Count	Duration of stay (%)			Total
		1-3 days	1-6 days	1 week and more	
Below 25	% within age groups	92 (54.8)	48 (28.6)	28 (16.7)	168 (100.0)
	% within duration of stay	92 (38.2)	48 (34.0)	28 (23.7)	168 (33.6)
26-50	% within age groups	118 (47.0)	70 (27.9)	63 (25.1)	251 (100.0)
	% within duration of stay	118 (49.0)	70 (49.6)	63 (53.4)	251 (50.2)
51 and above	% within age groups	31 (38.3)	23 (28.4)	27 (33.3)	81 (100.0)
	% within duration of stay	31 (12.9)	23 (16.3)	27 (22.9)	81 (16.2)
Total		241 (48.2)	141 (28.2)	118 (23.6)	500 (100.0)

VI. SUGGESTIVE MEASURES AND INTERVENTIONS

- It is suggested that reception on arrival, reservation procedures, front office staff, personal hygiene and room, and food services are some of the critical elements of improving the quality of accommodation services. Both the government and private tourism service providers should seriously look into the shortcomings that may impede the growth of pilgrimage tourism in the tourism circuit.
- It is strongly suggested that the transport network highlighting on the connectivity, operation, regularity and reasonable fare should be improved round the year and more specifically, during the festive occasions. It is also suggested that transport tariff should be reasonable to the pilgrims as the majority of them are a budget category of tourists. The study has also recommended that government should evolve some mechanisms to subsidize the cost of visiting this holy pilgrim site in Chhattisgarh. More particularly, domestic tourists with the proof of below poverty line should be provided with transport subsidy as there is no difference of experience of the first time and repeat visitors with regard to the improvement of transport network and other ancillary benefits.
- The findings of the study have suggested for the improvement of basic facilities such as road, parking areas, traffic and health services. Since there is a strong relationship between preferences for destination selection and improvement in basic services, efforts should be made at the higher level of the government administration to help build the infrastructure at Chhattisgarh. When this religious site have gained visibility worldwide, the Government of Chhattisgarh can take increase the domestic tourist arrivals by showcasing the pilgrim tourism circuits.
- The study has also found insufficient provisions for

purified drinking water facilities, rest shed, toilet and washrooms, cloakrooms, shopping centers, hygienic and clean, safety and security and police and it is suggested to the Government to gear up with adequate budget to outlay to make the amenities of Chhattisgarh more visitor friendly, thereby making the place more pleasant and peaceful as the symbol of spiritualism. As such, most of the holy shrine and pilgrim sites are facing the problem of unhygienic, litter, crime, contaminated water. Thus, approaches should be made to help the religious sites overcome the problem of maintaining the amenities with the direct intervention of the PWD, Health Department, Home Department; etc. and the Ministry of Tourism should take the lead role in bringing all them into one umbrella to resolve the chronic problem.

- Religious duties as the major driving motivational forces stimulating the religious oriented people to undertake travel, the mean experience of sample respondents is not significantly different on each element representing the religious obligations. Thus, the study is very unique in finding the linkage between the religious obligations of the pilgrims and sanctified atmosphere of the religious sites. Fortunately, Chhattisgarh have preserved the sanctity and purity of the places from the religious perspectives for which a steady stream of visitors are arriving into these holy places irrespective of several personal and destination related constraints.
- Since the duration-of-a stay is a critical independent factor influencing the experience of the visitors at the religious sites; the study has found the differences of experiences of the sojourners on basic infrastructure. Moreover, religious tourists are generally long haul visitors and their length-of-a stay is relatively more due to their attachment to the religious places. With this backdrop, the study has suggested to ensure the

improvement of infrastructure to help the pilgrims stay comfortably.

- The study has found the difference so f experiences of pilgrims on the amenities at the religious sites, it is suggested that the existing provision so fame nities are extremely in adequate and more provisions should be made to improve the condition of the amenities, thereby making tourists feel at home and their stay comfort and memorable.
- Law and order is one of the sociopolitical risk factors that mostly hamper the tourism business whether it is special interest or common interest tourism. The study has found out sharp differences of experience of the pilgrims about the law and order situation at these three religious sites. Thus, it is suggested that the government should be more vigilant in enforcing the law and order when these three places receive a huge number of tourist traffic during the festivals and other auspicious occasions. More police out post and the concept of community police should be introduced to help maintain the law and order in a sustainable way.

VII. CONCLUSION

Pilgrimage tourism is no wre no wned a foundation of diversify the country's wealth. It would however be folly to imagine that the part will keep on inspiring the market lacking proactive actions intended at running the forces confronting this segment. The study has discovered a mixture of troubles that deal with the continuous improvement of pilgrimage tourism. The data presented in this paper indicate the prospective for pilgrimage tourism development. Although progress to date has been restricted to few major sites, the analysis shows that it should be possible to spread the progress of pilgrima get ouri smto more parts of the region. mostly taking into report the prospective for combining pilgrimage tourism with civilizing and nature- based tourism and the prospective for increasing new age or pilgrimage tourism it should be possible to use the major newscaster

sites famous to stimulated regional growth. These problems had been analyzed in detail and suitable suggestion had been given. As a basis for planned policy directions and strategies, statistics, it is useful to consider these various recommendations and suggestions lavishly show that by the paper effective achievement of these suggestions, pilgrimage site can be developed as a delightful objective for pilgrimage tourism. The generally aim will apparently be to develop the benefits of pilgrima get our is mandits people in term so fforeign exchange, employment generation, income and government revenue, etc. Realizing this potential will obviously require a high level of inter-community support given the scope of the pilgrimage tourism religions recognized. In addition the significance of pilgrima get our is mprovide factor sac knowledged in the research shows the need for widespread group effort involving the public area, which is responsible for policy and encouragement the pilgrimage site which manages most of the tourism sector which provides the supporting amenities this underlines the significance of networking in the future growth of pilgrimage tourism. In developing new products and new markets as a result the pilgrimage tourism attractions of the area should think more critically about the pilgrimage tourism essentials of existing demand and in particular the expansion of new products of promising niches such like pilgrimage tourism.

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Determination of Pesticide in Kheera (vegetable) of Chhattisgarh

¹Dr. Manish Upadhyay , ²Shabana Parveen

^{1,2}Department of Chemistry, Dr. C. V. Raman University, Kota, Bilaspur, Chhattisgarh – 495113

Abstract:

Kheera (salad vegetable) from various sale points of the market of Bilaspur city (Chhattisgarh) are collected, preserved and transported to Research Laboratory Extraction, clean up and analysis processed with the use of Liquid chromatography with Mass spectrometry (LC-MS/MS).

Spot diameter of Chlormequat (pesticide residue) of sample is identified, reported and results and need of inspection on pesticide residues in agricultural products in order to prevent the contamination and secure human safety also suggested.

Index Terms: Chattisgarh Open Market, Kheera (salad vegetable), Pesticides, LC-MS/MS, Chlormequat, MRL values

I. INTRODUCTION

Pesticides are the only toxic substances released intentionally into our environment to kill living things. The use of toxic pesticides to manage pest problems has become a common practice around the world. Pesticides are used almost everywhere not only in agricultural fields, but also in homes, parks, schools, buildings, forests, and roads. It is difficult to find somewhere where pesticides aren't used world is filled with pesticides. Pesticides have been linked to a wide range of human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption. Acute dangers - such as nerve, skin, and eye irritation and damage, headaches, dizziness, nausea, fatigue, and systemic poisoning-can sometimes be dramatic, and even occasionally fatal [1-6].

Chronic health effects may occur years after even minimal exposure to pesticides in the environment, or result from the pesticide residues which we ingest through our food and water. Pesticides can cause many types of cancer in humans. Some of the most prevalent forms include leukemia, lymphoma, brain, bone, breast, ovarian, prostate, testicular and liver cancers. There is also mounting evidence that exposure to pesticides disrupts the endocrine system, wreaking the complex regulation of hormones, the reproductive system, and embryonic development. Endocrine disruption can produce infertility and a variety of birth defects. Children are particularly susceptible to the hazards associated with pesticide use. Children have not developed their immune systems, nervous systems, or detoxifying mechanisms completely, leaving them less capable of fighting the introduction of toxic pesticides into their systems.

II. MATERIAL AND METHODOLOGY

Kheera (salad vegetable) from various sale points of the market of Bilaspur (Chhattisgarh) are collected, preserved and transported to Research Laboratory, Extraction, clean up and analysis then processed with the use of Liquid chromatography with Mass spectrometry (LC - MS / MS). Using following Methodology of USEPA [7-10].

A. Sample handling and Preparation

Freshly collected samples kept in cold condition before and during transportation to the laboratory. Once received at laboratory, samples were kept at -20°C for minimum 30 minutes prior to blending.

~2kg of kheera sample was blended and ~200g of crushed sample taken homogenized for one minute.

B. Extraction & Clean up

Homogenized the ~2 Kg sample and weighed 10 ± 0.1 in 50 mL polypropylene centrifuge tube Added an internal standard (CCC d4), mixed thoroughly by vortexing for 1 min. Added 20 mL of methanol (1% formic acid). Homogenized and vortexed the sample for 2 min and centrifuged at 4000 rpm for 5 minute. Drawn 0.5 mL supernatant and diluted with 0.5 mL methanol, Injected into LC-MS/MS.

C. Identification and Determination of Analytes

Injected 10 μ l from the extract in to LC-MS/MS with following specifications. Column: Phenomenex, Luna, 5 μ m, Hilic 200 A, 4.6 x 150 mm.

Mobile Phase A: 10 mM Ammonium formate in Water

Mobile Phase B: 100 % Acetonitrile

Injection volume: 10 μ l Detector: Mass Spectroscopy

Stop time: 12 minutes

D. Preparation of Calibration Curve Standards Standard stock solution

Chlormequat stock solution was individually prepared in acetonitrile at a concentration level of 1000 ppb and stored in a freezer at -18°C, this stock standard solution can be used up to 3 months. Suitable concentration of working standards is prepared from stock standard solution by dilution using acetonitrile, immediately prior to sample preparation as below:

Table I: Preparation of Calibration curve standards

Concentration of Stock solution (ppb)	Volume taken from stock solution (ml)	Final Volume made (ml)	Final concentration (ppb)
1000	1	10	100
1000	0.75	10	75
1000	0.5	10	50
100	2	10	20
100	1	10	10

E. Mass Spectrum & Linearity

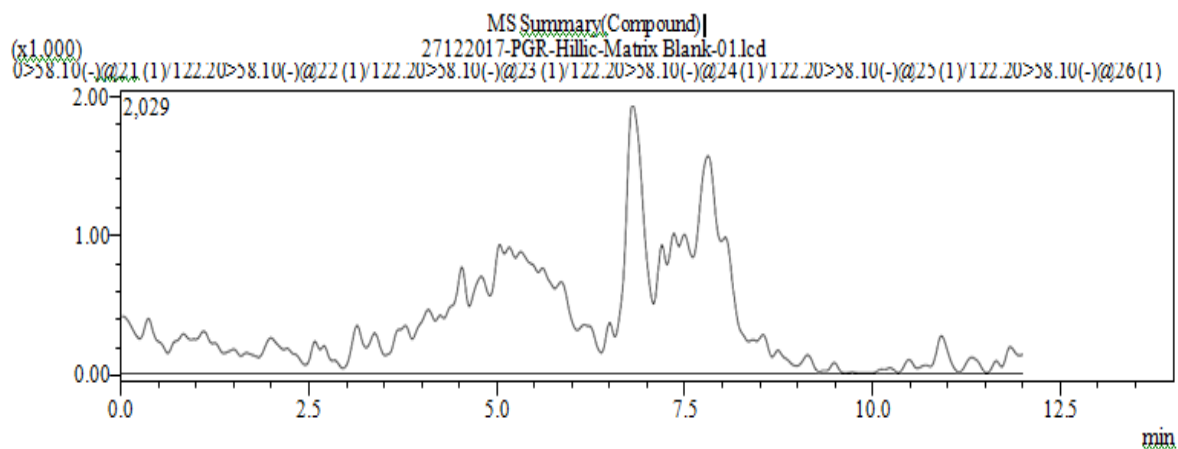


Fig.1 : Chromatogram of Blank

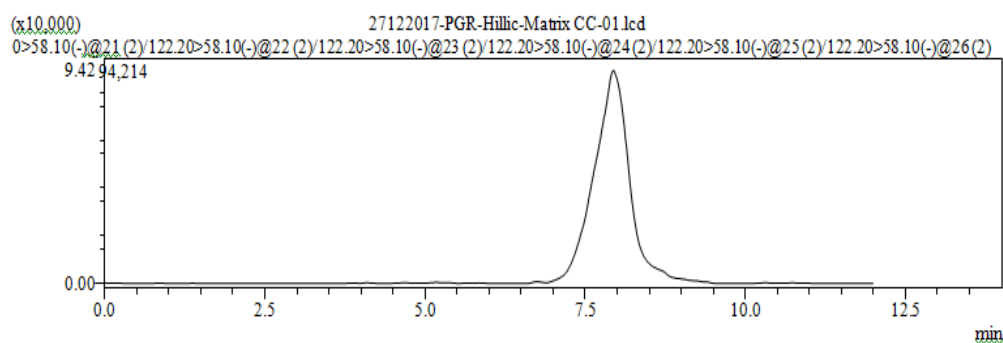


Fig.2 : Chromatogram of 10PPB Standard

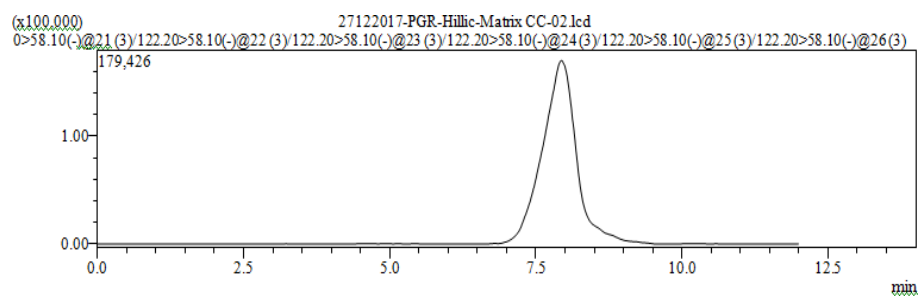


Fig.3 : Chromatogram of 20PPB Standard

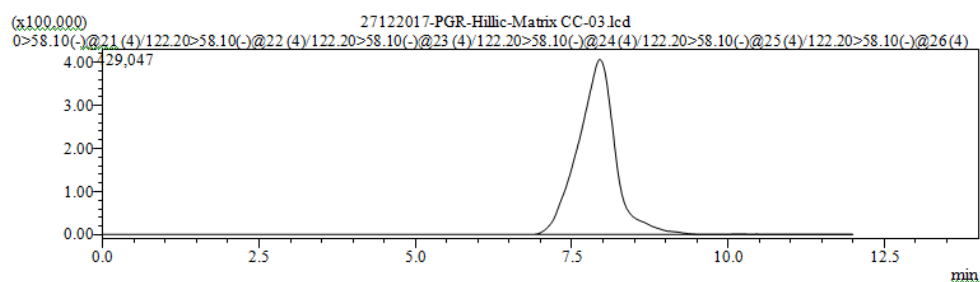


Fig.4 : Chromatogram of 50PPB Standard

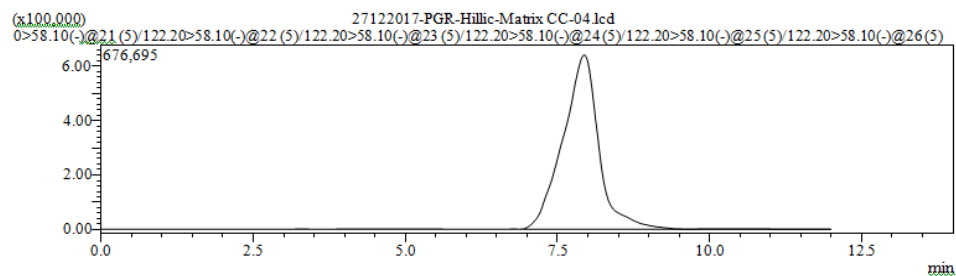


Fig.5 : Chromatogram of 75PPB Standard

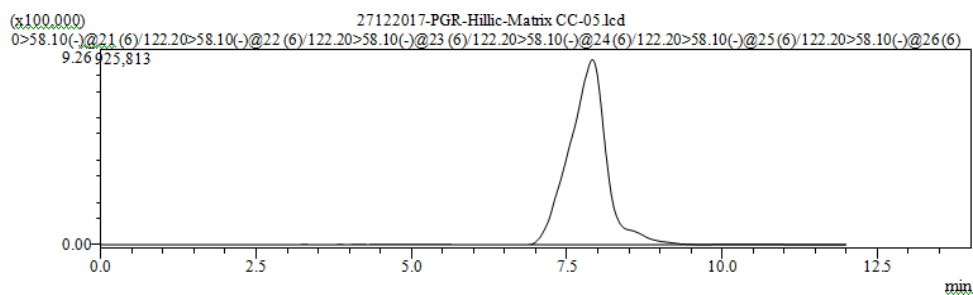


Fig.6 : Chromatogram of 75PPB Standard

F. Linearity

Table II: Response of calibration curve standards with LCMS/MS

S.No.	Standard Conc(ppb)	RT	Response
1	10.0	7.943	3308912
2	20.0	7.941	6600661
3	50.0	7.949	15981665
4	75.0	7.940	25131804
5	100.0	7.895	35263061

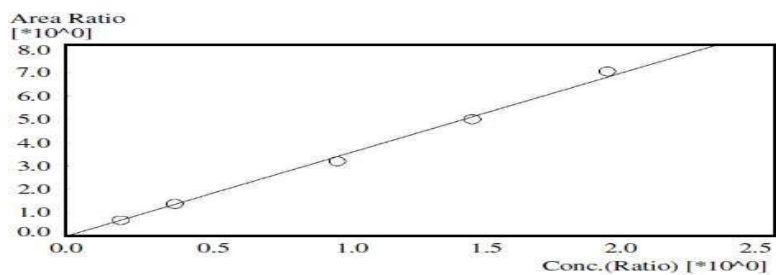


Fig.7 : Calibration curve (Linearity)

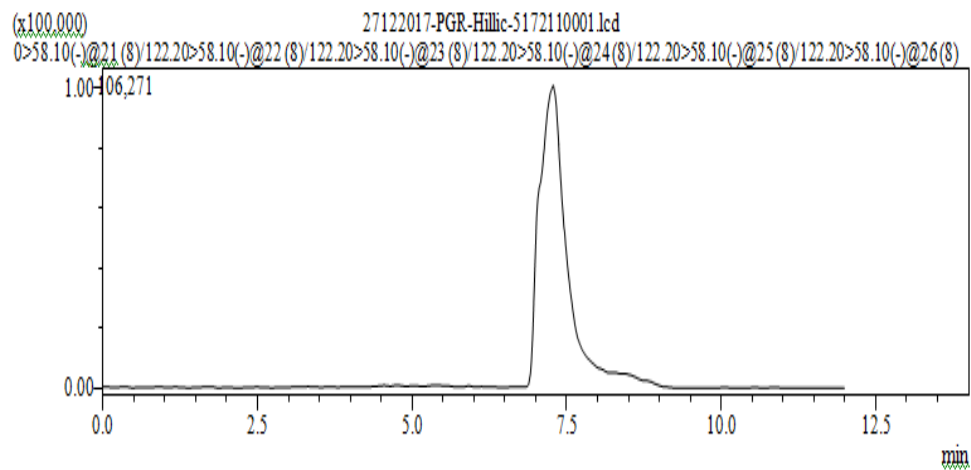


Fig.8 : Chromatogram of sample

III. RESULT, CALCULATION & CONCLUSION

A. Result

Table III: Response of Sample in LCMS/MS

S.NO.	RT	Response	Final Conc(PPb)
1	7.608	85730840	224.365

B. Calculation

The Concentration of Acephate in sample analyzed by LC-MS/MS was determined directly from the standard curve.

Where,

Y = Peak area of Standard

M=Slope of line from the calibration curve

X= Concentration of analyta in injected sample C= 'y' intercept of the calibration curve

Recovered concentration (ppb) will be converted in to mg/kg (1ppm = 1000ppb)

Table 4 : Final Concentration of Chloromequat in sample

S.No.	Name of the Compound	Unit	Result (mg/kg)
01	Chlormequat	mg/kg	0.22

In above analysis Chlormequat is identified in very high concentration.

C. Conclusion

In above analysis Concentration level of Chlormequat is identified in very high concentration, and it is very dangerous to human being.

Hence we need more stringent guidelines to educate formers for utilization of pesticides in their crops and to restrict this type of vegetables to enter in to market in order to prevent the contamination and secure human safety.

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Role of Textural and Spectroscopic Analysis of Soil in Agriculture

¹Safder Ali, ²A. K. Shrivastava, ³M. Z. Khan, ⁴A. Pandey
⁵V.Mishra, ⁶U. Shrivastava, ⁷Nitesh Kumar, ⁸D.V.K.Narasingham
¹Research Scholar, Dr. C.V. Raman University Kota, Bilaspur (C.G.)
^{2,3,4,5,6,7&8} Dr.C.V. Raman University Kota, Bilaspur (C.G.)
drakshrivastava01@gmail.com

Abstract:

In this research paper an attempt has been made by authors to study the role of textural and spectroscopic analysis of soil in agriculture. Remote sensing is an object or phenomena from a remote distance, signal, sensor, sensing or the component of remote sensing. Soil has different properties as physical, chemical and geographical. In physical properties, soil texture (sand, silt and clay), bulk density, WHC, particle density, porosity, volume expansion, wetting point, transition moisture, water content, dielectric constant exist. Now, in chemical properties pH, EC, OC, heavy metals viz Fe, Pb, Mn, Zn, Cr, Micro nutrients metals viz Fe, Mn, Zn, Cu and macro nutrients viz, N, P, K, Mg. A further geographical property is denoted by LALA, i.e. Latitude, Altitude, Longitude, average rain fall. Recently new term is introduced in concerned research is hydraulic pressure. The pH of a soil refers to how acidic or alkaline the soil is. Eighteen elements, called nutrients, are essential for plant growth. They are classified as macro and micro-nutrients, based on the quantity required. As they grow, plants extract nutrients they need from the soil. Unless these nutrients are replenished, plants will eventually cease to grow. In nature, nutrients are returned to the soil when plants die and decay. When cultivated plants are harvested, nutrients that the plants extracted from the soil are taken away. To keep the soil productive, it is necessary to replace these nutrients artificially.

Index Terms: Sand, Silt, Clay, Emissivity, Dielectric Constant, Soil, Spectroscopic behaviour.

I. INTRODUCTION

Soil is the unconsolidated or loose covering of fine rock particles that covers the surface of the earth. Soil characterization in relation to evaluation of fertility status of an area or region is an important aspect in context of sustainable agricultural production. Really soil is the unconsolidated material on the immediate surface of the earth that serves as a natural medium for the growth of land, plants and has been subjected to and influenced by genetic and environment factors of parent material, climate (including moisture and temperature effects), macro and micro organisms and topography, acting over a period of time and producing a product that differs from material from which it has derived all the properties and characteristics..As we know that soil is the part and parcel of human being. In this context, the study of soil physics is very important all concerned parameter such as physical properties, chemical properties, geographical properties play pivotal role in the production of agriculture. Besides this agricultural meteorology plays very important role in agriculture. Six conditions or factors are known to be necessary before the plant will make good growth; the soil must supply a suitable amount of food, water, air, temperature, adequate root room, free from injurious conditions or parts. The soil particles have originally been derived from the rocks and their present state is the outcome partly off the nature of

the rock from which they arose and partly of the circumstances through which they have passed. Calcium carbonate is one of the simplest and most important of the soil constituents, though it is sometimes present only in very small amounts. One of the commonest mineral substances on the earth is silicon dioxide or silica. The chief constituents of the quartz, flint and most sands. Three terms- soil land and earth are commonly used in literature. Earth is the entire three dimensional lands mass, while soil is the top layer of the surface of earth as the peel to the orange. Soil is distinguished from land in that it has three dimensions, i.e. length, breadth and thickness, why land has only two dimensions, i.e. length and breadth. Generally the soil has been perceived differently by different users. An engineer regards soil as a complex material Lying at Earth's surface, consisting of solid particles are varying composition – minerals and or organics. For a mining engineer soil is debris covering the rocks and minerals. A geologist calls this layer as the regolith and frequently beings investigations below it. A farmer considers soil as a top few centimeters of earth surface, Equal to depth of plough, which is technically known as topsoil or plough layer. The topsoil or plough layer is the topmost layer, usually 15 centimeter deep, where most of the plant roots, microorganisms, and another animal life are located. Farmers tend to ignore the soil below plough layer, called the subsoil. A gardener thinks of the soil as the top few centimeters equal to a spade or garden fork depth. Subsoil is very important for plant growth. Soil has been defined from pedological as well as edaphological point of view. Pedologically soil is defined As “a natural body of mineral an organic constituents differentiated into horizons, Usually unconsolidated end of variable depth, which differ among themselves as well as from the underlying parent Material in morphology, physical make up, chemical properties and composition and biological characteristics” (Whitney 1882, Hilgard 1892, Dokuchaev 1900 and Joffe 1936). Another pedological definition of soil available in

literature is “The unconsolidated mineral matter on the earth surface that has been subjected to and influenced by genetics and environmental factors of climate (Including moisture and temperature), organisms (macro and micro flora and fauna), Parent material, and topography, over a period of time, that differs from the parent material in physical, chemical, biological and morphological properties and characteristics”.

The term edaphology also comes from Greek word edaphos, which means soil or ground. Edaphology studies soil from plant production point of view.

Edaphologically soil is defined as “an Unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants”. As we know that soil is the most valuable natural resource which is formed due to the disintegration of parent materials why physical and chemical weathering over a period of time. The process of soil formation is known as Pedogenesis. Soils are formed largely by the action of climate (water, wind and temperature), organisms (plant and animals) and topography overtime on parent material, these five variables are known as the factors of soil formation soil formation maybe depicted in the form of any question as follows:

$$Soil = f (Cl, O, R, P, T).$$

Soil formation is a function of time. Soil development is a process and not an event. The underlying rock which undergoes weathering process is called bedrock. The entire mantle of unconsolidated material lying over bedrock is called regolith. The vertical section of the soil in the field is called soil profile, which exhibits more or less distinct horizontal layers regarded as soil horizons..

$$Soil \leftarrow Regolith \leftarrow Bedrock$$

Different systems have been used to classify soils in different countries such as: Australian soil classification system, Canadian system of soil classification, French soil classification system, FAO soil classification system, USDA soil taxonomy system.

In India, The USDA soil taxonomy system of classification is in common use. The size distribution of soil solids, call soil texture. It is very important and basic soil parameter determined by the parent material. Soil texture is important because it determines soil characteristics as physical, chemical, biological and mechanical. Soil texture affects the plant growth such as water holding capacity, cation exchange capacity, soil aeration and workability of soils. Soil texture maybe defined as the relative proportion of the various size - groups of individual (Primary) soil particles in a soil mass (particles < 2mm diameters). In a simple words soil texture refers to the percent distribution of sand, silt and clay in a soil mass powered through 2mm size. These soil fractions, i.e. sand, silt and clay are called soil separates. Soil texture considers only the primary particles (Sand, silt and clay) but not the secondary particles (soil aggregates). It is very important soil parameters as it influences various physical (specific surface, density, porosity, water holding capacity, permeability, drainage, aeration, soil cracking, susceptibility to erosion), chemical (Surface change, buffering capacity, CEC etc), biological (microbial mass etc.) and mechanical properties (plasticity, swelling, shrinkage, workability, bearing capacity etc. of soul. So textural analysis is very important.

The dielectric properties of soil called from different regions of CVRU campus and Kulgam district has been a study at AAS. Due to COVID-19 the measurement of dielectric constant at X band frequency has not been

II. THEORETICAL CONSIDERATION

The infinite sample method described by Altshuler is used for the Measurement of dielectric properties. Besides this the instrument AAS has been utilized. Sweats are grouped into different classes based on mass ratio of soil separates namely sand, silt and clay which are called Soil textural classes. Soil textural classification is given below:-

Broad Groups	Textural Classes	Important Characteristics
Coarse textured soils Sandy soils	Sand loamy sand	Feel gritty, low specific surface area, low electrical activity, non-sticky and non plastic in nature, high drainage and aeration, low water and nutrients retention, generally low productivity.
Medium – Textured soils (Loamy soils)	Sandy loam , loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam	Feel smooth, cohesive, good drainage, medium water and nutrients retention capacity, low plasticity, low stikness, easy to till, productive soil, properties vary with the dominant soil fraction, the content
Fine – textured soils Clayey – soils	Sand clay Silt clay Clay	Feel sticky, very large specific surface area, theoretically active, have high CEC, high water and nutrients retention, high total porosity, poor drainage, difficult to till, productive soils

performed for farmed but likely to be performed in the future. The following relation has been used as:

$$\varepsilon^* = \varepsilon' - j\varepsilon''$$

$$\varepsilon^* = \frac{1}{1 + \left(\frac{\lambda_c}{\lambda_g}\right)^2} + \frac{1}{1 + \left(\frac{\lambda_g}{\lambda_c}\right)^2} \left[\frac{r - j \tan k (D - D_R)}{1 - j \tan k (D - D_R)} \right]^2$$

Where, λ_c , λ_g and K cutoff wavelength, guide wavelength and wave vector, r is voltage standing wave ratio (VSWR) and D and D_R are the position of first minima with and without sample respectively.

The gravimetric soil moisture content in percentage W_c (%) is calculated using wet (W_1) and dry (W_2) soil masses using the following relation:.

$$W_c \% = \frac{W_1 - W_2}{W_2} \times 100$$

From the measurement of dielectric constant and dielectric loss other electrical parameters can be obtained.

$$\sigma = \omega \epsilon_0 \epsilon''$$

and

$$\tau = \frac{\epsilon''}{\omega \epsilon'}$$

III. MATERIALS & METHODS

A. Soil Sampling:

Soil samples are taken from different locations of district Kulgam and CVRU campus Kota. For each sample 15 mm topsoil was removed and 3 pits were dug. A composite sample of about 1 to 2kg represents one site. Same procedure is followed for all the samples collected from the study area. Soil samples were collected from 50 different location of Kulgam and CVRU campus Kota in a zigzag pattern. Representing soil samples were collected with wooden tools to avoid any contamination of the soils. 4 to 5 pits were dug for each sample. From each pit sample were collected at a depth of 0-20 cm.



Fig. 1: Collection of soil samples

The samples were then dried in the open atmosphere to remove the traces of moisture present in it. When the samples were completely dried, they are crushed and then sieved through the gyrator sieve shaker, which is available at the civil engineering laboratory in Dr. C V Raman university, to remove the coarse particles. The sieved out fine particles were dried in the hot air oven to a temperature around 110°C for about 21 hours in order to remove completely any trace of moisture. This dry sample is called as oven dry when compared with the wet

samples. After sieving the given samples were packed in the polythene bags for further laboratory investigation.

B. Atomic absorption spectroscopy:

Atomic absorption spectroscopy is one of the most important instruments which is used for the determination of most metals and metalloids. There are two basic atom cells (means converting of sample from liquid into free atoms) used in AAS: (1) the flame and (2) electrothermal heating of sample cell. Atomic absorption spectroscopy, in both the modes, is the best method for the determination of metal concentration in many different kinds of specimens which dissolve in acid (Kalbasi and Mosaddegh, 2012). Atomic absorption spectroscopy is sensitive to Palladium and Rhodium (Scaccia and Goszczynska, 2004) and is being used for determination of amount of metals in nanoparticles (Kalbasi and Mosaddegh, 2012; Budiman et al., 2010).



Fig. 2: Atomic absorption spectroscopy

C. Sieve analysis:

The soil is sieved through a set of sieves which are generally made of spun brass and phosphor bronze (or

stainless steel) sieve cloth. According to IS : 1498 - 1970, the sieves are designated by the size of the square opening, in mm or microns ($1 \text{ micron} = 10^{-6} \text{ m} = 10^{-3} \text{ mm}$). Sieves are of various sizes ranging from 80 mm to 75 microns. The diameter of sieve is generally between 15 to 20 cm. The sieve analysis is done for coarse grained soils. The coarse grained soils can be further subdivided into gravel fraction (size $> 4.75 \text{ mm}$) and sand fraction ($5\mu < \text{size} < 4.75\mu$). The selection of sieves is done to obtain a good particle size distribution curve. The sieves are stacked one over the other, with decreasing size from top to the bottom. The sieve of the largest opening is thus kept at the top. A cover or lid is placed at the top of the largest sieve. A receiver which is known as pan is placed at the bottom of the smallest sieve, which has no opening.



Fig. 3: Sieve analysis at civil engineering lab Dr. C V Raman University

There are two methods for the sieve analysis - dry sieve analysis and wet sieve analysis.

The method used for the current study is dry sieve analysis. In this method the soil sample is taken to a suitable quantity. The larger the size of soil particles the greater is the quantity of soil required. The soil is first oven dried. It should not contain any lump. The soil sample is pulverized

D. Water Content:

Water content is the ratio of water to the mass of solids.

$$w = \frac{M_w}{M_s}$$

Water content is also known as moisture content (m). Water content of fine grained soils, such as clays and silts, is generally more than that of coarse grained soil, like sands and gravels. Some fine grained soils may have water content more than 100%, which indicates more than 50% of total mass is that of water.

Water content is one of the important property of soil. The characteristic of soil changes to a marked degree with the variation of its water content.

E. Water content determination:

The water content of soil is important parameter that controls its behaviour. Water content is the quantitative measure of wetness of soil mass. It is determined by any of the following methods:

- (1) Oven dry method
- (2) Torsion balance method
- (3) Pycnometer method
- (4) Sand bath method

- (5) Alcohol method
- (6) Calcium carbide method
- (7) Radiation method

In the present study the method used for determination of water content is oven dry method. This method is standard, laboratory method and is very accurate. The soil sample is taken in an air tight container. The mass of the soil sample and container is obtained by using an accurate weighing balance. The quantity of soil sample to be taken for test depends upon the gradation and the maximum size of the particles and the degree of wetness of the soil. The soil sample in the container is dried in an oven at the temperature of about $110 \pm 5^\circ\text{C}$ for 24 hour. This range of temperature is suitable for most of the soils. Below $110 \pm 5^\circ\text{C}$ temperature may not cause complete evaporation of water and temperature higher than this range may cause breaking down of crystalline structure of the soil particles and loss of chemically bound, structural water.

Minimum quantity of soil for water content determination

S No.	Size of particle more than 90% passing	Minimum quantity (gm)
1.	452 microns IS sieve	25
2.	2 mm IS sieve	50
3.	4.75 mm IS sieve	200
4.	10 mm IS sieve	300
5.	20 mm IS sieve	500
6.	40 mm IS sieve	1000

The duration of 24 hours for drying has been recommended for normal soils, as this period has been found sufficient for complete evaporation of water. The sample is dried in the oven till it attains constant mass. Some soils may require more than 24 hours for drying like soils containing gypsum and organic matter. The following equation is used for the calculation of water content in the soil sample.

$$w = \frac{M_w}{M_s} = \frac{M_2 - M_3}{M_3 - M_1} \times 100$$

Where, M_1 = mass of container with lid

M_2 = mass of container, lid and wet soil

M_3 = mass of container, lid and dry soil

F. pH

The pH of soil is the negative algorithm of active hydrogen ion concentration in soil solution. It is one of the most significant properties of soil, which affects all other parameters. Scale for the measure of pH goes from 0 to 14, neutral point is at the pH of 7. The pH of soil decreases with the increases in the amount of hydrogen ions resulting the soil more acidic. The acidic nature of soil increases from the pH of 7 to 0. while the sodicity of

soil is increasing from 7 to 14. Most of the nutrients elements of soil are found in 5.5 to 6.5 pH range.

G. Electrical Conductivity

Electrical conductivity is measure of presence of ions in a soil. EC of the solution of soil increases with the increase of concentration of ions. EC is very important property of soil as it is used to check the health of the soil and is simple, inexpensive and quick method.

To measure the EC of the soil, the sample taken should be passed through the sieve and air dried.

IV. RESULT AND DISCUSSION

Table I: physico chemical properties of soils of different places of Kulgam district

S. No.	Village	Geographic location		Texture	Sand	Silt	Clay	OC(%)	Ph(1:2.5:)	Ec(d Sm ⁻¹)
		Latitude	longitude							
1	Chawalgam	33°38'43.52"	74°59'55.23"	sicl	22.4	47.8	31.0	2.19±0.21	5.40±0.10	0.61±0.04
2	Pombay	33°38'50.06"	74°56'26.66"	I	34.2	39.1	25.2	2.02±0.04	5.80±0.46	0.44±0.17
3	Gopalpora	33°38'24.82"	74°55'40.48"	sicl	19.2	47.3	33.2	2.23±0.09	5.54±0.10	0.43±0.03
4	Nillow	33°39'53.24"	74°57'16.91"	I	29.1	46.2	22.3	2.52±0.32	5.16±0.14	0.56±0.04
5	Liraw	33°38'46.93"	74°58'10.37"	I	36.8	33.6	28.9	2.20±0.13	5.54±0.23	0.47±0.04
6	Ashthal	33°37'45.70"	74°59'11.18"	I	42.3	33.0	23.7	2.08±0.23	5.65±0.30	0.65±0.12
7	Mirhama	33°38'43.53"	74°57'40.96"	sicl	23.8	43.7	31.7	1.61±0.14	6.05±0.09	0.77±0.08

8	Kakran	33°39'0.97"	74°56'41.25"	cl	20.23	49.0	30.5	1.52±0.20	6.24±0.06	0.77±0.11
9	Modergam	33°38'41.21"	74°57'7.06"	sicl	17.8	51.3	30.4	2.78±0.28	4.97±0.03	0.52±0.05

Table II. Available nutrients present in the soil of Kulgam district (mean ±SE)

S No.	Village	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	Ca (kg ha ⁻¹)	Mg (kg ha ⁻¹)
1	Chawalgam	349.36±10.61	24.39±2.61	209.18±09.38	413.37±6.27	596.55±09.18
2	Pombay	411.28±08.03	15.87±1.67	240.58±04.21	386.31±3.92	527.87±10.28
3	Gopalpora	428.62±02.52	16.06±1.05	240.48±08.92	422.45±3.47	543.76±13.81
4	Nillow	152.32±07.70	22.16±2.92	321.18±03.72	427.34±9.40	594.23±05.77
5	Liraw	450.64±12.65	22.09±2.51	308.92±07.82	420.30±8.05	437.42±13.97
6	Ashthal	449.64±08.53	17.95±2.37	358.32±11.07	390.12±8.55	518.91±11.43
7	Mirhama	355.24±07.93	20.74±2.24	340.05±11.14	209.78±8.57	521.63±10.02
8	Kakran	349.95±13.59	9.85±0.83	206.86±04.53	381.34±6.13	509.43±05.04
9	Modergam	409.33±11.30	16.72±0.84	306.09±03.76	501.12±4.47	621.23±09.66

Table III. Correlation between physico chemical properties and available nutrients

	N	P	K	Ca	Mg
pH	-0.70	-0.52	0.12	0.89	0.68
EC	0.50	0.09	0.12	0.35	0.04
OC	0.98	0.80	0.41	-0.71	-0.63
Clay	0.50	0.37	0.62	0.72	0.67

V. CONCLUSION

Agriculture largely depends on the chemicals which has an important role for the improvement of food productivity to meet the needs of the human beings. From the past many years farmers use pesticides and fertilizers in excess amount. This is the main reason that the quality of soil decreases with the excess use of chemicals. Even small crops got affected with use of large amount of pesticides and fertilizers. Therefore, it is essential to analysis the parameters of soil. The information above helps the farmers to use the chemicals in a sufficient amount to maintain the essential nutrients in the soil for the growth of plants. Many farmers use inorganic and artificial fertilizers to get high yield. The nutrients present in these fertilizers are not used by plants directly but remain in soil for many years and by the time the quality of soil changes. Like fertilizers, there are many more chemicals which are used as pesticides. But those chemicals are most harmful which either degrade very

slowly or do not degrade in nature. There are number of problems with the use of pesticides associated with the environment. These problems include toxicity in soil, persistence in environment, water supplies vegetation and so on. The toxicity and persistence of several pesticide compounds dependent on number of soil characteristics. It also helps the farmers to use nutrients in a proper supply for the healthy growth and also to increase yield of crops. In many cases some farms are producing high yield than others, some gardens are producing larger vegetables than others, and the reason is only that the physical and chemical properties of soil is different. That is why the need of the examination of soil is important that provides the information which nutrient should be used and which fertilizer must be applied. At present there is a majority of land resources which are degraded so, it is very important to maintain the health of the soil for the security of food and increasing production of agriculture.

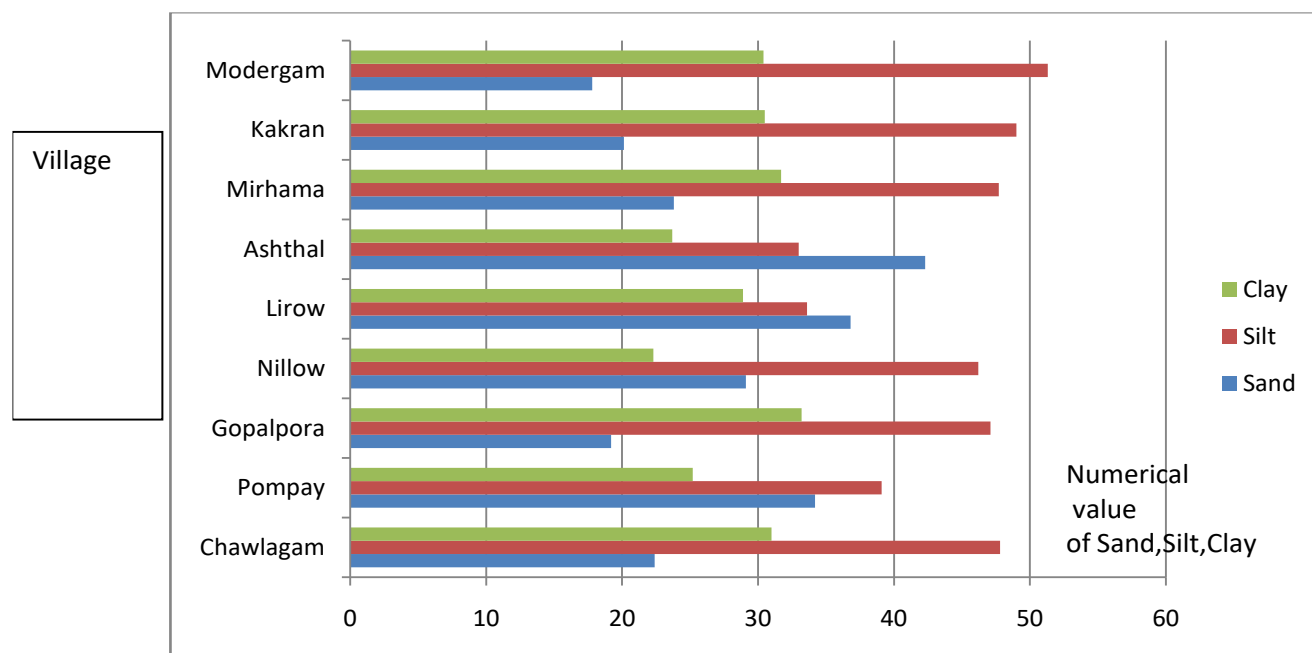


Fig. 4: Graphical representation of Sand , Silt and Clay of different villages

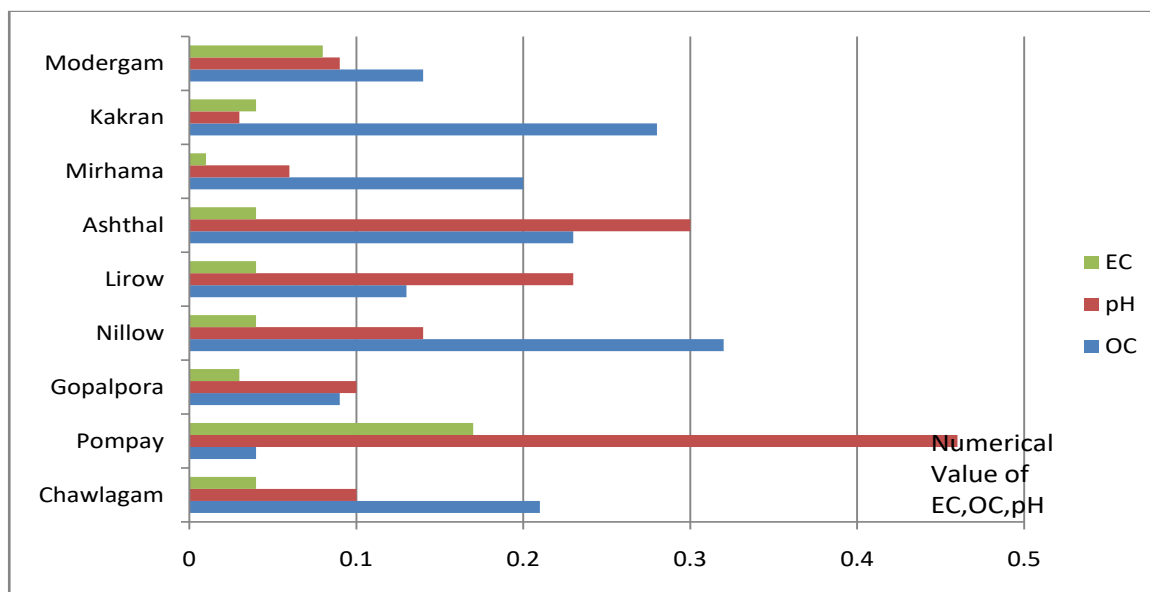


Fig. 5: Graphical representation of EC, pH, and OC.

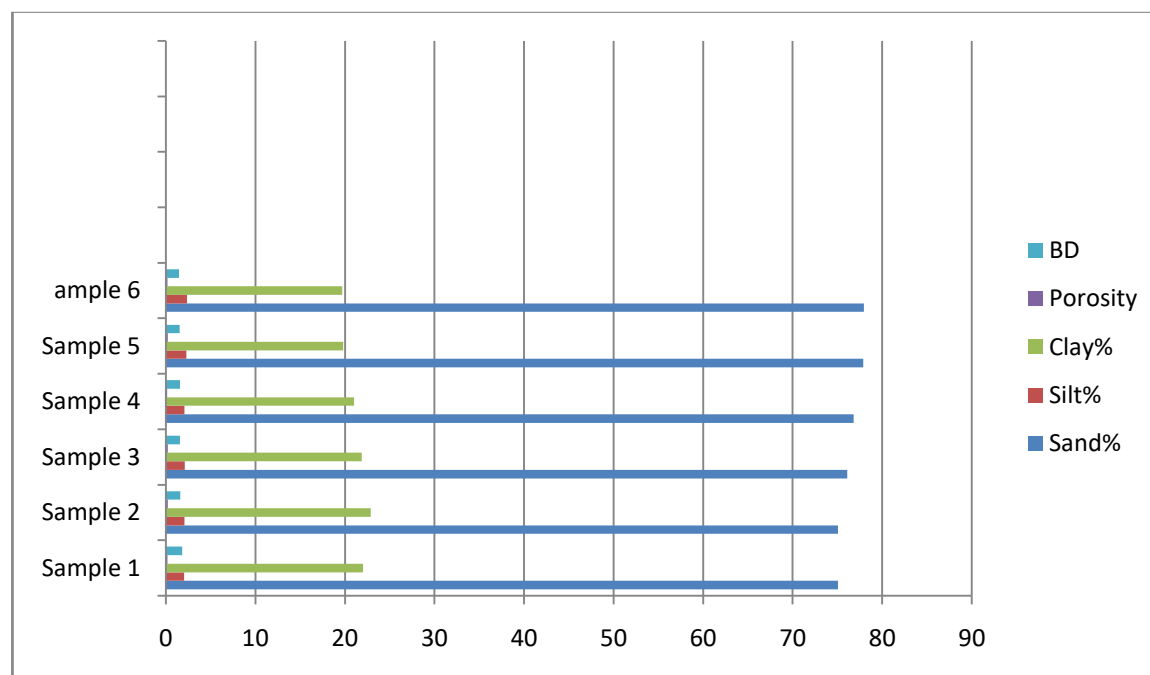


Fig. 6: Graphical representation of Sand, Silt, Clay, Porosity and BD

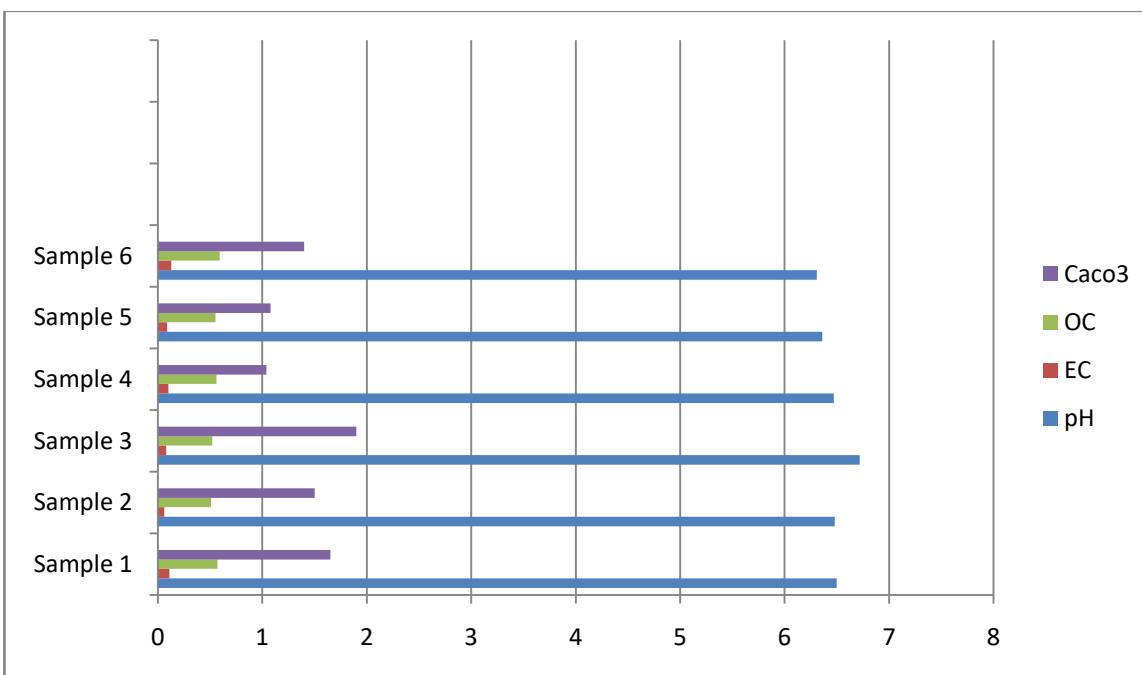


Fig. 7: Graphical representation of OC, EC,pH, and CaCo3 of Soil of Chhattisgarh

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Noise Pollution and it's Impact on Human Psychology and Health

¹MS. Richa Sharma, ²Dr. A.S. Majumdar

¹Asst. Prof., Civil Engg. Department. Dr. C.V. Raman University (C.G.),

²Professor and Head, Civil Engg. Department. Dr. C.V. Raman University (C.G.)

drakshrivastava01@gmail.com

Abstract:

Human well being very much depend's upon tranquillity in the environment tranquillity imbibes calmness and peace, devoid of unpleasing sound. The noise originates from human activities especially the urbanization and the development of transport and industry, our environment is such that it has become difficult to escape noise. Even electrical appliances at home have a constant hum or beeping sound.

Through this paper while using "Real time sound analyzer a sincere effort has been made to understand the basic causes and features of noise to study it's impact on human beings and community as a whole . According to Birgitta and Lindwall, road traffic ,jet planes , garbage trucks ,construction equipment, manufacturing processes and lawn movers are some of the major sources of this unwanted sound that are routinely broadcast into the air , through noise pollution is a slow and subtle killer ,yet very little effort's have been made to

ameliorate the same . It may cause hypertension, disrupt sleep and/ or hinder cognitive development in children the effect of excessive noise could be severe that either there is a permanent loss of memory or a Psychiatric disorder.

Index Terms: Tranquillity, hinder cognitive, psychiatric disorder.

I. INTRODUCTION

Noise pollution is the disturbing or excessive noise that may harm the activity or balance of human or animal life.

High noise level can contribute to cardiovascular effects in human and an increased incidence of coronary artery disease .In animals, noise can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation [1].

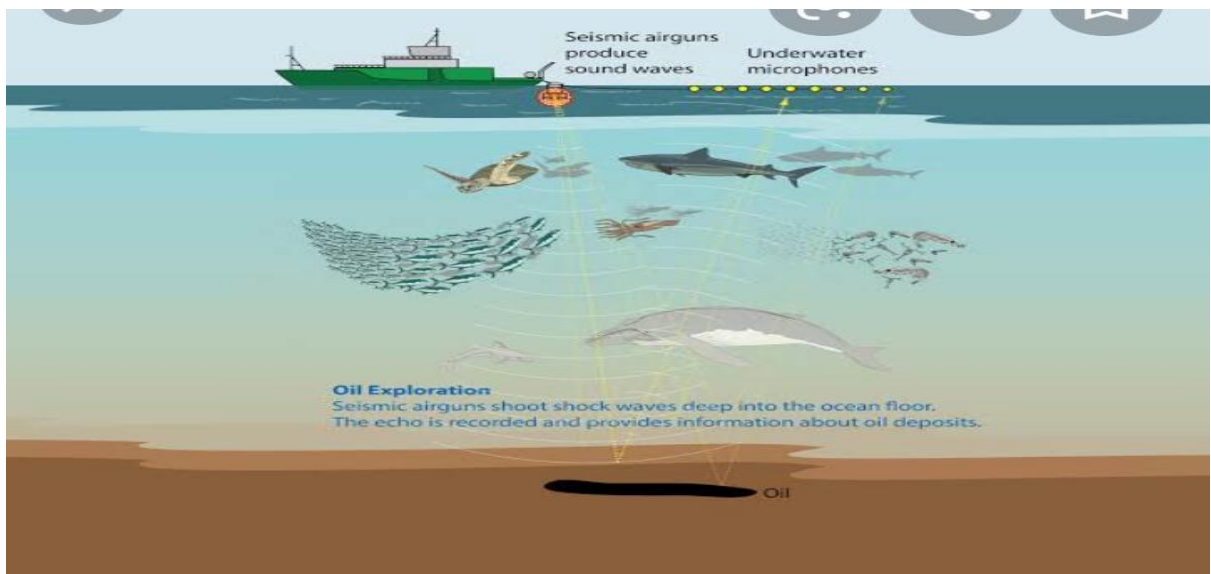


Figure: 1

Noise also make species communicate more loudly, which is called Lombard vocal response. Scientist and researchers have conducted experiments that show whale song length is longer when submarine- detectors are on. If creatures do not ‘speak’ loudly enough their voice will be masked by anthropogenic sounds.

Sound is mechanical energy in the form of pressure variances in an elastic medium, there pressure (P) as waves propagate through vibrating sources make changes in air pressure .This can be represented by wave form following is a graphic representation of a sound. -

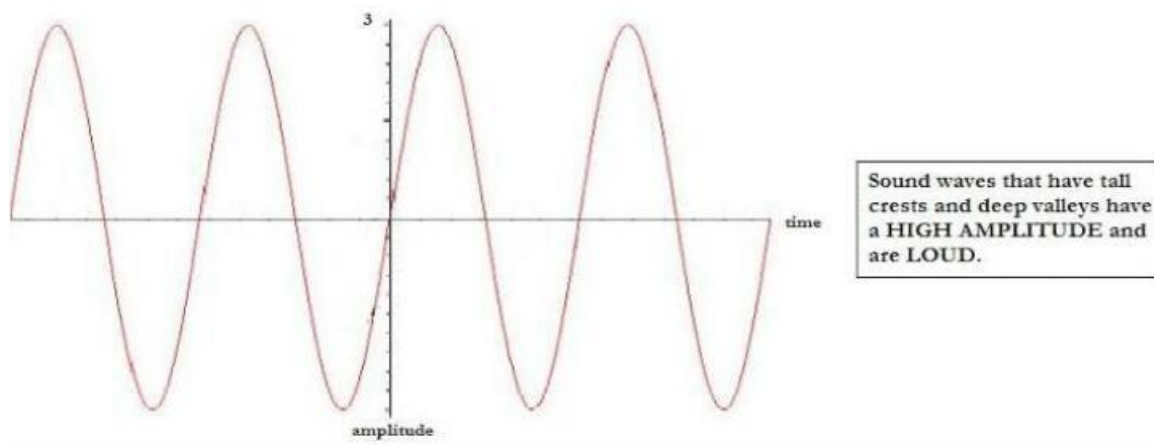


Figure 2

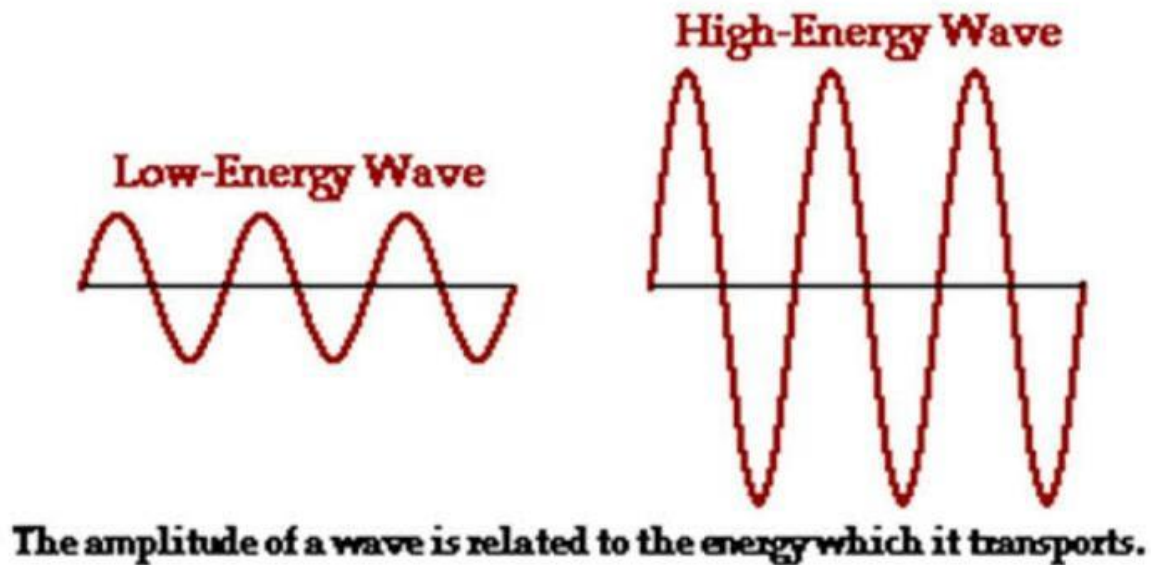


Figure 3

Audio frequency ranges from 20 Hz to 20 KHz any unwanted sound [2], which we don't want to listen and has a very annoying effect on our ears is noise.

II. REVIEW OF LITERATURE

A study by Singh and Mahajan (1990) conducted in Delhi and Calcutta; found that the noise level is 95dB as against the ambient limit of 45 dB. Even at the "calm" places, it does not fall below 60 dB [3].

Murli and Murthy (1998) also found that traffic noise in Vishakhapatnam exceeds 90 dB even in morning hours that act as a source of nuisance. The noise pollution is not a unique problem for developing countries like India only. In China till third century B.C. instead of hanging [4].

III. OBJECTIVE

To create social awareness among the educated people and spread the knowledgeable information about,

Which are the sources of sound pollution?

How sound pollution is measured?

At what intensity range the sound levels acceptable inside the buildings?

What are the effects of noise pollution on human being?

What are major symptoms occur on affected person?

Which are various techniques to control noise pollution?

Which are the most effective means to prevent the formation of noise pollution or minimize their emission at the source itself?

And in what ways the sound pollution can be controlled at the source?

What are the laws for prevention of noise pollution?

IV. AREA OF STUDY

Bilaspur is a city in Bilaspur district in the Indian state of Chhattisgarh, situated 133 km (83 miles) north of the state capital, Naya Raipur. It is the second-largest city (after Raipur-Bhilai-Durg Tri city Metro area) in the state. Chhattisgarh state High court at village Bodari, District Bilaspur privileges it to host the name 'Nyaydhani' of the state. It is the administrative headquarter of Bilaspur District. Bilaspur is the commercial centre and business hub of North east Chhattisgarh region. It is also an important city for the Indian Railway Zone and the Bilaspur Railway Division. It is also the headquarter of South Eastern Coalfields Limited.

Bilaspur is known for its aromatic Doobraj rice, handloom woven colourful soft kosa silk saris, and more

for its rich, varied and colourful culture. After the formation of Chhattisgarh state Bilaspur has emerged as the most favourable place to live in the state and developed city township.

V. HISTORY

Historically, Bilaspur was a part of the Kalchuri dynasty of Ratanpur. The city, However, came into prominence around 1741, the year of the Marathas Empire rule, when a Maratha official took up his abode there[5].

The management of Bilapur district was taken over by the British East India Company of Great Britain In the year 1854 from the then ruler of the region, Bhosle of the Nagpur Kingdom belonging to the Maratha Empire. Under Bhosle of the Nagpur Kingdom there were many subedars or Zamindars/landlords like Akbar Khan, Vazeer Khan, Sao and others in Bilaspur.

Bilaspur district was constituted in 1861, followed by Bilaspur municipality in 1867. Famines in the Bilaspur district were recorded by the British administration in 1828-9, 1834-5, 1845-6 1868-9 and 1899-1900. In 1868-9 and 1899-1900, the rains failed almost completely, resulting in severe distress, migration and desertion of village. After the 1868-9, famine there was prosperity for the next 25 years; but in 1895 there was a very poor harvest, followed in 1896 by a complete failure of crops and severe famine continued throughout 1897. In that year the mortality rate was as high as one in six people. The famine of 1897 was followed by two favourable years; but in 1899 monsoon failed completely and the rice crop was wholly destroyed.

VI. GEOGRAPHY

Bilaspur is located at 22°05'N 82°09'E / 22.09°N 82.15°E. It has an average elevation of 264 meters (866 ft).

VII. DIFFERENT ZONE IN BILASPUR

A. Residential Area

A residential area is a land use in which housing predominates, as opposed to industrial and commercial areas. Housing may vary significantly between, and through, residential areas. These include single family housing, multifamily residential, or mobile homes.

Exa.-Shivam homes in Mangla chowk.

B. Commercial Area

A commercial area is a real estate intended for use by for profit business, such as office complex, shopping malls, services station and restaurants. It may be purchased outright by a developer for future projects or leased through a real estate broker.

Exa- City mall in Mangla chowk, Manoj sweets (restaurants) in Mungeli naka (Post).

C. Industrial Area

Industrial park (also known as industrial estate, trading estate) is an area zoned and planned for the purpose of industrial development. An industrial park can be through of a more "heavy weight" version of a business park or office park, which has office and light industry, rather than heavy industry.

Example: NTPC at Seepat in Bilaspur.

D. Silence Zone

A silence zone is also called skip zone, is a region where a radio transmission can not be received. The zone is located between region is both closer and farther from the transmission where reception is possible.

VIII. DATA COLLECTION

TABLE I: NOISE FOR DIFFERENT ZONE IN BILASPUR

AREA	CATEGORY OF AREA /ZONE	Limits in dB	
		DAY	NIGHT
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zone	50	40

TABLE II: NOISE FOR PROMINENT LOCATION OF BILASPUR

S.NO.	AREA	TIMIMING PER HOURS		
		6 AM	12PM	6PM
1)	Nehru chowk	35 dB	70 dB	98 dB
2)	Mandir chowk	40 dB	73 dB	100 dB
3)	Maharanapratap chowk	45 dB	68 dB	130 dB
4)	27 kholi	42 dB	72 dB	90 dB
5)	Mangala chowk	48 dB	85 dB	105 dB
6)	Mungelinaka	40 dB	82 dB	97 dB

TABLE III: (A) Office building deepawali festival, 2014

LOCATION:A	NORMAL DAY			DEEPAWALI DAY		
Time duration	L min	L max.	Leq dB (A)	Lmin	Lmax	Leq dB (A)
18:00 to 19:00 hr	46.1	62.2	56.4	45.9	72.6	64.9
19:00 to 20:00 hr	56.1	64.3	60.1	61.2	96.4	64.2
20:00 to 21:00 hr	60.1	65.3	62.1	62.6	94.6	72.0
21:00 to 22:00 hr	48.2	62.2	49.9	60.1	98.2	78.2
22:00 to 23:00 hr	40.0	56.2	43.1	59.0	86.1	68.2
23:00 to 24:00 hr	35.1	48.0	40.2	42.0	67.0	50.0

Leq → Equivalent Continuous Sound Level

TABLE IV: (B)Traffic police thana ,Bilaspur

LOCATION:B	NORMAL DAY			DEEPAWALI DAY		
Time duration	L min	Lmax	Leq dB (A)	L min	L max	Leq dB (A)
18:00 to 19:00 hr	62.9	96.9	71.9	67.2	98.3	78.0
19:00 to 20:00 hr	62.9	99.3	68.6	65.8	93.0	87.6
20:00 to 21:00 hr	64.1	99.1	72.8	68.4	102.3	79.6
21:00 to 22:00 hr	61.6	100.2	81.3	62.3	89.2	81.2
22:00 to 23:00 hr	53.4	94.9	76.6	62.3	89.2	81.2
23:00 to 24:00 hr	42.9	80.2	46.6	43.4	85.9	59.8

IX. RESULT

A. *Noise control at source*

The noise pollution can be controlled at the source of generation itself by employing technique like-

B. *Reducing the noise level from domestic sector*

The domestic noise coming from radio, tape recorder, television, mixers, washing machine, cooking operations can be minimised by their selective and judicious operation. By usage of carpets or any absorbing material, the noise generated from felling of items in house can be minimised.

C. *Maintenance of Automobiles*

Regular servicing and tuning of vehicles will reduce the noise levels. Fixing of silencers to automobiles, two wheelers etc. will reduce the noise level.

D. *Control Over Vibration*

The vibration of materials may be controlled using proper foundation, rubber padding etc.

E. *Maintenance of machine*

Proper lubrication and maintenance of machines, vehicles etc. will reduce noise levels. For example, it's a common experience that, many parts of a vehicle will become loose while on a rugged path of journey. If these loose parts are not properly fitted, they will generate noise and cause annoyance to the driver/ passenger.

F. *Prohibition on usage of loud speakers*

By not permitting the usage of loudspeakers in the habitant zones except for important meeting/ function. Now a days, the urban Administration of the metro cities in India, is becoming stringent on usage of loudspeakers.

G. *Selection of machinery*

Optimum selection of machinery tools or equipment reduces excess noise levels. For example selection of chairs or selection of certain machinery / equipment which generate less noise (SOUND) due to its superior technology etc.

X. CONCLUSION

This paper explores the source, effects, reactions, and suggestion, for controlling the excessive noise. Automobiles and public address system (loudspeakers) turns out to be major sources of noise pollution. Disturbance by loudspeakers and automobiles is felt by age groups of 20-40 years somewhat lesser than group. Across various age group, there is almost an equal proportion reporting neighbourhood, music and religion function as sources of noise. Though the psycho-somatic effects (annoyance and depression) are also common yet the extreme affects e.g. deafness and mental breakdown are not ruled out. In a majority of cases, the effected party tenders a request to stop noise. A substantial proportion of respondents among various age – groups complain to administration. Interestingly, about one third of young people (below 20yrs) prefer to quarrel with the erring part.

Noise pollution is one of the virtual problems now days. There are many reasons of it, but mostly its caused by traffic and industrial sources.

1. Control at receiver's end.
2. Suppression of noise at source.
3. Acoustic zoning.
4. Sound insulation at construction stage.
5. Planting of trees.
6. Legislative measures.

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Microwave Remote Sensing Dielectric Behaviour of Soil in Relation to Custard Apple Farming in Mungeli District

¹Usha Patel, ²A.K.Shrivastava, ³Amit Sharma, ⁴A.Pandey, ⁵A.Paul, ⁶V. Mishra, ⁷Nitesh Kumar

¹Research Scholar, Department of Physics, DR.C.V.Raman University Kota, Bilaspur, Chhattisgarh,

³Department of Botany, DR.C.V.Raman University Kota, Bilaspur, Chhattisgarh

^{2,4,5,6,&7}Department of Physics, DR.C.V.Raman University Kota, Bilaspur, Chhattisgarh,
drakshrivastava01@gmail.com

Abstract:

In this research paper an attempt has been made by authors to study microwave remote sensing dielectric behaviour of soil in relation to custard apple farming in Mungeli district with analytical aspects about MRS and electrical spectroscopic behaviour of soil. Indian soils are divided in six parts. Chhattisgarh state covers sub-tropical part or south east central region. In Chhattisgarh majority of soil is 'black-yellow soil'. Due to its higher absorption capacity, black soil requires lesser irrigation. So black soil is better for agricultural purpose than white soil. Soil has various properties. Soil has physical property, chemical property and geographical property. In soil constituents as-micro-nutrients (Fe, Mn, Zn, Cu), macro-nutrients (N, P, K, Ca, Mg), organic carbon and sodium, are present. The effect of pH, soil wilting point capacity, water holding capacity, bulk density, soil porosity, air field porosity, conductivity, TDS, frequency, volumetric water content, gravimetric water content, dielectric loss, relaxation time, tangent law, resistivity, texture (sand,silt and clay) affect the soil parameter. But dielectric property plays important role in microwave remote sensing. Complex permittivity is related with dielectric constant and dielectric loss. Due to covid-19 only secondary data of soil has been utilized. It has been seen that the variation of organic carbon, electrical conductivity and pH are nearer to each other.

Index Terms: MRS, sand, silt, clay, dielectric loss, dielectric constant, soil, spectroscopic behaviour.

I. INTRODUCTION

India is mainly agricultural based country. It is known that there are eighteen elements present in the soil such as Carbon, Boron, Calcium, Manganese, Potassium, Sulphur, Chlorine, Phosphorus, Oxygen, Hydrogen, Molybdenum, Nickel, Zinc, Cobalt, Iron, Cooper, Magnesium and Nitrogen.

It is noted that conductivity, permanent electrical dipoles, ionic properties are affected by dielectric properties. In hydrological and meteorological application, the role of soil is very important. The important parameters such as soil analysis and dielectric constant also affect the production of agriculture. Moisture content directly affects the dielectric constant. Soil texture pyramid explains more about sand, silt and clay. Theoretically the size of sand is 2.00-0.05mm. The size of silt is 0.05-0.002mm [1-5]. The size of clay is less than 0.002mm. On the basis of map there are major soils types are divided in six parts as alluvial soil, forest and mountain soil, red and yellow soil, black soil, laterite soil and arid soil. Forest and mountain soil are found in north and north east region. Alluvial soil is found in Punjab, Uttarakhand, Uttar Pradesh, Bihar, Assam and Gujarat. Red and yellow soil is found in Manipur, Nagaland,

Arunachal Pradesh, Chhattisgarh, Kerala, Tamil Nadu and Odissa. Black soil is found in Chhattisgarh, Madhya Pradesh, Gujarat, Maharashtra and Andhra Pradesh. Laterite Soil is found in Rajasthan and Maharashtra. Arid soil is found in Rajasthan. It has been seen that electrical conductivity increases linearly with temperature and moisture content regarding food. Electrical properties such as electrical conductivity, dielectric properties, permittivity, dielectric loss, polarization of dielectrics, power density and penetration depth affect the production of agriculture. Soil is as a disperse system. As it has been mentioned earlier that partition of soil is divided into six parts such as tropical weight, arid tropical weight and dry, subtropical, humid subtropical, highland. Highland is related with Jammu and Kashmir, Sikkim, Himanchal Pradesh and Arunachal Pradesh. Humid subtropical is related with Punjab, Himanchal Pradesh, Chhattisgarh, Uttarakhand, New Delhi and Uttar Pradesh. Tropical weight and dry are related with Chhattisgarh, Karnataka, Tamil Nadu, West Bengal, Andhra Pradesh, Maharashtra and Odissa. Arid is related with Gujarat, New Delhi, Punjab, Haryana, Karnataka, Maharashtra and Tamil Nadu. Tropical weight is related with Kerala, Goa, Karnataka, Andaman & Nicobar and Lakshadweep.

Organic and inorganic constituents are found in soil, so soil is not a collection of mineral particles. Soil has its own bio environment; therefore soil is often complex soil. Aluminum, potassium, sodium, and magnesium are found in the form of chemical composition. Calcium and magnesium are found in the form of rock based lime and they enriches the growth of microbes and metabolic system. Microbes cells from the inorganic and organic chemicals and they bound the soil particles. The formation of mineral matter form due to broken of rocks. Humus is found after decomposition of debris microbes. In the soil, minerals are present with solutions. Soil water reaches with the help of capillary with the support of soil particles. This solution is very important for soil. Several

types of bacteria also present in the soil. Carbon dioxide and oxygen are present in the form of gases as well as air.

Custard Apple is the sweetest fruit. Its botanical name is *Annona reticulata*. Its leaves are dark green. Due to special flavours of green leaf animal do not eat generally. So there is need not of caring from wandering animals. Custard Apple is useful in heart diseases due to presence of tetrahydroisoquinolines alkaloid in the leaf. The root is used in diarrhoeas also. Soap and paint are made from the seed of custard apple. 14.5% Sugar is found in custard apple. Doam soil is very suitable for custard apple cultivation whereas generally everywhere is cultivated. Chhattisgarh is largest producer of custard apple in India. Plant of custard apple is very hard and it is flourished in dry climate. For custard apple 50-75 cm. Average annual rain is suitable. Generally pH is 5.5-6.5. It is also called fruits of common man. This custard Apple is cultivated all over the world viz Australia, Brazil, Myanmar, India, Chilli, Israel, Mexico, Spain and Philippines. Sugar, calcium, phosphorus and vitamin B group are present in the custard apple. Custard apple has protein 1.6%, fat 3%, fiber 2.4%, Carbohydrates 24.2%. There are 114 calorie energy in 100gm. For promotion of custard apple high technique machine has been launched which produces ice cream sweets etc. Development of this machine has been promoted under the project of NAIP, but the custard apple of Mungeli district has special test for which it is known in the world. At the bank of Agar river there is a huge garden of custard apple. Some place of Mungeli district are very popular for quality based production of custard apple such as Surda, Suretha, Kharaghat, Rehuntha, Nuniakchhar, Hathnikala, Bhatgaon, Bachhera. In my research the soil physics of custard apple has been studied although due to COVID-19 it has affected a lot. Especially laboratory work has been disturbed but it has been discussed with the help of theoretical data.

Custard apple is the cash crop. It has been produced by farmer's at large scale in Mungeli district of Chhattisgarh.

It has been known by the daily newspaper (NaiDunia) dated Nov. 18, 2019. At the bank of Agar river custard apple plays pivotal role for nearby farmers. The taste of custard apple has very significant role in their quality. There is a garden of custard apple at the bank of Agar. The village Surda, Sangwakapa, Dewari, Sureta, Kharrakhat, Rehunta, Nuniyakchhar, Hathanikala, Bhatgaon and Bachhera are the producer of custard apple. Custard apple is the panacea for the farmers. Model gram(village) Hathanikala's custard apple has its own importance for taste and flavour. Women self-help groups make ice-cream with custard apple flavour. The physio-chemical properties of concerned soil has been obtained and analysis its characteristics.

Soil colours have little effect on the behaviour and use of soil. Soil has electrical properties. Microwave remote sensing of natural earth material such as soil and water has a very close dependence on their electrical parameters. The dielectric characterization applications in agriculture have been collected along with their techniques and measurements. At a particular point in time and place soil moisture and dielectric behaviour is influenced by precipitation history, texture and heterogeneity of the soil.

II. THEORETICAL CONSIDERATION

Theoretically, dielectric properties of the material depend on the concentration, activity of permanent electric dipole molecules, ionic conduction and degree of dipole alignment with the applied time varying electric field. Therefore, when sample holder is filled with material, the dielectric properties are affected by the composition of the material and temperature, which affects molecular movement. The microwave soil dielectric measurement uses absorption. The microwave soil dielectric measurement uses absorption of microwave energy, corresponding to rotational energy of water molecules. When electromagnetic field is applied to dielectric

material, electromagnetic energy is dissipated in dielectric materials as a result of dielectric relaxation process, and the interaction of electromagnetic field depends upon the complex dielectric permittivity relative to the free space.

The infinite sample method described by HM Altshuler is used for the measurement of dielectric properties. At X band microwave bench operating at 10.45 GHz in the TE₁₀ mode with a slotted section and a crystal detector used for measurements of VSWR and the shift of minima are needed. Due to COVID-19 pandemic presently only secondary data has been utilized. Further the theoretical data of soil has been utilized by secondary data. Soil samples are taken from different locations of district Mungeli which is mentioned earlier. For each sample 15 mm top soil was removed and 5 pits were dug. A composite sample of about 1 to 2kg represents one site. Representing soil samples were collected with wooden tools to avoid any contamination of the soils. 4 to 5 pits were dug for each sample. From each pit sample were collected at a depth of 0-25 cm. The samples were then dried in the open atmosphere to remove the traces of moisture present in it. When the samples were completely dried, they are crushed and then sieved through the gyrator sieve shaker, which is available at the civil engineering laboratory in Dr. C V Raman University, to remove the course particles. the sieved out fine particles were dried in the hot air oven to a temperature around 110 °C for about 21 hours in order to remove completely any trace of moisture [6-9]. This dry sample is called as oven dry when compared with the wet samples. After sieving the given samples were packed in the polythene bags for further laboratory investigation. The complex dielectric constant calculated using the relation,

$$\epsilon^* = \epsilon' - j \epsilon'' \quad (1)$$

Where,

$$\epsilon^* = \frac{1}{1 + \left[\frac{\lambda_c}{\lambda_g}\right]^2} + \frac{1}{1 + \left[\frac{\lambda_g}{\lambda_c}\right]^2} \left[\frac{r - j \tan[k(D - D_R)]}{1 - jr \cdot \tan[k(D - D_R)]} \right]^2 \quad (2)$$

Separating the real and imaginary part of dielectric constant from eq (1), the equation for dielectric constant ϵ' is given by,

$$\epsilon' = \frac{1}{1 + \left[\frac{\lambda_c}{\lambda_g}\right]^2} + \frac{\left[\frac{\lambda_c}{\lambda_g}\right]^2}{1 + \left[\frac{\lambda_c}{\lambda_g}\right]^2} \left[\frac{(r^2 - E^2)(1 - r^2 E^2) + (2rE)^2}{(1 - r^2 E^2) + (2rE)^2} \right] \quad (3)$$

And dielectric loss ϵ'' is given by

$$\epsilon'' = \frac{\left[\frac{\lambda_c}{\lambda_g}\right]^2}{1 + \left[\frac{\lambda_c}{\lambda_g}\right]^2} \left[\frac{2rE\{(1 - r^2 E^2) - (r^2 - E^2)\}}{(1 - r^2 E^2) + (2rE)^2} \right] \quad (4)$$

Where,

λ_c , is cut off wavelength

λ_g , is guide wavelength

K, is wave vector

r, voltage standing wave ration (VSWR). The gravimetric soil moisture content in percentage Wc (%) is calculated using wet (W1) and dry (W2) soil masses using the relation,

$$Wc (\%) = (W_1 - W_2) / W_2 \times 100 \quad (5)$$

From the knowledge of dielectric constant and dielectric loss, the ac electrical conductivity and relation we are obtained by using the relation,

$$\sigma = [\omega \epsilon']_0 \epsilon'' \quad (6)$$

And

$$\tau = \epsilon'' / (\omega \epsilon') \quad (7)$$

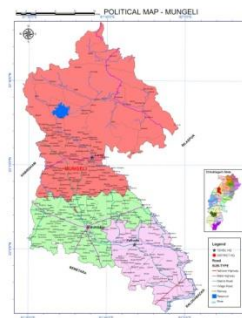
Where, ω is angular frequency ($f = 9.44$ GHz), ϵ_0 , permittivity of free space (8.85×10^{-12} Fm⁻¹)



Daily Newspaper, NaiDunya, dated-18.11.2019.



Garden of custard apple at the bank of Agar river



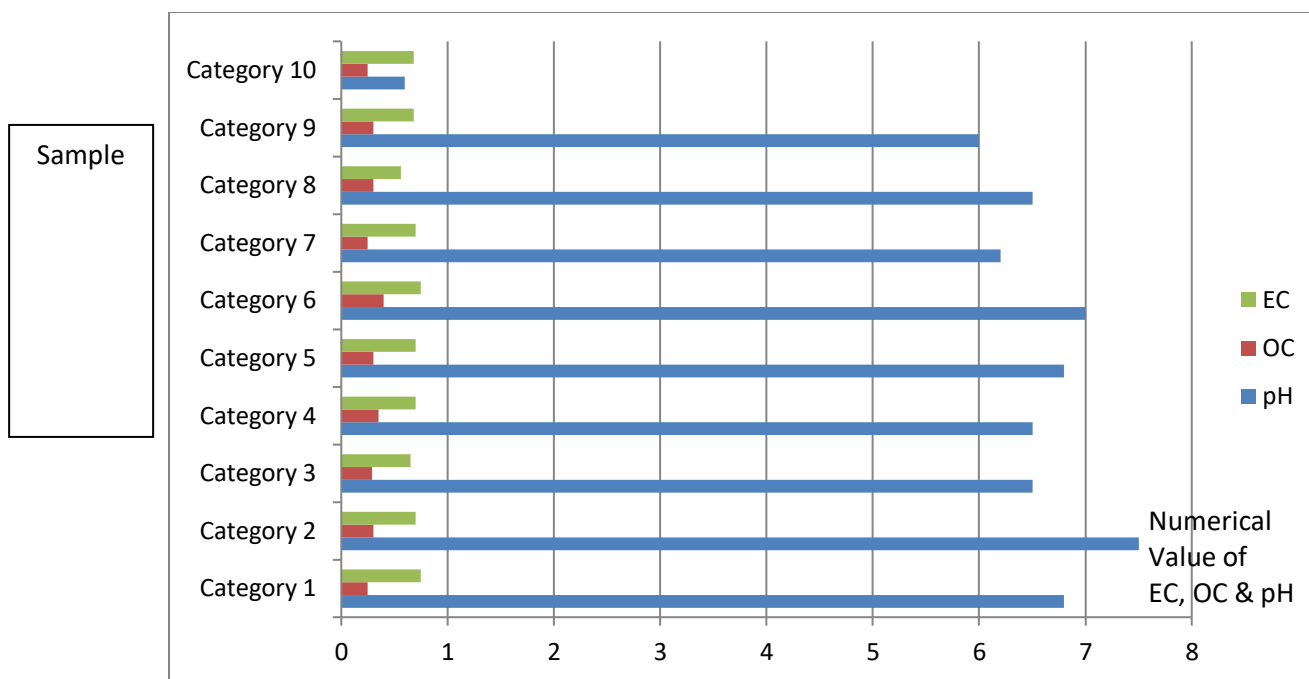


III. RESULT & DISCUSSION

Data of soil of Mungeli District:

Sl. No.	pH	EC	OC	N	P	K	S	Zn	B	Fe	Mn	Cu
01	6.80	0.75	0.25	263.00	11.64	235.00	3.75	0.41	08.00	1.09	2.51	0.17
02	7.5	0.70	0.30	250.00	10.75	470.00	3.75	0.20	05.00	5.51	10.68	1.51
03	6.50	0.65	0.29	326.00	12.46	392.00	1.25	0.35	12.00	0.61	1.22	-
04	6.50	0.70	0.35	275.00	9.85	392.00	3.75	0.53	06.00	3.05	3.96	0.71
05	6.80	0.70	0.30	225.00	13.44	358.00	6.25	0.56	03.00	1.41	1.31	0.40
06	7.00	0.75	0.40	263.00	17.92	448.00	5.00	0.14	02.00	1.20	9.55	0.15
07	6.20	0.70	0.25	285.00	17.92	380.00	7.50	0.25	07.00	1.30	9.55	0.15
08	6.50	0.56	0.30	188.00	10.75	313.00	3.00	0.36	06.00	2.20	2.94	0.45
09	6.00	0.68	0.30	250.00	19.71	324.00	3.75	0.14	09.00	14.90	16.12	2.14
10	0.60	0.68	0.25	213.00	10.75	224.00	5.00	0.04	09.00	10.35	1.15	-

Graphical Presentation of Numerical Value of EC, OC & pH



IV. CONCLUSION

Microwave remote sensing characterization of soil is very essential for farming utilization. Fundamental parameters of soil properties and dielectric properties play pivotal role in farming. Role of fertilizers play significant part in farming. Soil testing and recommended fertilizers enhance agricultural productivity. Clearly it has been observed that dielectric properties enhance the quality of soil fertility. Sand, silt, clay, textural classes, bulk density, maximum water holding capacity, porosity, wilting point, field capacity, transition moisture, hydraulic conductivity, pH, electrical conductivity, organic carbon, calcium carbonate, available nitrogen, available phosphorous, available potassium, available iron, available manganese, available zinc, available copper, dielectric constant, dielectric loss, tangent loss, emissivity, scattering, absorption, vary with dielectric constant although it has been observed from research papers and also it has been seen that generally the values are nearer to each other except few values.

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Analysis of Pesticide in Grapes of Chhattisgarh

¹Rajni Kujur, ²Kailashi Dansena, ³Dr. Manish Upadhyay

^{1, 2, 3} Department of Chemistry, Dr. C. V. Raman University, Kota, Bilaspur, Chhattisgarh – 495113

Abstract:

Grapes from various sale points of the market of Bilaspur city (Chhattisgarh) are collected, preserved and transported to Research Laboratory for analysis of acephate residue. The steps involved in process Extraction, clean up of extract and analysis using Liquid chromatography with tandem Mass spectrometry (LC-MS/MS). The analysis was carried out with most confirmative method with two MRM transitions and reported the results and results are compared with Maximum Residual Limit (MRL) of European union available with Agricultural & Processed Food Products Export Development Authority (APEDA-Government of India) and need of inspection on pesticide residues in agricultural products in order to prevent the contamination and secure human safety also suggested.

Index Terms: Chhattisgarh Open Market, Grapes, Pesticides, LC-MS/MS, Acephate, MRL Values.

I. INTRODUCTION

Pesticides are the sole noxious substances the free designedly into environment to kill living things. The use of noxious pesticides to manage pest issues has become a standard follow round the world.

Pesticides area unit used virtually all over not solely in agricultural fields, however conjointly in homes, parks, schools, buildings, forests, and roads. it's troublesome to search out somewhere wherever pesticides are not used [1-2]. world is crammed with pesticides. Pesticides are connected to a large vary of human health hazards, starting from short impacts like headaches and nausea to chronic impacts like cancer, procreative hurt, and endocrine disruption.

Acute dangers - like nerve, skin, and eye irritation and injury, headaches, dizziness, nausea, fatigue, and

general poisoning - will generally be dramatic, and even sometimes fatal [3].

Chronic health effects could occur years once even minimal exposure to pesticides within the setting, or result from the chemical residues that we tend to ingest through our food and water. Pesticides will cause many sorts of cancer in humans. a number of the foremost prevailing forms embrace malignant neoplastic disease, lymphoma, brain, bone, breast, ovarian, prostate, gonad and liver cancers. There is conjointly mounting proof that exposure to pesticides disrupts the system, wreaking the advanced regulation of hormones, the genital system, and embryonic development [1]. Endocrine disruption will turn out physiological condition and a spread of birth defects. Children area unit notably liable to the hazards related to chemical use [2]. Kids haven't developed their immune systems, nervous systems, or detoxifying mechanisms fully, feat them less capable of fighting the introduction of noxious pesticides into their systems.

II. MATERIAL AND METHODOLOGY

Grapes from various sale points of the market of Bilaspur (Chhattisgarh) are collected, preserved and transported to Research Laboratory, Extraction, clean up and analysis then processed with the use of Liquid chromatography with Mass spectrometry (LC- MS/MS)[7]. Using following Methodology of USEPA and Standard procedure provided by National Research Centre for Grapes.

A. Sample handling and Preparation:

Freshly collected samples kept in cold condition before and during transportation to the laboratory. Once received at laboratory, samples were kept at -20°C for minimum 30minutes prior to blending [6]. ~2kg of berries were blended and ~200g of crushed sample was taken homogenized for one minute.

B. Isolation of Pesticides from samples:

10±0.1g homogenized grape sample taken in to a polypropylene centrifuge tube , 10ml,of ethyl acetate is added vortexed for 1minute, 10g of anhydrous sodium sulfate is added and homogenized at 15000rpm for 1 minute and centrifuged at 5000rpm for 5minutes [8].

C. Extraction & clean up:

For LC-MS/MS amenable compounds: 5ml supernatant is taken in to 15ml polypropylene centrifuge tubes containing 25mg primary secondary amine (PSA), shaken for 30sec. and centrifuged for 5minutes at 10000rpm [5].

2ml of supernatant drawn in to the test tube containing 200µl of 10% diethylene glycol(DEG) solution, evaporated it to dryness under nitrogen at 35°C.

Reconstituted with 1ml Methanol and (followed by) 1ml

0.1% acetic acid in water, sonicated for 1min and vortex for 30seconds

Centrifuged the extract at 10000 rpm for 5min and filtered through 0.2µm Nylon6,6 membrane filter in to a LC vial [5].

Table I: Preparation of Calibration curve standards

Concentration of Stock solution(ppb)	Volume taken from stock solution(ml)	Final Volume made (ml)	Final concentration(ppb)
1000	1	10	100
1000	0.5	10	50
100	2	10	20
100	1	10	10
50	1	10	5
20	1	10	2

D. Identification and Determination of Analytes

Injected 10 µl from the extract in to LC-MS/MS with following specifications [4]

Column: C18(Agilent-ODS-4- 150mmX2.1mm,1.7µ)

Mobile Phase: Water +Acetonitrile

Injection volume: 10 µl Detector: Mass

Stop time: 20minutes

Preparation of Calibration Curve Standards Standard stock solution

Mass Spectrum & Linearity: Mass Spectrum

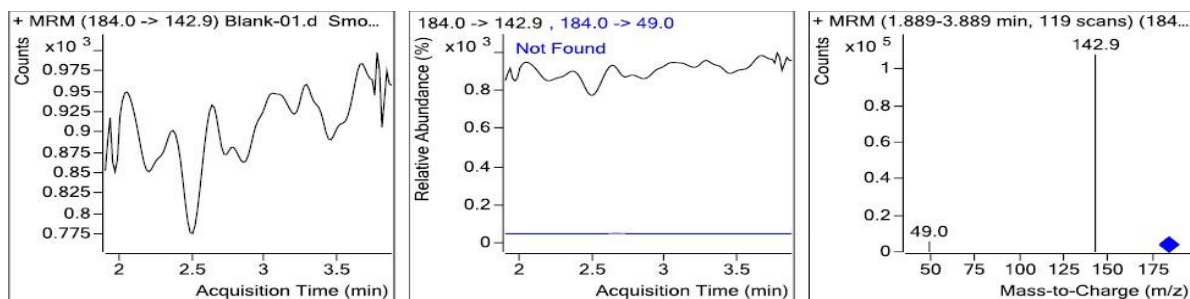


Fig.1 : Chromatogram and Mass spectrum of Blank

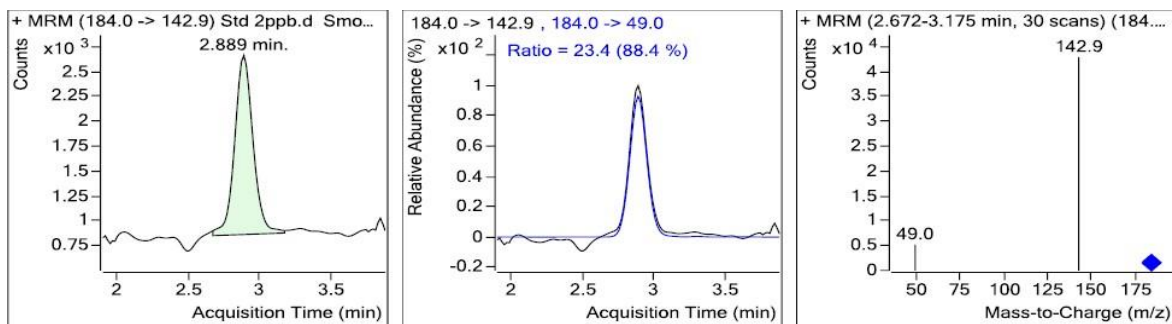


Fig.2 : Chromatogram and Mass spectrum of 2PPB Standard

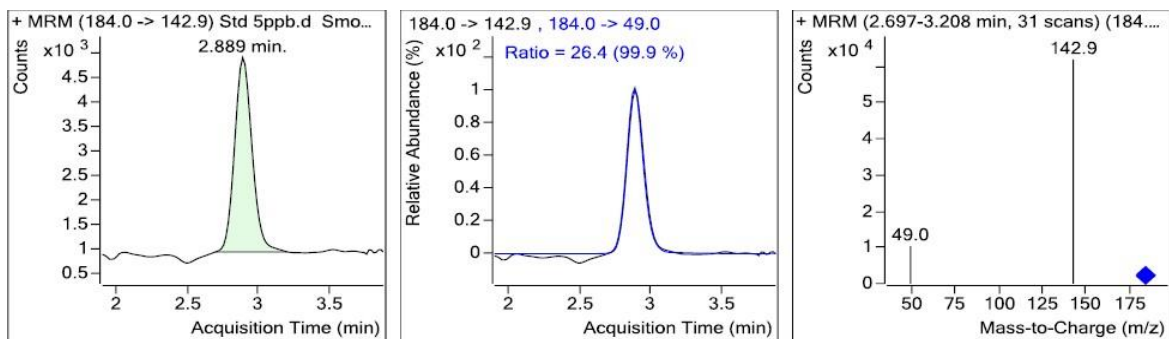


Fig.3 : Chromatogram and Mass spectrum of 5PPB Standard

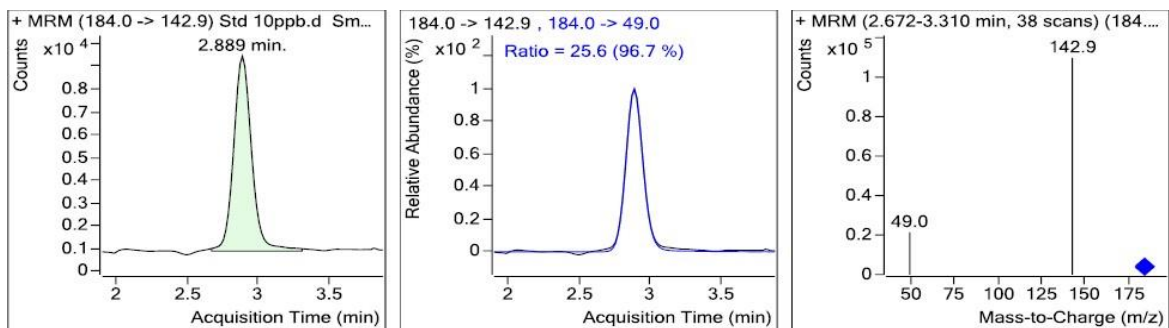


Fig.4 : Chromatogram and Mass spectrum of 10PPB Standard

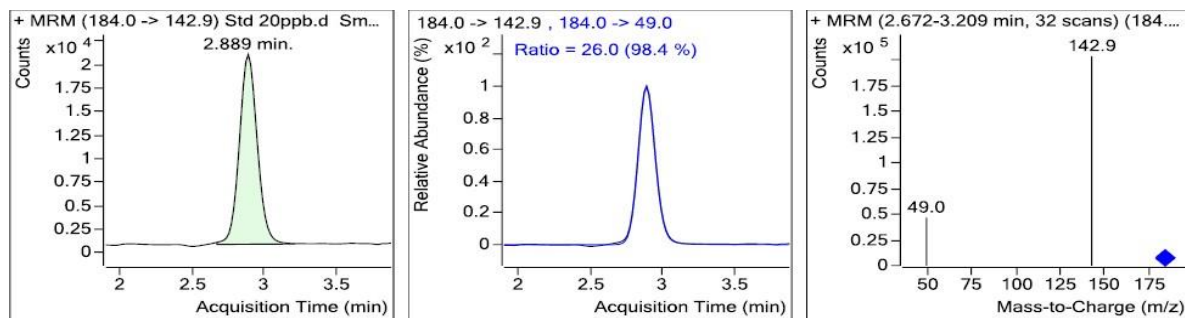


Fig.5 : Chromatogram and Mass spectrum of 20PPB Standard

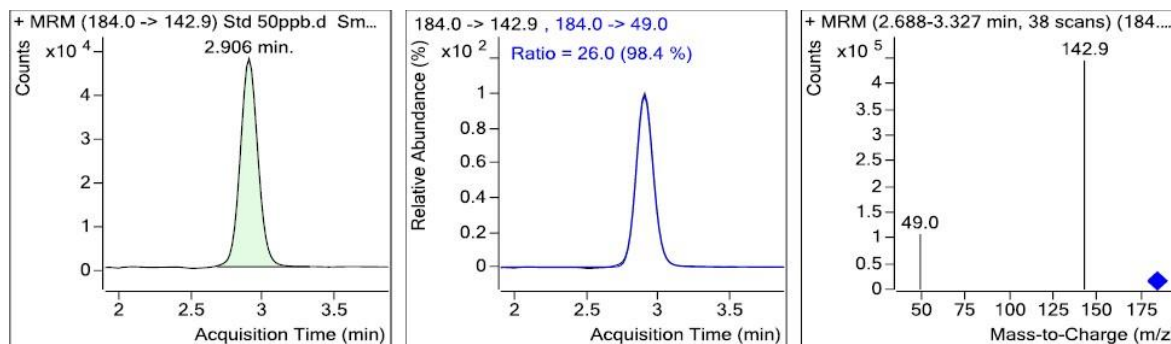


Fig.6: Chromatogram and Mass spectrum of 50PPB Standard

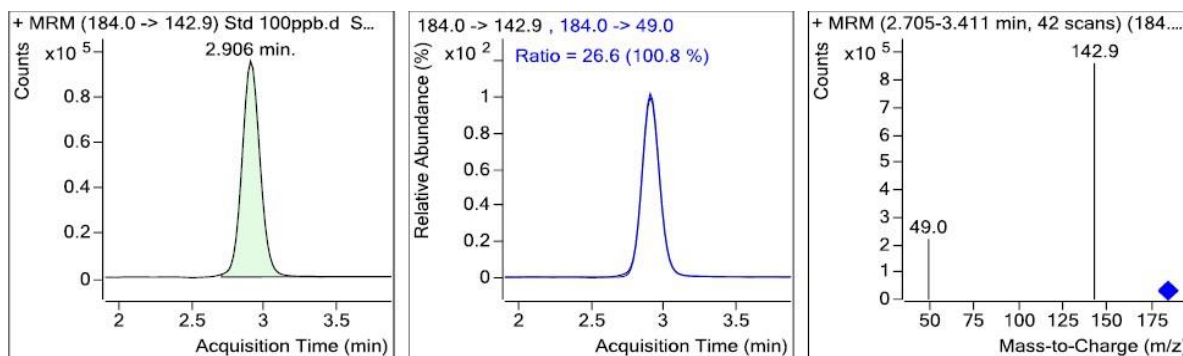


Fig.7: Chromatogram and Mass spectrum of 100PPB Standard

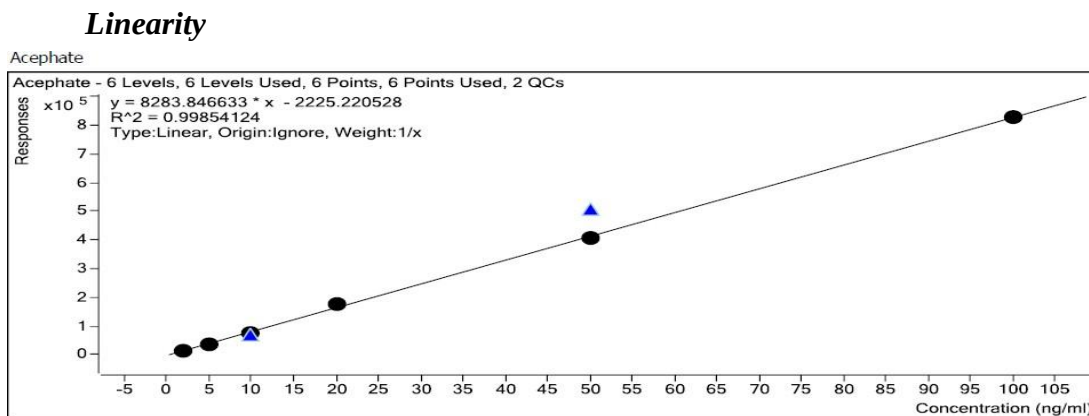


Fig.8: Calibration curve (Linearity)

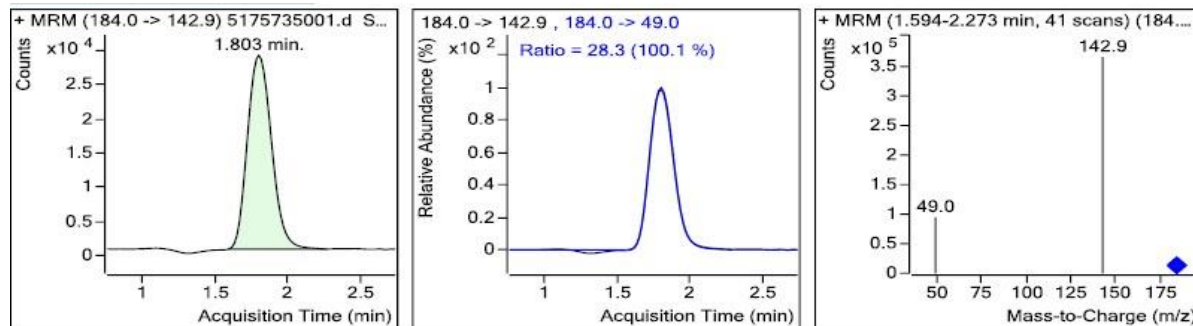


Fig.9: Chromatogram and Mass spectrum of sample

Table II: Response of calibration curve standards with LCMS/MS

S.NO.	Standard Conc(ppb)	RT	Response
1	2.0	2.889	16150
2	5.0	2.889	34333
3	10.0	2.889	76422
4	20.0	2.889	174675
5	50.0	2.906	408586
6	100.0	2.906	825562

III. RESULT & CALCULATION

A. Result:

Table III: Response of Sample in LCMS/MS

S.No.	RT	Response	Final Conc(PPb)
1	2.923	229200	30.01

B. Calculation:

The Concentration of Acephate in sample analyzed by LC-MS/MS was determined directly from the standard curve [7].

$$Y=mx+C$$

Where,

Y = Peak area of Standard

m=Slope of line from the calibration curve

x= Concentration of analyta in injected sample C= 'y' intercept of the calibration curve

Recovered concentration (ppb) will be converted in to mg/kg (1ppm = 1000ppb)[7]

Table IV: Final Concentration of Acephate in sample and comparison with Harmonized EU-MRL

S.No.	Name of the Compound	Unit	Result (mg/kg)	Harmonized EU-MRL (mg/kg)
01	Acephate	mg/Kg	0.031	0.010

In above analysis Acephate is identified and compared with Maximum Residual Limit (MRL) values of European Union available with Agricultural & Processed Food Products Export Development Authority (APEDA-Government of India).

IV. DISCUSSION

In above identified compound Concentration level of Acephate beyond the Minimum Residual Limits of European Union. This product will be rejected to export to European Union countries, but without any restriction, road side vendors are selling in India.Hence India needs more stringent guidelines to educate formers for utilization of pesticides in their crops and to restrict this type of fruits/food material to enter in to market in order to prevent the contamination and secure human safety.

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Digital Financial Services and the Pandemic: It's Impact on Financial Inclusion

¹Dr. Indu Santosh, ²Dr. Preeti Shukla

^{1,2}Department of Commerce & Management, Dr. C. V. Raman University, Kargiroad, Kota, Bilaspur (C.G)

Abstract:

The COVID-19 pandemic and the need for social distancing have put a spotlight on digital financial services. Digital financial services allow for social distancing; they allow governments to disburse funds to those in need quickly and effectively; and allow many households and firms to rapidly access online payments and financing. However, risks to stability and integrity, always present, may worsen if the use of digital financial services is scaled up quickly in times of crisis without appropriate regulations and safeguards. At the same time, efforts to ramp up the use of digital financial services should avoid increasing existing divides across users. Financial services and adequate credit where needed by vulnerable groups such as weaker sections and low income at an affordable cost. Financial inclusion includes access to financial products and services like banks accounts, insurance, remittance & payment services, financial advisory services etc. It provides individuals with the possibility to save for future stability, a high level of bank deposit would enable a stable deposit base, opportunities to build savings, make investments and access credit. Now a day, there is an inclusive growth focused on financial inclusion. Collectively, these are achieved with the enabling of new banking technology. Many banks have arrived with new banking technology that took place in the new scenario of banking customers that is called "Digital finance". Thus, digital finance has given a new shape to the banking industry. Digital finance is a financial service delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system Digital finance has the potential to provide affordable, convenient and secure banking service. Digital finance provides greater control of customer personal finance, quick financial decision making, and the ability to make and

receive payments. Financial inclusion is a win-win situation that is achieved through digital finance.

Index Terms — Covid-19 Pandemic, Financial inclusion, Digital finance, Financial Products, Financial services, Innovative Financial Technology.

I. INTRODUCTION

Financial institutions across the world are monitoring and dealing with the effects of the COVID-19 pandemic. They are working to understand the immediate challenges to society and economies, and the long-term impact on the interconnected financial system. They are using their expertise to help themselves and their customers to make good decisions in today's highly volatile operating environment.

At a time of crisis, it is important that we share our insights and experience, helping each other to contain and mitigate the impact of COVID-19 on the financial system and the broader economy. Our professionals within our global network are speaking every day with financial services business leaders, and will continue to share our insights and resources on industry developments and responses.

Digital finance and financial inclusion have several benefits to financial services users, digital finance providers, governments and the economy. Since 2010, the G-20 and the World Bank have led the initiative for

increased financial inclusion in developing countries to help reduce poverty levels in developing and emerging economies [1]. During pandemic-19 the access to digital technologies allows a wider range of financial services such as online banking, mobile banking etc. The technology has spread internet banking, mobile banking, e-wallets, mobile wallets, and credit and debit cards. It provides several benefits like convenience, easy financial transactions etc. to the customer. However, the threat of cyber-attacks is the red alert which coincides with the evolution of the economy. It seems that while people are getting comfortable with cashless payments, some kind of negative perceptions like security problems, poor network coverage, and lack of merchant willingness, high transactional costs, lack of users' knowledge on technology etc. are holding back many from adopting the new system

Digital financial services can be more convenient and affordable than traditional banking services, enabling low-income and poor people in developing countries to save and borrow in the formal financial system, earn a financial return. It is vital to the public as it boosts security for their cash and it's more convenient compared to keeping money at home traveling with the money. However, in COVID-19 the provision of digital finance involves the large number of participation of different players such as banks/financial institutions, mobile network operators, financial technology providers, regulators, agents, chains of retailers and clients (Haider H, 2018). It can eliminate such transaction costs and provide affordable, convenient and secure banking services to poor individuals in developing countries.

Financial inclusion refers to the access and applying a set of adequate financial services by households and firms is essential for advancement as it can help poor family units enhance their lives while likewise impelling financial movement. Digital financial services are held out as key money-related answers for enhancing monetary

consideration [2]. Financial inclusion is bridging the gap between cash and digital payments. Customers are connected to a digital payment system, they are able to transfer money instantly and cheaply to friends, family and business collaborate.

II. OBJECTIVES

In this paper, we the researcher intends to identify the impact of digital finance in bringing about financial inclusion among people. Digital finance includes Internet banking, Mobile banking, Mobile Wallets (apps), Credit card and debit card. Financial inclusion is taken for the study are Convenience, Adaptability, affordability, Security, User-friendly, Low Service charge, Accurate timing, Online Monthly statement, Quick financial decision making, Easy interbank account facility, Internet Connectivity, and Usability.

III. REVIEW OF LITERATURE

Introduction to the special issue: Internet finance in ChinaInternet finance [3], which is often referred to as "digital finance" and "Fintech". Internet finance refers to the new business model of utilizing the Internet and information communication technologies to accomplish a wide range of financial activities, such as third-party payment, online lending, direct sales of funds, crowdfunding, online insurance, and banking. The Internet can significantly lower transaction costs and reduce information asymmetry, enhance the efficiency of risk-based pricing and risk management, and expand sets of feasible transactions.

The Effect Of Digital Finance [2] on Financial Inclusion In The Banking Industry In Kenya, The study concluded that digital finance doesn't have any correlation on financial inclusion in banking sector in Kenya since banking institutions adopt digital financial services to lower operating cost associated with opening and operating branches to improve their profitability and financial performance and not to foster financial

inclusion.

Impact of Digital Finance on Financial Inclusion and Stability [1], this article provides a discussion on digital finance and its implication for financial inclusion and financial stability. Digital finance through Fintech providers has positive effects for financial inclusion in emerging and advanced economies, and the convenience that digital finance provides to individuals with low and variable income is often more valuable to them than the higher cost they will pay to obtain such services from conventional regulated banks.

Innovative financial technologies to support livelihoods and economic outcomes [4], the study examined the innovative financial technologies support livelihoods of people. Access to digital technologies, in particular mobile phones, internet connectivity and biometric authentication, allows for a wider range of financial services, such as online banking, mobile phone banking, and digital credit for the unbanked. Digital financial services can be more convenient and affordable than traditional banking services, enabling low-income and poor people in developing countries to save and borrow in the formal financial system, earn a financial return and smooth their consumption

IV. RESEARCH METHODOLOGY

A well-structured questionnaire was carefully prepared for the collection of primary data. Multiple choices and Likert scale questions were carefully framed to study the impact of digital finance in financial inclusion. The Cronbach's alpha is 0.976, proving its reliability and validity. Data were entered into the Statistical Package of Social Sciences (SPSS) ver. 20.0 for analysis. The statistical techniques used for analyzing the data are One way ANOVA and Reliability test.

One way ANOVA is similar to test, but it is used when you have two or more groups and you wish to compare the mean scores on the continuous variable. It is called one way because you are looking at the impact of only one independent variable on your dependent variable. The study conducted a post hoc test to find which group is significantly different from another group.

V. ANALYSIS AND FINDINGS

The aim of this analysis is to identify the impact of digital finance (Internet Banking, Mobile Banking, Mobile wallets (Apps), Credit card and Debit card) on financial inclusion. One way analysis is used to identify the impact of digital finance on financial inclusion.

Table I: One way ANOVA for significant difference among digital finance and financial inclusion

Financial Inclusion	Digital Finance					F value	P value
	Internet banking	Mobile banking	Mobile wallets (Apps)	Credit card	Debit card		
Convenience	3.37a (1.165)	3.24ab (1.091)	4.05b (1.105)	4.00b (.849)	3.94b (1.056)	2.655	.037*

Adaptability	3.37 (1.165)	3.35 (.931)	3.95 (1.050)	4.00 (.843)	4.06 (1.507)	2.348	.060
Affordability	3.47 (1.219)	3.59 (.939)	4.05 (.923)	4.00 (.849)	3.94 (1025)	1.289	.280
Security	3.37a (1.165)	3.47ab (1.007)	4.05ab (1.050)	4.12ab (.766)	3.94b (1.026)	2.384	.057
User friendly	3.42a (1.170)	3.41a (1.121)	4.20ab (.894)	4.00ab (1.104)	3.94b (1.056)	2.418	.054
Low Service charge	3.37a (1.165)	3.29a (1.160)	4.15ab (1.040)	4.00ab (.849)	4.06b (1.046)	2.639	.039*
Accurate timing	3.07a (1.165)	3.35ab (1.169)	4.15ab (1.030)	3.00b (.829)	4.21b (.863)	2.652	.038*
Online Monthly statement	3.58 (1.071)	3.41 (1.121)	4.05 (1.050)	3.96 (.824)	3.94 (1032)	1.408	.237
Quick financial decision making	3.58a (1.219)	3.35ab (1.057)	4.20ab (.768)	4.00ab (.849)	3.94b (1.058)	2.407	.055
Easy inter bank account facility	3.47a (1.219)	3.35ab (.931)	4.25b (.786)	4.00b (.856)	3.94b (1056)	2.871	.027*
Internet connectivity	3.47 (1.124)	3.35 (1.007)	4.05 (1.050)	4.00 (.849)	3.94 (1.056)	1.599	1.81
Usability	3.37a (1.165)	3.24a (1.091)	4.05b (1.050)	4.12b (.766)	4.06b (1.056)	3.385	.012**

(Source: Primary data)** Highly Significant*Significant

Inference :

****with DMRT (Duncan multiple range Test)**

Since the p-value is less than 0.01 the null hypothesis is rejected at 1% level of significance with regard to Usability. Based on Duncan multiple range Test (DMRT) the Internet banking, Mobile banking is significantly different with the Mobile wallets (apps), Credit and debit card at 5%. Hence, there is no significant difference between Internet banking, mobile banking, Mobile wallets (apps), Credit card and debit card with regard to Usability.

***with DMRT (Duncan multiple range Test)**

Since the p-value is less than 0.05 the null hypothesis is

rejected at 5 % level with regard to Convenience, Low service charge, accurate timing, and easy interbank account facility. Based on Duncan multiple Range tests, Internet banking, Mobile wallets (apps), Credit card and debit card is significantly different at 5%. But the digital finance of mobile banking is not different from any other group. In Low service charge, Internet banking, Mobile banking is significantly different with the debit card at 5%. But the digital finance of mobile wallet and credit card is not different with any other group. In Accurate timing, Internet banking has significantly differed with the credit card and debit card at 5% level. But the digital finance of Mobile banking and mobile wallets (apps) is not different from any other group. In easy interbank account facility, Internet banking is significantly different with Mobile

wallets, credit card, and debit card at 5%. But the digital finance of Internet banking and mobile banking is not different from any other group.

There is no significant difference among Digital finance (Internet banking, mobile banking, mobile wallets (Apps), Credit card and Debit card with respect to Adaptability, Affordability, Security, User-friendly, Online monthly statement and quick financial decision making. Since the p-value is greater than 0.05. Hence the null hypothesis is accepted at 5% level with regard to Adaptability, Affordability, Security, User- friendly, online monthly statement, and quick financial decision making.

VI. CONCLUSION

This article provides a discussion on Digital finance and its impact on financial inclusion. Digital Finance plays a vital role in the day to day activities of the people. The findings of the study found that Usability, Convenience, Accurate timing, and easy interbank account facility has positive impacts on Mobile banking, Low service charge and accurate timing has significant impacts on mobile wallets (apps) even Low service charge has positively impacted on the credit card. Hence the study concludes that the digital finance (Internet banking, mobile banking, mobile wallets (apps), credit card and debit card has a significant impact on financial inclusion. Though digital finance has many negative on an issue like affordability, security, adaptability etc. Every human being intends to avail the facility of digital finance in their lives

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Impact of SVC on Power Quality Issue in Photovoltaic Solar Power System

¹Amit Agarwal, ²Dr. Shanti Rathore, ³Dr. Nagendra Tripathi

¹PhD. Scholar, Department of Electrical Engineering, Dr. C V Raman Institute of Science and Technology

²Associate Professor, Department of Electronics and Communication Engineering, Dr. C V Raman University

³Associate Professor, Department of Electrical Engineering, Bhilai Institute of Technology, Durg

Abstract:

The limited fossil fuels and continuously increasing energy demand are the main reason for use of Renewable Energy sources. Renewable energy systems play a vital role in sustainable development. In this paper we discuss about power quality issue in solar PV power plant which comprises PV array, power quality improvement of harmonics distortion, correcting power factor and protection of solar PV plant by over voltage and over current using ETAP. In this paper, different analysis of grid connected PV plant on the power quality is reviewed

Index Terms: Photovoltaic Cell, Harmonic distortion, Power factor, ETAP.

I. INTRODUCTION

In today's life, energy-related aspects are becoming extremely important as they involve, for instance, a rational use of resources, the environmental impact related to the pollutants emission and the consumption of non-renewable resources.

These are the reasons behind an increasing worldwide interest in sustainable energy production and energy saving. Among all the technologies and research work done on the generation of sustainable and widespread energy, interesting solutions are represented by photovoltaic (PV) cell.

The research activity and development process in

photovoltaic field have usually been focused on solar radiation analysis, efficient operating strategies, design, improvement and sizing of these systems. Solar cell efficiency plays an important input parameter in PV-powered product design. Often, limited space is available for the solar cells to be integrated.

When considering only modern renewable, Solar Photovoltaic technology is getting the most attention, due to its feasibility in most parts of the world unlike the wind and tidal projects which are practically feasible only at certain geographical locations in the world.

II. GRID CONNECTED PV SOLAR POWER SYSTEM

As we know that solar demand is increasing day by day. It is widely used in generation of electricity by capturing the sunlight via the solar panels. These panels convert light energy into electrical energy (DC).

Now in grid connected PV solar power system, the power is being transferred to the grid. This power should be synchronized as that of the Power available in the grid. The grid connected system has two important tasks to perform:

- (1) Tracking of maximum power from the solar panels with the help of suitable MPPT method.
- (2) The voltage at the PCC must be sinusoidal and at the same level of grid voltage.

III. POWER QUALITY IMPROVEMENT OF SOLAR PV PLANT

Renukadevi V and Dr. B Jayanand have proposed a two part of the circuits, one of the circuits is detecting harmonic and reactive component, and other circuit generating the compensation current of grid-connected PV system. Here the load current is having three components – active, reactive and harmonic. It tracks the actual compensation current that the command current aroused, and compensate Harmonic and reactive component of the grid current, and offset harmonics and reactive component of load current and compensate active component of grid current to provide the active power to the load and power grid.

Block diagram representation of the proposed system Albert Alexander S has explained a detailed analysis of employing different switching techniques and observing its performance. ETAP is used to perform the simulation studies in which a separate model is developed for In addition; the past works by the author including intelligent control strategy and switches reduction topology are also included. This ensures the consumers to make an optimal choice of the photovoltaic inverter which upholds the better improvement in performance parameter [4].

A. Load Flow Analysis:

The ETAP Load Flow Analysis module calculates the bus voltages, branch power factors, currents, and power flows throughout the electrical system. ETAP allows for swing, voltage regulated, and unregulated power sources with multiple power grids and generator connections. It is capable of performing analysis on both radial and loop systems. ETAP allows you to select from several different methods in order to achieve the best calculation

efficiency.

This chapter defines definitions and explains the usage of different tools you will need to run load flow studies. Theoretical background for different load flow calculation methods is also provided.

The Load Flow Toolbar section explains how you can launch a load flow calculation, open and view an output report, or select display options. The Load Flow Study Case Editor section explains how you can create a new study case, what parameters are required to specify a study case, and how to set them. The Display Options section explains what options are available for displaying some key system parameters and the output results on the one-line diagram, and how to set them. The Load Flow Calculation Methods section shows formulations of different load flow calculation methods. Comparisons on their rate of convergence, improving convergence based on different system parameters and configurations, and some tips on selecting an appropriate calculation method are also found in this section. The Required Data for Calculations section describes what data is necessary to perform load flow calculations and where to enter them. The Load Flow Study Output Report section illustrates and explains output reports and their format. Finally, the Load Flow Result Analyzer allows you to view the results of various studies in one screen so you can analyze and compare the different results.

B. Static VAR Compensator:

A static VAR compensator is a parallel combination of controlled reactor and fixed shunt capacitor shown in the figure below. The thyristor switch assembly in the SVC controls the reactor. The firing angle of the thyristor controls the voltage across the inductor and thus the current flowing through the inductor. In this way, the reactive power draw by the inductor can be controlled.

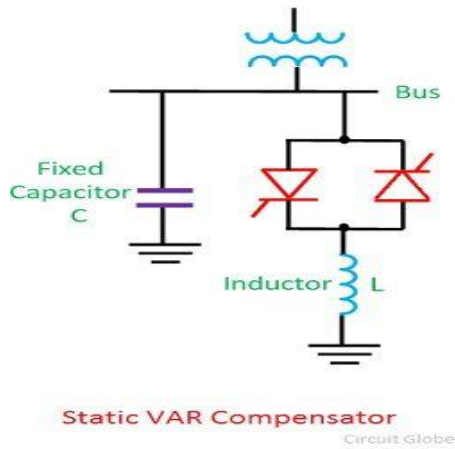


Fig.1: SVC (Static VAR Compensator)

The SVC is capable of step less adjustment of reactive power over an unlimited range without any time delay. It improves the system stability and system power factor. Most commonly used SVC scheme are as follows.

1. Thyristor controlled reactor (TCR)
2. Thyristor-switched capacitor (TSC)
3. Self Reactor (SR)
4. Thyristor controlled reactor – Fixed capacitor (TCR-FC)

Thyristor-switched capacitor – Thyristor controlled reactor (TSC-TCR)

IV. METHODOLOGY

Single line diagram of PV connected distribution system of Dr. C.V. Raman University is shown in figure 1. At present distribution system is supplied from 315kVA, 11000/415V Grid connected Transformer, 100kW solar panel is also grid connected through 415 V system at Bus 5. Also a SVC is connected to the system at bus 3 to enhance the voltage quality of the system. Simulation is done by using ETAP software

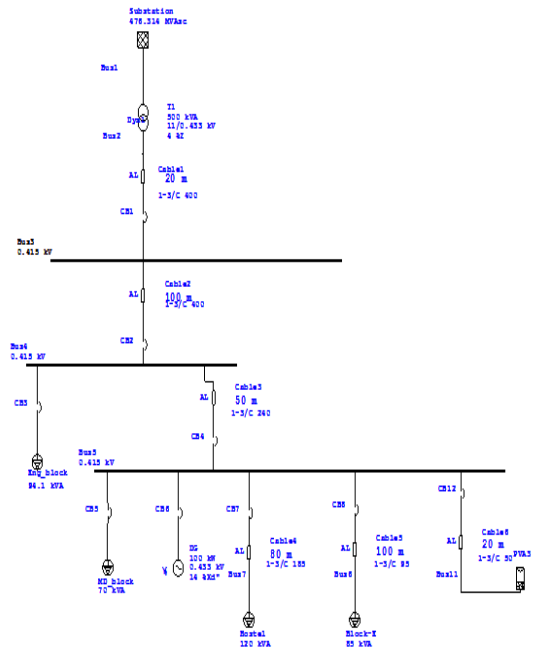
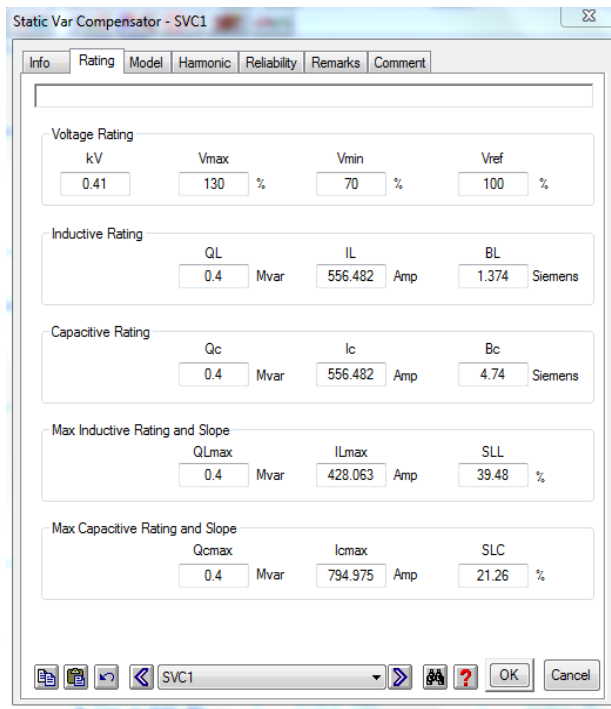


Fig. 2: Model of PV Solar panel connected to grid power system

V. DESIGN IMPLEMENTATION

ETAP software provides a platform to set parameter and check the system operation in a wide range. According to set parameter, input and output property of the sub-systems the sub-systems are connected to form an integrated system which fulfill our demand in this project.



VI. RESULT AND DISCUSSION

This section deals with the results of the project with or without Static VAR Compensator that was used to mitigate power quality issue present in grid connected PV solar power system.

A. When SVC is not connected to the System:

In this dissertation, the basic structure of an SVC operating under typical bus voltage control and its model are described. This shows, the effectiveness of shunt FACTS devices such as SVC has been studied in improving the system stability of an IEEE 9 bus system.

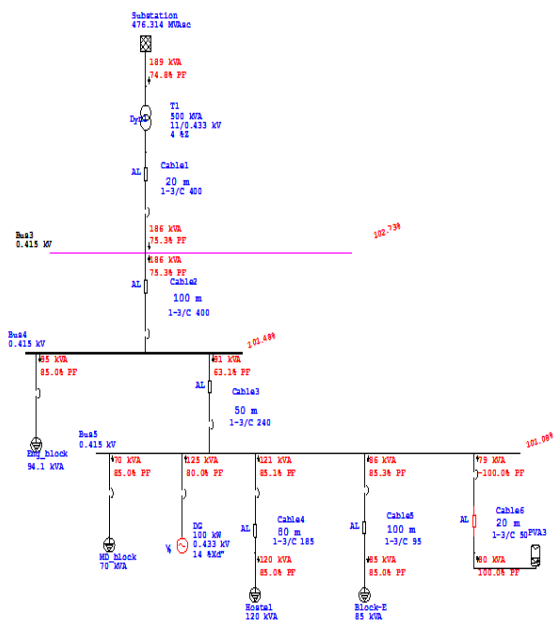


Fig. 4: Load Flow Analysis of grid connected PV system with SVC

B. When SVC is connected to the System:

By adding SVC to the secondary of the transformer, reactive power is compensated in the bus 3 hence increasing the power quality of the system.

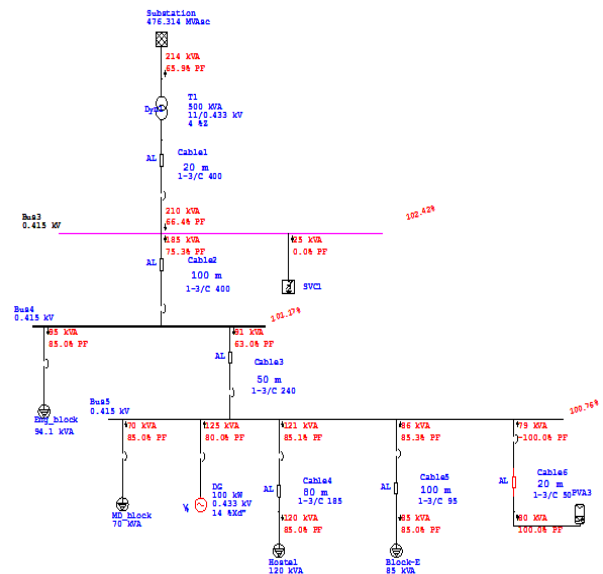


Fig. 5 : Load Flow Analysis of grid connected PV system with SVC.

Reactive Power	At Bus 3
Without SVC	186
With SVC	210

Table I: Reactive power compensation with and without SVC

VII. CONCLUSION

This review has provided brief information on power quality issues for the solar power plant and its improvement using SVC. Most of these authors considered the grid connected issue of three phase system like power stability, phase balancing, voltage stability, harmonics and power factor. Most of the techniques focus on the developing ETAP simulation of the power quality of the solar plant. Considering the different existing methods of the solar off grid connected power plant for power quality improvement as above and advantages and limitations. Also, it is low cost and can be indigenously developed. However, the total power quality improvement for harmonics distortion, power factor correction, over voltage and current protection, economics, durability, reliability, etc. of its components is required to be tested.

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