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Research emerges through systematic process of enquiry or investigation. It aims to either find out something very new or verify the existing knowledge.

Nowadays, Research has become an important component of higher education institutions. The academic fraternity should dwell into various research activities both to rejuvenate and update them and to bring laurels to the parent institution.

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The journal publishes articles in all the subjects within the perimeter of Sciences (Physics, Chemistry, Zoology, Botany, Plant biotechnology, Mathematics, Geography, Computer Science) and Arts, humanities & languages (History, Tamil, English, Economics, Commerce).

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EDITORIAL

Dear Readers,

I am delighted to inform the readers that MVM Journal of Research provides platform to the academicians to exhibit their exuberant explorations in their areas of specialization. MVM Journal of Research publishes papers with originality and high quality. The present volume of the journal contains sixteen multi-disciplinary articles which will quench the readers' thirst for knowledge. These 16 papers are arranged in the order of their receipt by the editorial board. Some papers are traditional, some are scientific, informative, effective and illuminative. Papers from various disciplines have been examined by eminent reviewers which will add additional strength to the quality of the journal. One of the most interesting things about the journal is the broad diversity of its brain power. The Editorial Board is thankful to the respected Principal Dr. P. Parvathi and the meritorious faculty for their encouragement which will make the Board to work with more enthusiasm.

December 2017
Dindigul.

Chief Editor

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CLUSTER FORMATION BASED BROADCAST EXPENSES CONTROLLING IN MANET

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ABSTRACT

A Mobile Adhoc Networks (MANETs) is a group of autonomous mobile wireless nodeswithout a fixed infrastructure used for communications during emergency situations like disaster management and military deployment. New members can join and leave the network at any time.Due to this mobility nature of the MANET, the nodes state informationchanges frequently and finding a channel schedule for the nodes in the network becomesdifficult. The channel bandwidth and battery lifetime are the two resources to beoptimized to improve the performance of the MANET and it is importantto study the effect of different transmission power levels on the performance of theMANET.This has drawn much attention for research, due to its adhoc nature. This leads to the design of logical clusters, wherethe cluster heads in every cluster play the role of base station and also form of thevirtual back bone for routing the packets in the network. As MANET is very much used foremergency communication, this network should meet with this challenges and it must toleratethe faults occurred due to node death and link failure. In this paper, proposed a new routing algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) for energy efficient path between sender and receiver. This proposed CFBEC algorithm provides better performance compare to existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm and also increasing throughput, reducing end-to-end delay with number of nodes, transmission range, and mobility is increased.

Keywords: Broadcasting, Clustering, Routing, Neighbour Coverage, Throughput.

I. INTRODUCTION

A Network facilitates the distribution of files and informationbetween multiple computers. Computer networks can be interconnectedthrough either Ethernet cables or using wireless cards that send and receivedata or wireless medium like air. An Ad hoc network establishes a linkbetween various nodes without any base station.Mobile Ad Hoc Networks (MANETs) are quickly becoming acommon mode in telecommunication because of easy deployment and fastconfiguration. These

networks use broadcasting as a method for communication, forupdating the topology, maintaining the network, giving warning messages.They consist of a group of nodes that communicate with each other over awireless medium like air without the need for any predefined infrastructure.All the nodes are working as source, router or destination. The topology ofthe network can change dynamically because the nodes move in differentdirections, leave or join it. Such change creates problems in maintaining therouting process through energy loss, delay and instability in linking. So, therouting protocol must be designed to provide energy maintenance, avoiddelay and make the link stable.

Till now, variety of routing protocols are developed for MANETs the set of applications for MANETs is numerous, starting from little, static networks that area unit affected by power sources, to large-scale, mobile, extremely dynamic networks. In adhoc networks, nodes don't have a priori information of topology of network around them, they need to find it. Mobile Adhoc Networks (MANETs) represent a replacement type of communication consisting of mobile wireless terminals wherever it's an infrastructure less IP based mostly network of mobile and wireless machine nodes connected with radio. In recent years, MANET has gained quality and much of research is being done on completely different aspects of MANET. It's an infrastructure less network having no fastened base stations. MANET is characterized by dynamic topology low information measure and low power consumption. All the nodes within the network are moving i.e. topology of the network is dynamic therefore the nodes will act each as host furthermore as router to route info excess for its use. It's well-known for its routable network properties wherever every node act as a router to forward the traffic to alternative fixed node within the network. MANET may be a wireless multihop network with none fastened infrastructure, in distinction to today's wireless communications that is predicated on fastened, pre-established infrastructure. All networking functions, like determining the configuration, multiple accesses, and routing of knowledge over the foremost acceptable ways, should be performed in an exceedingly distributed manner. These tasks are significantly difficult, because of the restricted communication information measure accessible within the wireless channel.

II. RELATED WORKS

Survey of Broadcast Expenses Controlling Techniques in Mobile Adhoc Networks have been studied and discussed fromNaeem Ahmad, et.al (2015).Performance Analysis of Broadcast Based Energy Efficient Routing Protocol for MANET Using BTSNA-DS Algorithmhave been proposed by Saraswathi, R. et. al (2018).Broadcasting Based Energy Efficient Protocol to Enhance the Routing Performance in MANET Using BTSNA-DS Algorithmhave been proposed by Saraswathi, R. et. al (2018).Energy Efficient Neighbor Coverage Protocol for Reducing Rebroadcast in MANET were discussed and analyzed from RagulRavi.Ra, et. al (2015). Enhanced Internet Accessibility for adhocnetwork with On-Demand Gateway Broadcast Strategy were studied and

discussed from HuaqiangXu, Lei Ju, and ZhipingJia, (2015). An efficient broadcast-based information transfer method based on location data over MANET were discussed from Yosuke Totani, et. al (2016). Network resource efficient routing in mobile ad hoc wireless Networks have been discussed from Ahyoung Lee, and Ilkyeun Ra, (2015). Performance analysis of an extended grid based broadcast algorithm in mobile ad-hoc networks have been discussed nad analyzed from AbderezakTouzene, et al (2015).Performance comparisons of routing protocol in MANET were discussed from Prabu, K., et.al, (2012).Energy efficient routing in MANET through edge node selection using ESPR algorithm were discussed and analyzed from Prabu, K., et.al, (2014).Cluster based controlling of route exploring packets in ad-hoc networks were investigated by Hussain, S.Z., and Ahmad, N., (2014). Energy evaluations of AID protocol in Mobile Ad Hoc Networks were studied by M. Bakhouya, J. (2015).Approaches for Engineering Adaptive Systems in Ubiquitous and Pervasive Environments were studied and discussed by M. Bakhouya and J. Gaber (2015).Energy Efficient Probabilistic Broadcasting for Mobile Ad-Hoc Network have been proposed by Sumit Kumar, and Shabana Mehfuz1 (2016).Broadcasting Mechanism with Less Flooding Packets by Optimally Constructing Forwarding and Non-Forwarding Nodes in Mobile Ad Hoc Networks have been proposed by R. Reka, and R. S. D. Wahidabanu (2014).

III. PROPOSED CONCEPT

A graph $G = (V, E)$ is used to model the ad hoc network in which V, E is a finite setof nodes and bidirectional edges that connect the nodes. Cardinality defined as thenumber of elements in a particular set. The cardinality of set V is constant, but thecardinality of set E is not constant, since it depends on the nodes mobility. Eachnode v_i?v must have unique identity, mobility v_{mob}, and the largest transmissionrange v_{tr}. The node $v_i$is within the transmission range of $v_j$if dist $(v_i, v_j)<v_{tr}$.
Where,

V_{mob} - is the mobility of the node
V_{max} - is the maximum mobility of the node
V_{tr} - is the transmission range of the node

The mobility of the nodes is increased or decreased as per requirements, but a node can have maximum mobility of v_{max}.The weight of each node is calculated using the mobility and the remaining battery power.At the first stage a volunteer cluster head choice function is called.The energy drain rate of the cluster heads was very high. The cluster head re-election process is called when the battery level of the cluster head falls below 20% of threshold value in order to keep up alanced energy level in all the nodes.

Objective of broadcasting techniques, an optimized strategy of blind flooding is broadcasting in which only intended nodes receive the query packet. It is an essential technique to discover the desirable route for data transmission. This technique has multiple objectives in the route discovery

phase which are common for every routing protocol.In MANET nodes are keeping moving and communicate with each other in wireless link. In clustering scheme the network is divided into chunk of nodes known as Clusters where one node in each cluster act as a Cluster head which is used for Routing. Mainly we used creation of cluster and election of cluster head algorithm. The Cluster creation algorithm we check that node is in the communication range or not. If present in range then node will be added otherwise not added. For each node less distance is efficient. The cluster information is maintained by each node. The cluster information is very important. This information keeps track of the all necessary information for clustering algorithm. When updating the information, a node can determine its own status by exchanging cluster information with its neighboring nodes. The cluster information is used for cluster maintenance and routing. Each node maintains neighbor tables that contain Unidirectional and Bidirectional neighbor table. The information stored in neighboring table.

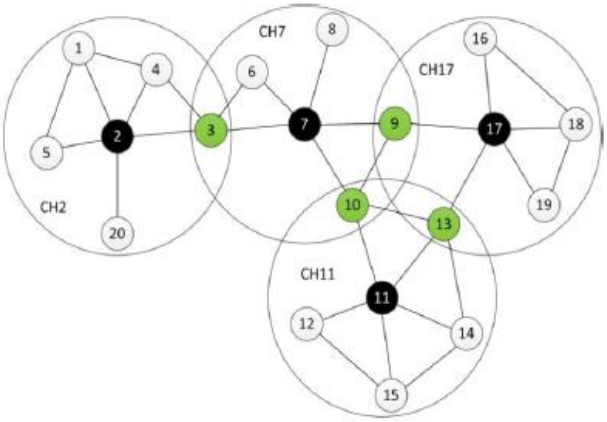

Figure 1 : Clustering in MANET

Cluster Formation: In this method, every node in the network broadcast a hello packet which contains no. of neighbors, energy, hierarchical level & cluster head id. Initially id of cluster head, hierarchical level and no. of neighbors of nodes are blank.

Cluster Head: The cluster is coordinator of the cluster. The cluster head forward the packets. Resource management function performed by cluster head for its members & for intra-inter communication. It acts as a base station in the structure. The cluster head shows in (fig.1)with dark filled circle.

Gateway Node: It is non-cluster head node. Gateway node contain inter cluster links. It can access neighboring clusters. It exchange the cluster related information. It acts as an access point between two clusters.There are two types of gateway nodes:

Ordinary Gateway (OG): node which lies within the transmission range of two cluster heads. The cluster head use hops that away from its neighbor and transmits them between the nodes.

Distributed Gateway (DG): node uses the hops that away from its neighbor and both clusters can communicate with each other.

Algorithm for Cluster Formation based Broadcasting Expenses Controlling (CFBEC):

The proposed algorithm is broadcast expenses controlling to find the path using clusterformation functionalities. The below steps are thatconsider in our proposed algorithm.When node receives RREQ request then it doesfollowing steps:

Step 1: Create a cluster in the entire network.
Step 2: Collect information about neighbor node in each cluster.
Step 3: Selectthe Cluster Head(CH) in each clusterwhich contains maximum power.
Where, CH = Cluster Head, N_D = Node Degree, N_{BP} = Node Battery Power,
N_{TP} = Node Transmission Power, and N_S = Node Stability.
Step 4: Each Cluster Head(CH) keep neighbour nodesinformation to forward thepacket to neighboring CH.
Step 5: Source node sends RREQ request to all CHthat are located in the cluster.
Step 6: After receiving RREQ then CH forward RREQto each CH in the network.
Step 7: Check destination node in the network, If yes go to Step 8, otherwise go toStep 9.
Step 8: Broadcast RREQ.
Step 9: Reject RREQ.
Step 10:RREP send to the source from destination.

In the above algorithm executes based on the cluster formation for efficient broadcast to find the path from source to destination and also hop1, hop2 and so on until reach the destination.

IV. RESULTS AND DISCUSSIONS

The performance of the proposed scheme is evaluated using Network Simulator version 2 (NS2). Some of the basic assumptions (Table. 1) made for the simulations are the mobile adhoc networks works in a secure environment and thus not prone to any sort of attack, each of the mobile nodes has a maximum battery power that a mobile node in a MANET could offer since it has to be

used in the military battlefield which may require a high backup to sustain for a longer duration of each and every node has enough memory to store a copy of the token being circulated. Since any node can become a primary or secondary cluster head has to recover the token and circulate it under situations of token loss. With the assumption of the following parameters are chosen for the simulation environment.

Table 1: Simulation Parameters.

Parameters	Values
Simulation	NS-2
MAC Layer Protocol	IEEE 802.11
Mobility Model	Random Waypoint
Terrain Range	1,000 X 1,000 m2
Transmission Range	250 Meters
Examined routing protocol	CFBEC
Channel Bandwidth	2 Mbps
Speed	10-20 m/s
Application Traffic	CBR
Simulation Time	500 s
Propagation mode	Free space
Data Packet size	512 bytes
Packet rate	2 packets/s
Number of Nodes	20–100

The following performance metrics to evaluate through networks simulation (NS2):

1. Throughput: Throughput is the number of bytes or bits per seconds arriving at the time interval t. It is generally measured by kilo bits per second (kbps) or mega bits per second (mbps).

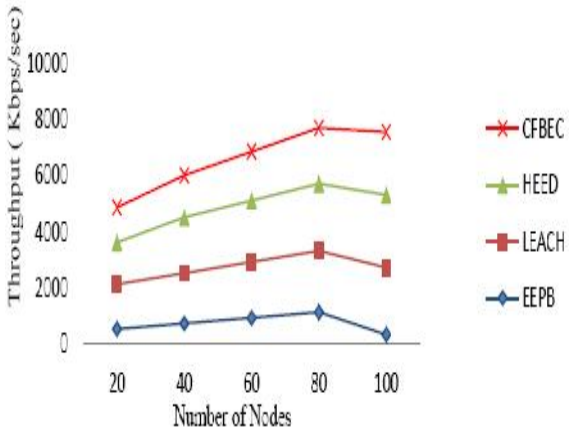

Figure 2 : Throughput (kbps) Vs. Number of Nodes.

In this part, performance analysis of proposed algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) and existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm. In Fig. 2 the proposed CFBEC algorithm provides better performance compare to existing HEED, LEACH, and EEPB algorithm and also increasing throughput (kbps) with number of node is increased.

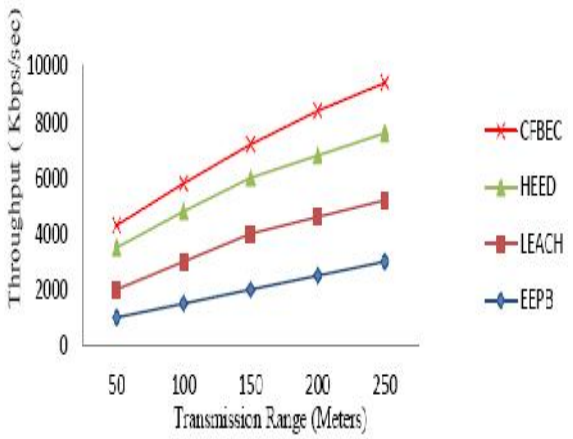

Figure 3 : Throughput (kbps) Vs. Transmission Range (Meters).

In this part, performance analysis of proposed algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) and existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm. In Fig. 3 the proposed CFBEC algorithm provides better performance compare to existing HEED, LEACH, and EEPB algorithm and also increasing throughput (kbps) with transmission range (meter) is increased.

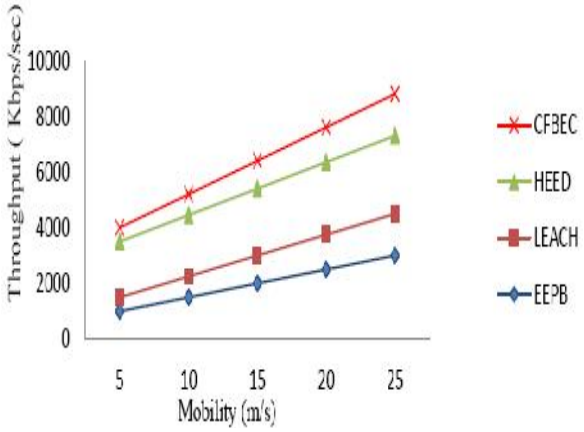

Figure 4 : Throughput (kbps) Vs. Mobility (m/s).

2. **End-to-End Delay:** delay is number of bytes or bits per seconds at time interval t.

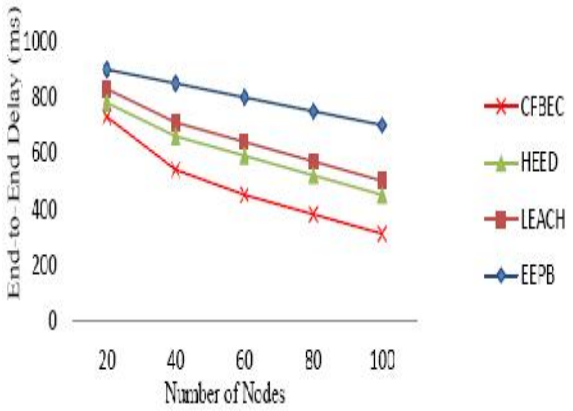

Figure 5 : End-to-End Delay (ms) Vs. Number of Nodes

In this part, performance analysis of proposed algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) and existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm. In Fig. 5 the proposed CFBEC algorithm provides better performance compare to existing HEED, LEACH, and EEPB algorithm and also reducingend-to-end delay (ms) with number of node is increased.

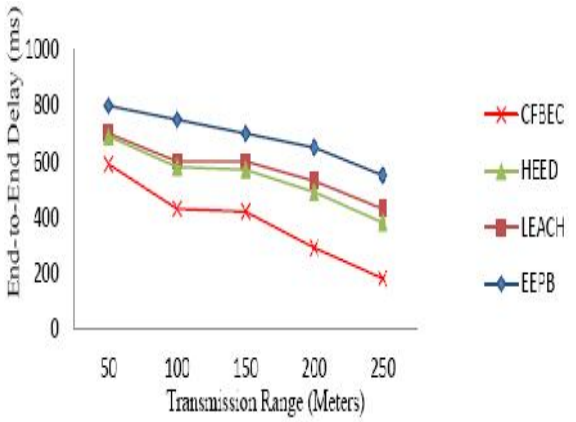

Figure 6 : End-to-End Delay (ms) Vs. Transmission Range (Meters)

In this part, performance analysis of proposed algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) and existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm. In Fig. 6 the proposed CFBEC algorithm provides better performance compare to existing HEED, LEACH, and EEPB algorithm and also reducing end-to-end delay (ms) with transmission range (meters) is increased.

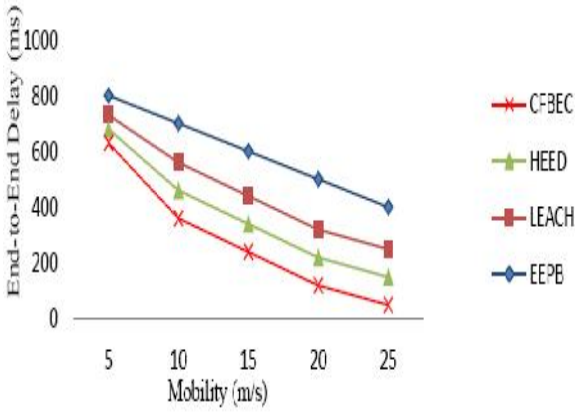

Figure 7 : End-to-End Delay (ms) Vs. Mobility (m/s)

In this part, performance analysis of proposed algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) and existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm. In Fig. 7 the proposed CFBEC algorithm provides better performance compare to existing HEED, LEACH, and EEPB algorithm and also reducing end-to-end delay (ms) with mobility (m/s)is increased.

V. CONCLUSION

Mobile Adhoc Networks (MANETs) are considered as the most active research areas inthe recent trends in networking communication world. Mobile Adhoc Networks (MANETs) are thewireless infrastructure in which the nodes in the MANET do not haveany fixed infrastructure and communication happens in the ad-hoc manner.In MANETs nodes communicate with the adjacent nodes within the radiorange and use multihop communication for long distances.The infrastructure less networks and mobile networks are energyconstrained, but no limitation at the base station. In this paper, proposed a new routing algorithm named Cluster Formation based Broadcasting Expenses Controlling (CFBEC) for energy efficient path between sender and receiver. This proposed CFBEC algorithm provides better performance compare to existing Hybrid Energy Efficient Distributed (HEED) clustering algorithm, Low-Energy Adaptive Clustering Hierarchy (LEACH), and Energy Efficient Probabilistic Broadcasting (EEPB) algorithm and also increasing throughput, reducing end-to-end delay with number of nodes, transmission range, and mobility is increased.

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HEALTH CARE SERVICES UNDER PRIVATIZATION AND ITS IMPACT ON RURAL WOMEN

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INTRODUCTION

Proper health Care is essential for an individual to lead a full, healthy and productive life. Only a productive life contributes to the sustainable economic growth and development of country and it ensures a better quality of social life and peace. Health care is in two level, and institutional or government level. The individual level means how the individual care her body and institutional level denote what are the facilities provided by the governments and private institution to women and how they utilize it.

RURAL WOMEN AND HEALTH CARE

Rural areas in India are under developed both economically and socially. Rural health care has been a perpetual problem in India. The fundamental issues concerning women and their health care are nutrition, sanitation, infections, overwork, work hazards, stresses, mental tensions, pregnancy, child birth and social harassment. In any society, women's health and their active involvement in health care programmers are essential keys to the general health of the community. This is because, quite aside from their own special health problems, women customarily do most of the services for their family members. Women in rural areas, because of their household responsibilities tend to neglect their illness until they become too sick to move around and perform household chores. Although women suffer from grater incidence of poor health and illness the traditional social system favors the health case of male members. Women patients are usually brought into hospital when the disease is at an advanced stage.

PRIVATIZATION IN HEALTH CARE

A burning issue in the health sectors in recent years is the privatization of health care. As a result of political and economic changes in most countries, there is a marked reliance on the market section. These trends are also seen in education and health the traditional domains of public sector. Due to the Lack of financial resources and poor quality of public services, governments feel that a

policy of privatization in the health care sector may not only free government resources, but may also improve the quality of services, since private providers are expected to have better incentives to provide good quality services to their customer.

Rural women face. High risk of nutrition retardation in growth and development, disease, disability and even death at three critical stages in their lives – infancy early childhood and reproductive phase, by and large, these women seek medical aid from private clinics But this is not an easy going affairs for them as private medical services are very expensive. But the poor women go to private clinics, not because they can afford the expense but a member of other factors.

COST OF HEALTH CARE

The important feature of health care system in India is that even visits to public facilities generally involve considerable out of pocket expenditures. These expenditures take the form of payment for medicines, laboratory tests, dressing linen and as direct payment to providers. This happen as medicines are often out of stock at public health facilities and patients have to approach the market for medicines as well as tests.

Next is the poor quality of health care available in the public sector. This is consistent, with large short falls in personnel, equipments, and medicine in public facilities reported in primary health centers and sub-centers. The poor quality of public facilities as one of the most important reason behind the rural women health care in private sectors and it result in the cost of health care increase.

Health care costs cuts rural women's households budgets in two ways Not only do they have to spend a large amount of money and resources on medical care but they also unable to earn during the period of illness. The poor have to borrow funds at a high interest rate to meet both medical expenditure and other household consumption needs, which carries them in to indebtedness, more than 40 percent of individuals, who are hospitalized in India in one year, borrow money or sell assets to cover the cost. The burden of treatment is particularly high on them when seeking in patient care. Many rural women do not seek health care because high cost involved. Those who avail of treatment pay a large proportion of their annual income. Hospitalized Indians spend more than half of their total annual expenditure on health care one possible consequences of this high medical expenditure could be the pushing of these rural women families into zone of permanent poverty. Almost one quarter of hospitalized Indians fall into poverty every year.

PRIVATIZATION OF HEALTH INSURANCE

The new economic policy and liberalizations process followed by the government of India has paved the way for privatization of the insurance sector in the country. Health insurance which has remained highly under developed and less significant. The privatization of health insurance raises several issues not the best being fears that if not regulated effectively, entry of private companies in health insurance could lead to adverse effects on care, equity and consumes satisfaction, fraud and deterioration in ethical standards . On the other hand, Properties of privatization claim that improvements in standards will occur as a result of competition and there will be a wider choice for the consumer with flexibility and cost effective packages, lower premium and claim settlement would be smoother and faster. But we relate this to rural women, the enormous financial burden arises because the poor are benefit of any safety nets like health insurance. A large majority of the rural especially rural women population mostly working in the informal section, remain outside the health insurance systems and thus have low protection from risk. And we must think how we can include them in health insurance system.

Insurance agencies are most important financial intermediaries who mobilize funds from the employees, government and house- holds and helps to finance the high cost of treatment in times of need.

CONCLUSION

Rural women are unable to access health care facilities, because of their poor purchasing power. It is mainly due to their weak asset base. Though enhancing their purchasing power is the desirable solution, the present economic system does not have the capacity to do so. So the economic system must bring changes for the benefit of rural women.

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ISOLATION, CHARACTERIZATION AND ENUMERATION OF EFFICIENT MICROORGANISMS IN TERMITE MOUND MATERIALS

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ABSTRACT

This work highlights the isolation, identification and characterization of beneficial microbial population in ten different termite mound materials. As major eco-engineers in tropical ecosystems, termites build biogenic structures with galleries, sheeting's, fungus-comb chambers where the diazotrophs influence nitrogen fixation altering soil mineralogy. Nitrogen fixers strongly influence the physical and chemical properties of soils there by SOM gets altered. In dry land ecosystems, termite mound materials (TMM) are used to enhance soil fertility thus mound soil acts as hotspots for primary production.

INTRODUCTION

Termites are the dominant arthropod decomposers in tropical ecosystems. Termites are major components of detritivore macrofauna feeding on a whole range of living, recently dead plant material in various stages of decomposition (Wood, 1988). Among the soil invertebrates, termites act as ecosystem engineers (Jones *et al.* 1994) which have profound effect on promotion of litter decomposition and the formation of stable pools of soil organic matter.

Termites perform several activities that qualify them as soil engineers. Free living N_2-fixing bacteria are found to be associated in termite gut and mound soil. Biological nitrogen fixation offers a non polluting source of nitrogen and can improve crop production and decrease the global use of synthetic fertilizers. Besides this, termite mound material (TMM) can be used as organic resources to improve soil productivity. It can also counteract land degradation through their soil borrowing and feeding activities.

MATERIALS AND METHODS

Isolation enumeration and characterization of indigenous isolates of *Azotobacter, Beijerinckia, Derxia* sp, Actinomycetes and heterotrophs from different termite mound material

(*Trinervieus trinervoides* and *Odontotermes obesus*) in the vicinity of various blocks of Dindigul district , TamilNadu, India were carried out. The population of the different groups of microorganisms such as bacteria and actinomycetes in various samples were enumerated using standard plate count method (Kannan and Rao, 1996) .

One gram of material from each termite mound soil were suspended in 99 ml of sterile distilled water in a 250 ml Erlenmeyer flask and shaken vigorously for 30 minutes with orbital shaker incubator at 150 rev / min at 24°C to form a uniform solution of 10^{-2} concentration and served as master stock. This stock was subjected to serial dilution with sterile distilled water using a sterile pipette to form 10^{-3} to 10^{-7} concentration. One ml of dilutions 10^{-3} / 10^{-4} were pipetted out to sterile petri plate for the enumeration of bacterial count; the same was repeated with dilutions of 10^{-5}/ 10^{-6} for actinomycetes . The media and growth condition used for the enumeration of Total Colony Forming Units (CFU/ml) of bacteria and actinomycetes are given as follows

Table 1: Media and growth condition

Sl. No.	Microbial group	Isolation media	Dilution factor	Growth temperature (°C)	Period of incubation (in days)
1	*Azotobacter*	Waksman	$10^{-3}/10^{-4}$	37°C	7
2	*Beijerinckia*	Jensens	$10^{-3}/10^{-4}$	37°C	5
3	*Derxia*	Cample's and Doberneir's	$10^{-3}/10^{-4}$	37°C	5
4	*Actinomycetes*	Kenknight's Agar	$10^{-3}/10^{-4}$	37°C	5-7
5	Heterotrophs	Soil extract agar	$10^{-5}/10^{-6}$	37°C	2-3 days

After incubation counts of each microbial groups were noted, average counts and the total population per ml of sample were calculated. The microbial population was expressed as Colony Forming Units (CFU / ml) of the sample. The distinct viable colonies were picked and restreaked on to appropriate agar medium to obtain pure cultures. Each isolate showed its characteristic growth, pigmentation and biochemical reactions. All the bacterial and actinomycetes isolates were identified through morphological and biochemical characteristics. The parameters investigated include colony morphology, gram's reactions, motility, acid production, methyl red reaction, green fluorescent. Voges Proskaur (VP) reaction, catalase reaction, cellulose activity and starch hydrolysis. (Apun., 2000). The test results were compared with that of Bergey's Manual of Determinative Systematic Bacteriology (Holt et.al, 1987) for identification of bacterial and actinomycetes isolates.

RESULTS AND DISCUSSIONS

The isolation, characterization and enumeration of efficient microbes like diazotrophs from termite mound material (TMM) of different species are given in table no. 2 and 3. The total colony forming units of diazotrophs varied across the different samples.

Table 2 : Characterisation of diazotrophs isolated from termite mound material

Colony characters.	*Azotobacter* sp	*Beijerinckia* sp	*Derxia* sp
Cell shape	Ovoid ,rod or cocci appears in pairs	Straight rods with rounded ends	Rods
Colony character	Smooth opaque, convex circular gummy colony with undulate margin	Smooth irregular folded glistening and raised colony with tenacious elastic slime.	White to brown. extremely tenacious growth
Cell size	2 x 1.5µm	2x1 µm	1.0-1.2 µm
Gram reaction	G-ve	G-ve	G-ve
Flagella	Peritrichous	Peritrichous	Peritrichous
Motility	+	+	+
Green fluorescent	+	+	-
Acid production	+	+	+
Cellulose hydrolysis	-	-	-
Starch hydrolysis	+	+	-
Glucose utilization	+	+	-
Sucrose utilization	+	+	-
Maltose utilization	-	-	-
Biotin requirement	-	-	-
Cyst formation	+	+	-
Polysaccharide production	+	+	+

The population of *Azotobacter* sp registered a maximum in TM4, TM5 and TM3 of 8.37 ,8.17 and 8.15 (x10^3 CFU/g) respectively. The population of *Beijerinckia* registered a maximum of 5.67, 5.2 and 5.13 (x10^3 CFU/g)in TM4, TM3 and TM5 material. The *Derxia* load (x10^3 CFU / g) varied from 1.7 to 2.87 in different termite mound analysed. Compared to *Azotobacter* and *Beijerinckia*, *Derxia* load was lesser than other diazotrophs. Highest number of *Azotobacter* and *Beijerinckia* population were recorded in TM5 and TM4. Likewise, the actinomycetes population

registered a maximum load of 12.38 ,12.23 and 12.12 (x10^3 CFU / g) in TM5, TM3 and TM4 respectively. The heterotrophs population were maximum in TM5 and TM3 with 41.67 and 40.27 (x10^6 CFU/g). On analysis, the TM4, TM3 and TM5 were found to possess a maximum diazotroph and microbial load than other mound samples.

Table 3 : Enumeration of microbes isolated from different termite mound at various selected sites

Termite mound	*Azotobacter* sp × 10^3	*Beijerinckia* sp × 10^3	*Derxia* sp× 10^3	Actinomycetes × 10^3	Heterotrophs ×10^6
TM1	5.10 ± 0.20	4.37 ± 0.12	1.23 ± 0.17	9.50 ± 0.01	26.77 ± 0.14
TM2	6.43 ± 0.12	3.60 ± 0.36	1.37 ± 0.12	9.45 ± 0.02	29.77 ± 0.12
TM3	8.15 ± 0.12	5.20 ± 0.08	2.57 ± 0.12	12.23 ± 0.02	40.27 ± 0.12
TM4	8.37 ± 0.12	5.67 ± 0.12	2.87 ± 0.12	12.12 ± 0.07	38.07 ± 0.05
TM 5	8.17 ± 0.12	5.13 ± 0.12	2.50 ± 0.08	12.38 ± 0.04	41.67 ± 0.12
TM 6	4.63 ± 0.17	2.17 ± 0.12	1.35 ± 0.01	10.17 ± 0.15	34.17 ± 0.24
TM 7	6.57 ± 0.12	4.43 ± 0.12	1.17 ± 0.12	8.86 ± 0.01	27.57 ± 0.34
TM 8	5.47 ± 0.12	ND	1.47 ± 0.12	8.23 ± 0.01	26.17 ± 0.12
TM 9	5.47 ± 0.12	1.80 ± 0.08	ND	8.77 ± 0.12	24.30 ± 0.08
TM 10	4.23 ± 0.12	2.67 ± 0.12	1.77 ± 0.12	8.10 ± 0.01	25.60 ± 0.36

ND - Not detected Values are mean ± standard error (n = 3)

Microorganisms are the dominant biotic structural components in soil and have higher biomass specific activities. The list of N2 fixing bacteria associated with non legumes includes species of *chromobacter*, *Acetobacter*, *Azotobacters*, *Beijerinckia*, *Bacillus*, *Enterobacter*, *Erwinia*, *Derxia* and *Rhodospirillum* (Wani,1990). Although many genera and species of N_2 fixing bacteria are isolated from the rhizosphere of various cereals, mainly members of *Azotobacter* and *Azospirillum* genera have been widely used to increase the yield of cereals and legumes in green house and under field conditions.

Diazotrophs are found in a wide variety of habitats including free living forms in soils, water, termite mound material (TMM), cyanobacterial symbioses with various plants and root nodule symbiosis with legumes (Dixon and Kahn, 2004). *Azotobacter* is a free living nitrogen fixing bacterium, which is used as a biofertilizer in the cultivation of most crops. It has several metabolic capabilities with highest metabolic rate to fix 20-60 kg nitrogen per hectare of land annually. *Azotobacter* is the most common biofertilizer for plants like maize, wheat, sorghum and rice which produces some plant growth promoting metabolites, nutrients to plants, enzymes, different growth hormones like IAA, auxins, gibberllins, cytokinins , vitamins and siderophores. It is probable that non symbiotic nitrogen fixers of the microbial population are widespread and abundant in termite mound material (TMM) which accounts for higher nitrogen fixation and crop yield.

CONCLUSION

Non symbiotic diazotrophs in termite mound can promote economic and environmental benefits including increased income from high yield, reduce fertilizer cost and reduce leaching of NO_3 to ground water. In this regard, diazotrophic diversity of termite mound material (TMM) and characterization are keys to understand the significance of nitrogen fixers as biofertiliser. Various environmental determinants and factors inherent to termite biology influence microbial distribution and play a role in ecosystem processing influencing soil fertility by providing beneficial role in agriculture.

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ROLE OF WOMEN FISHER FOLK IN FISHERY ACTIVITIES IN TUTICORIN DISTRICT OF TAMILNADU

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INTRODUCTION

India is endowed with a wide diversity of water resources, which sustains a large fisheries sector in the country. With a coastline of 8,118 km, the country ranks third in total world fish production and second in inland aquaculture. India contributes nearly five percent towards global fish production. Marine fisheries sector in India provides a gainful source of employment, income and livelihood to the million of fisherfolk, who support the fishery economy of the country. The socioeconomic profile and livelihood status of these fishermen assumes paramount importance in designing fishery developmental programmes for augmenting the fisheries production and raising the economic status of people involved in this sector.

Women play a key role in the development of fisheries sector in addition to their role of sole household managers in most fisher families. The contribution of the fisherwomen penetrate every aspect of post-harvest handling, preservation, processing and marketing of seafood products and provide an integral link between producers and consumers. Women, who constitute approximately half of India's population, play vital role in the operation of the fisheries and their continuing growth as a component of the agriculture sector of the economy. The irregularities in the earnings pattern of their man counterparts, coupled with need for livelihood sustainability forces most of the women to earn from a variety of fisheries activities. According to Marine Fisheries Census 2010, nearly 81.8 percent of the fisher folks engaged in marketing of fish were women. About 88.1 percent of the fisher folks engaged in curing and processing were women. About 89.6 percent of the fisher folks engaged in peeling were women. Empowerment of fisher women and gender equality are the significant issues in the globalized economy.

REVIEW OF EARLIER STUDIES

Krishna Srinath (1987) observed that, women in general are hopeful of improving their lives through the development of fisheries activities in the inland and show readiness to acquire new skills and undergo training for the same. But poverty and to certain extent, ignorance have hampered their progress. Ashalatha et.al (2002) analysed the changing role of fisherwomen of India and pointed out that women in value adaition sector indicated low price for products and lack of

assured markets as main constraints. Swathilakshmi (2011) found that the variables like annual income, scientific orientation, annual expenditure, annual debt and annual savings were found to have a positive and highly significant relationship with the livelihood index of fisherwomen. Vijaya Khader and Sathiadhas found that about 60 percent of fisherwomen carried out post-harvest activities to earn income. Food expenditure comprised 60.68 percent of the earned income contributing to the major share of the spending.

STATEMENT OF THE PROBLEM AND SIGNIFICANCE OF THE STUDY

Much of India's national food security rests on the shoulders of its fisherwomen. Affording comprehensive care for these women is correct in principle and a practical necessity of India's fishery sector is to be satisfactorily sustained and the fisher women empowered both socially and economically. India is an agrarian economy and women are playing a significant and crucial role in it. In agriculture, their contributions are at least quantified and are found to be about 50 percent, where as in the carse of fishers on their role is not recognized and quantified. This study aims at bring out the role of the her women in fishery activities. as in fisheries, their picture is not visible and their cry is not louder enough to catch the attention of the outer world. Debt servicing is a serious problem faced by the women fisher folk. They got loan mostly from the non-institutional sources .They are exploited by the exorbitant interest rate of money lenders. The fisher women are often denied credit from public sector institutions due to lack of ownership of assets.

Increased competition, declining resources and difficult working conditions make their work as challenging. The seasonal nature of the employment in the fisheries sector displays a distorted picture about the percapita earnings of fisher folk and this is quite correlative with their poverty status. The problem is more acute for the women stakeholders mainly due to the prevalence of wage disparities favouring man. Although women contribute in all spheres of development both at micro and macro level, it is approximately quantified or recognised. So it is essential to analyse the role of women in fishery activities. Empowerment of fisher women will lead to socio-economic development of fishermen society. assumes its-significance.

OBEJCTIVES OF THE STUDY

The present study has the following objectives.

- To analyse the role of women fisher folk in fishery activities.
- To find out the problems faced by the women fisherfolk.
- To provide solutions on the basis of findings

MATERIALS AND METHODS

Tuticorin is one of the maritime districts in Tamil Nadu. Tuticorin disstrict enjoys a unique position along the Gulf of Mannar in the east coast of India in view of the facilities available for the development and exploitation of the marine fisheries of the nation. Tuticorin is traditionally known for its pearl fishing and shipping industries. In Tuticorin District, there are 21 fishing vi1lages.Out

of these 21 villages, 5 villages were selected on the basis of random sampling method.. 150 fisherwomen were selected on the basis of simple random sampling method, from the selected villages. Field survey method was adopted for data collection. Field survey was administered through well structured interview schedule.

RESULTS AND DISCUSSIONS

Table 1 : Socio-economic status of fisherwomen

Parameters	No. of fish fisherwomen	Percentage
Age		
Below 30	20	13.33
31-40	60	40.00
41-50	45	30.00
Above 50	25	16.67
Total	150	100.00
Education		
Illiterates	55	36.671
Primary Education	45	30.00
Higher Education	30	20.00
Higher Secondary	20	13.33
Degree and above	NIL	NIL
Total	150	100.00
Type of Family		
Nuclear	140	93.33
Joint Family	10	6.67
Total	**150**	**100**
Size of Family		
Less than Four	71	47.33
More than Four	79	52.67
Total	**150**	**100**

Source : Primary Data

From the analysis of socio-economic status of fisherwomen, it is revealed that illiteracy prevails among the fisherwomen.

Majority of the fisherwomen are in the middle age group and majority of them are earning below Rs.4000 .This shows the poor earninggs of the fisher women. 93.33 percentage of the sample fisherwomen are living in nuclear family.Joint family system is tend to decrease,

ROLE OF WOMEN IN FISHERY ACTIVITIES

The present study identified the role of women fisherfolk in fishery activities. Prawn peeling, fish curing, drying, marketing and net making and repairing are the major areas of women's participation in fishery activities.

PRAWN PEELING

Peeled prawn is an important item of foreign exchange. Prawn peeling is. a seasonal activity, related with prawn fishery season . Prawn yields a sizeble amoout of foreign exchange. Peeling does not require any special skill. Peeling is carried out under the supervision of the agents who distribute weighed quantity of prawn among the women. In the sample selected 23.33 per cent of the women are found to be participated in prawn peeling.

CURING DRYING AND TRADING OF FISH

Curing, drying and trading of fish are the other activities carried out by women... Curing of fish is practiced on the seashore with the help of a few women. Drying of fishes is done in seashore or nearby the houses of the fisher women. Marine fisher women are also engaged in trading of fresh fish and dry fish as vendors. The participation of women in curing, and drying and in trading is 20 and 30 per cent respectively.

NET MAKING AND REPAIRING

Net making is a leisure time activity. Net mending is done by men during their leisure. The cotton and silk threads have been replaced by nylon yarn and braiding of nylon net for boats is the most important activity. The net making by women is reported to be decreasing with the introduction of nylon net factories. Women are also indulging in repairing the net. 6.67 per cent of women are engaged in this activity.

PROCESSING PLANT WORKERS

Another area, in which the fisher folk are working, is processing plant. In the processing plants fishes are processed and tinned. Fishes are exported from these processing, plants to various countries. In this activity, 20 per cent of fisher women are engaged.

Table 2 : Fishery Activities of women fisherfolk

Activities	No. of fish fisherwomen	Percentage
Prawn Peeling	35	23.33
Drying and curing	30	20.00
Fish Trading	45	30.00
Net making and repairing	10	6.67
Processing Plant workers	30	20
Total	150	100

Source: Primary Data

PROBLEMS FACED BY FISHER WOMEN

- Since most of the fishes marketed by women fish vendors are low value fishes, the intrinsic problems like lack of infrastructure, and basic amenities invariably affect the marketing of low value fishes.
- Low Value fishes are mainly preferred by a narrow spectrum of low and middle income consumers and the demand often fluctuated with season and availability. So the women fish traders are facing problems in selling of fishes.
- The fish trading women face severe competition not only from the men folk who use two-wheelers in domestic marketing but also from the agents of export companies resulting in the non-availability of quality fishes which commands high demand and price.

- Heavy expenses involved in storing of fishing and bringing the fishes to local market is an important problem faced by women fish vendors.
- Women fish traders are facing financial problems. They are exploited by the exorbitant rate of money lenders.
- Increasing cost of ice is also a problem faced by the fisherwomen.

FINDINGS OF THE STUDY

The analysis of data leads to the following findings.

- The socio-economic status of the women fisherfolk is found to be very poor. The monthly earnings of the fisherwomen are found to be very poor.
- Prawn peeling, fish trading, drying of flsh,marketing of fresh fish and dried fish and net making and repairing are imprtant areas in which the fisher women are actively playing their role.
- Poor infrastrcture,stiff competition, heavy trading expenses, increasing cost of ice, financial stiringency and exorbitant rate of interest are the major problems faced by the fisherwomen.
- House-based ventures are more prefered by fisherwomen and find suitable to thier present social fabric.

SUGGESTIONS

- Fisher women co-operative society can provide credit to fisher women at reasonable rate of interest.
- Micro finance can be provided through fisherwomen SHG’s.
- Infrastructure and transport facilities may be improved.
- Empowerment of fisher folk should be assured through education and gender equality, which gains significance in the context of ever changing technological options in marine fisheries.

- Several Mariculture technologies provide enough scope for accommodating women in large numbers women empowerment and the community development through combined effort of men and women folk require a holistic approach.
- Tamilnadu Govt can implement special welfare schemes, for the upliftment of the downtrodden fisherwomen.

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OPEN ACCESS JOURNALS AND ARTICLES ON 'GEOLOGY' : A CASE STUDY OF DIRECTORY OF OPEN ACCESS JOURNALS (DOAJ)

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ABSTRACT

Thanks to Open access movement and its widespread presence, the researchers now are able to access a good number of e-resources. The freely available journal and journal articles in very many subjects have created an intellectual vibration among academic community. The present study aims at analysing the open access journals and journal articles as listed in the Directory of Open Access Journals (DOAJ) as on 6th March, 2018. The data required for the study was downloaded from DOAJ website. The study reveals that: 90 journals and 24125 journal articles on Geology are listed in DOAJ. 14 journals have articles on Science, 6 have articles on environmental sciences, 4 on mining engineering / metallurgy, 4 on general geography. A majority of 62 journals don't charge any article processing charges. A majority of 42 journals have CC BY licence followed by 21 journals with CC BY-NC-ND and 12 with CC BY-NC. 12 journals on geology is published by Copernicus publications followed by 8 journals each from Europena Geosciences Union and De Gruyter Open. 14 journals from Germany. A majority of 79 journals are in English followed by 11 journals in Spanish and 6 journals in French. 41 journals on Geology in DOAJ follow peer review system while 27 journals follow blind peer review. 19 geology journals are added to DOAJ in 2017 followed by 18 journals in 2016 and 12 journals in 2015. The journal 'Biogeosciences" has published 37540 articles followed by 'Natural Hazards and Earth System Science' with 2739 articles. Copernicus Publicataions has published 11995 journal articles on geology followed by 1423 articles by Technical university of Kosice. A majority of 2769 journal articles of 2017 are listed in DOAJ followed by 2708 journal articles of 2015 and 2455 journal articles of 2016.

Keywords : DOAJ, open access journals, Geology license, review system, productive journals, productive publishers, preferred languages

INTRODUCTION

Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions. OA is entirely compatible with peer review, and all the major OA initiatives for scientific and scholarly literature insist on its importance. Open access journals and open access archives are very important tools to disseminate the scholarly literature among the users. The benefits of open access for authors, organization, users and society are great. Open access promotes wider accessibility of the information produced by the author.

DOAJ (DIRECTORY OF OPEN ACCESS JOURNALS)

The Directory of Open Access Journals (DOAJ) is a free service, which provides fully Open Access, peer-reviewed scholarly journals. DOAJ is a collection of peer review open access journals covering various disciplines and different languages published from different countries across the world.

DOAJ is a continuously updated, vetted list of fully OA (no embargo or delay), peer-reviewed journals, encompassing all scholarly disciplines. As of November 2016, DOAJ includes 9,201 journals from 128 countries, more than three times as many journals as were included in the 2007 DOAJ review. There is also an article-level search service for over 6,000 DOAJ journals encompassing over 2.3 million articles. Of these, 256,600 articles are identified as published in 2015 (Morrison, 2017).

DOAJ is an online directory that indexes and provides access to quality open access, peer-reviewed journals. The aim of the DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased usage and impact. The DOAJ aims to be comprehensive and cover all open access scientific and scholarly journals that use a quality control system to guarantee the content. In short, the DOAJ aims to be the one-stop shop for users of open access journals. (http://doaj.org/).

REVIEW OF LITERATURE

Stenson (2012) argued for the value of the directories, mainly focusing on two of them: DOAJ and DOAB. It provides an introduction to the services, containing a brief history and status report, and addresses the differences between OA journal publishing and OA monograph publishing. It also highlights the value of these services and discusses whether the financial models behind them are sustainable.

Koohang (2006) demonstrated that advanced technologies and the increasing acceptance of academic open access e-journals offer an opportunity to reconsider their form and function as a medium to enhance scholarly communication. The academic open access e-journal is envisioned as a platform and a portal within the context of an open source community including a format and functions that

enable it to achieve that objective. A working model for academic open access e-journals is presented. This model is intended for open source communities involved in designing, developing, and/or improving open access academic e-journals.

Kumar (2013) stated that there are many online databases available on internet that provides open access journals of various disciplines. The facility to access of these journals that is freely available on internet should be launched in the libraries. The present study deals with open access journals accessible from Directory of Open Access Journals (DOAJ) in the subject of library science. Analyzed based on country, keywords, frequency, etc., the analysis indicates that there was only one open access journal i.e. Bulletin of the Medical Library Association was available before 1990 in the field of library and information science (LIS). Only 19.04% journals have their EISSN. Almost one fourth journals were publishing on half yearly basis.

Walter (2011) examined the characteristics of 663 Open Access (OA) journals in biology, computer science, economics, history, medicine, and psychology, then compare the OA journals with impact factors to comparable subscription journals. There is great variation in the size of OA journals; the largest publishes with more than 2,700 articles per year, but half publish 25 or fewer. While just 29 percent of OA journals charge publication fees, those journals represent 50 percent of the articles in our study. OA journals in the fields of biology and medicine are larger than the others, more likely to charge fees, and more likely to have a high citation impact. Overall, the OA journal landscape is greatly influenced by a few key publishers and journals.

Hulagabali (2012) analysed the Library and Information Science (LIS) journals with the aid of bibliometric methods. The study covers year-wise, country-wise and language-wise distribution of LIS journals archived in Directory of Open Access Journals (DOAJ). The year-wise growth of LIS journals, in DOAJ, started in the year 2003 with 21 journals. Till 2009, it has archived 97 LIS journals in its database. The LIS domain stands third position, under the social science stream, out of 960 journals listed under ten major disciplines in DOAJ database. In a country-wise distribution of LIS journals, developed countries top the share. In view of language wise distribution of LIS journals, 71 journals are monolingual and only 15 journals are bilingual. Out 97 journals 40 journals are being published in English language.

Jamdade (2013) studied the directory of Open Access Journals with a special Reference to Library & Information Science. It is observed that in the world wide United States was in 1st rank with 37 e-journals, Brazil was in 2nd rank with 16 e-journals, and Spain was 3rd rank with 10 e-journals in the field of library and information science. It is also revealed that India was in 5th rank publishing 6 e-journals on library and information science. English is the most common communication language for the scientific communities in the field of Library & Information Science. It is also found that Engineering (General) Computer Science -Library & Information Science e - journals are interdisciplinary in nature.

Ambhore and Khaparde (2014) studied 57 Open Access Online Journal on Genetics as found in DOAJ. It is observed that U.S. was in 1st rank in publishing 15 e-journals followed by U.K. English is the most common communication language for scientific community. Four e-journals on Generics also published simultaneously in English, French, Germany and Turkish languages. Based on results the study suggested that Research scholars, scientists and Professionals should browse the DOAJ site and access the free online journals on their subject areas and also suggested that scientists and Research scholars should publish their research work in online open access journals for wider visibility of their research work and for greater impact factor and citation index.

Ramesh (2014) analyzed the foot Marks of LIS Journals in DOAJ and found that 150 open access e-journals are published in the area of Library and Information Science discipline by various publishers of the world. These 150 Library and Information Science e-journals have been analyzed based on the LIS journals in social science discipline, country of journal published, language of journal published, and year of journal addition to the DOAJ.

SCOPE

This study covers the Geology journals archived in the directory of open access journals (DOAJ). The data was collected on 6th March, 2018.

OBJECTIVES

The objective of the present study are :

1. **General:** To find out the number of journals and journal articles available on Geology in DOAJ as on the day.

2. **Journals :** To find out the language, licence models, publishers, year of addition, article processing charges, DOAJ seal, subjects, productive countries, review system and languages of Geology journals as listed in DOAJ.

3. **Artilces:** To find out the subjects, journal titles, journal license, publishers, languages and year of publication of journal articles.

DATA COLLECTION

The data required for the present study was downloaded from DOAJ website using the keyword ‘Geology’.

Journals Vs Articles	No.
Journals	90
Articles	24125

As on 6th, March, 2018, 90 journals and 24125 journal articles on Geology are listed in DOAJ.

DATA ANALYSIS

PART –A : JOURNALS

1: SUBJECTS

Subject	No.
Science	14
Environmental sciences	6
Dynamic and structural geology	5
Mining engineering. Metallurgy	4
Geography (General)	4
Stratigraphy	3
Physical geography	3
Geophysics. Cosmic physics	3
Geography. Anthropology. Recreation	3

Table 1 shows that out of 90 journals on Geology, 14 have articles on Science, 6 have articles on environmental sciences, 4 on mining engineering / metallurgy, 4 on general geography while 3 journals have articles on stratigraphy, physical geography and geophysics / cosmic physics, medicine.

2. ARTICLE PROCESSING CHARGES

Article processing charges (APCs)	No.
No	62
Yes	27
No Information	1

Table 2 reveals that a majority of 62 journals don't charge any article processing charges while 27 journals require payments. No information about article processing charges is available for 1 journal.

3. DOAJ SEAL

DOAJ Seal	No.
No	69
Yes	21

Table 3 shows that 21 journals have DOAJ seal on them while a majority of 69 journals don't have DOAJ seal on them.

4. JOURNAL LICENSES

Journal license	No.
CC BY	42
CC BY-NC-ND	21
CC BY-NC	12
CC BY-NC-SA	7
CC BY-SA	5
Publisher's own license	2
CC BY-ND	1

Table 4 reveals that a majority of 42 journals have CC BY licence followed by 21 journals with CC BY-NC-ND and 12 with CC BY-NC. Just one journal has CC BY-ND license.

5. TOP PUBLISHERS

Publisher	No.
Copernicus Publications	12
European Geosciences Union	8
De Gruyter Open	8
Hindawi Publishing Corporation	5
Springer	3
Elsevier	3
Universidad Nacional de Colombia	2
Taylor & Francis Group	2
Faculty of Mining and Geology, Belgrade	2
Estonian Academy Publishers	2

Table 5 shows that a majority of 12 journals on geology is published by Copernicus publications followed by 8 journals each from Europena Geosciences Union and De Gruyter Open. While Hindawi Publishing Corporation has pubished 5 journals on geology, Springer and Elsevier have published 3 journals each on Geology.

6. PRODUCTIVE COUNTRIES

Country of publisher	No.
Germany	14
Poland	8
Brazil	7
Indonesia	5
Egypt	5
United Kingdom	4
Romania	4
Spain	3
Serbia	3
Italy	3

Table 6 reveals that there are 14 journals from Germany. While 8 journals are published in Poland, 7 journals are published in Brazil and 5 journals each are published in Indonesia and Egypt. While UK and Romania have 4 journals on geology, Spain, Italy and Serbia have 3 each on geology. Just 10 countries publish 54 journals on geology.

7. LANGUAGES

Full Text language	No.
English	79
Spanish; Castilian	11
French	6
Portuguese	5
Serbian	2
Russian	2
Persian	2
Indonesian	2
Slovenian	1
Slovak	1

Table 7 shows that out of 90 journals on Geology listed in DOAJ, a majority of 79 journals are in English followed by 11 journals in Spanish and 6 journals in French. While 5 journals are in Portuguese language, two journals each are available in Serbian, Russian, Persian and Indonesian. There is just one journal in Slovenian and Slovak languages.

8. REVIEW SYSTEM

Peer review	No.
Blind peer review	27
Double blind peer review	21
Peer review	41
No information	01

Table 8 reveals that 41 journals on Geology in DOAJ follow peer review system while 27 journals follow blind peer review and 21 journals follow double blind peer review system.

9. DATE OF ADDITION

Date added to DOAJ	No.
2018	1
2017	19
2016	18
2015	12
2014	3
2013	2
2012	3
2011	8
2010	3
2009	2
2008	3
2007	6
2006	4
2005	3
2004	3

Table 9 shows that a majority of 19 geology journals are added to DOAJ in 2017 followed by 18 journals in 2016 and 12 journals in 2015. While 8 journals were added in 2011, 6 journals were added in 2007. Even one journal is added in the year 2018.

PART –B ARTICLES

10. SUBJECTS

Subject	No.
Environmental sciences	4864
Life	3754
Ecology	3754
Geography. Anthropology. Recreation	2753
Environmental technology. Sanitary engineering)	2739
Mining engineering. Metallurgy	2320
Science	2093
Dynamic and structural geology	1640
Geography (General)	843

Table 10 reveals that out of 24125 journal articles on Geology listed in DOAJ, 4864 are on environmental sciences, 3754 articles each are on life and ecology. While 2753 articles are published on geography, anthropology, recreation, 2739 articles are published on environmental technology. 2320 articles are published on metallurgy while 1640 articles are published on dynamic and structural geology.

11. JOURNAL TITLES

Journal title	No.
Biogeosciences	3754
Natural Hazards and Earth System Sciences	2739
Acta Montanistica Slovaca	1423
Geoscientific Model Development	1219
The Cryosphere	1153
Estudios Geologicos	944
Terrestrial, Atmospheric and Oceanic Sciences	819
Advances in Geosciences	785
Rivista Italiana di Paleontologia e Stratigrafia	654
Proceedings of the International Association of Hydrological Sciences	608

Table 11 shows that the journal 'Biogeosciences" has published 37540 articles followed by 'Natural Hazards and Earth System Science' with 2739 articles. These two are the most productive journals. They are followed by 'Acta Montanistica Slovaca' with 1423 articles and 'Geoscientific model development' with 1219 articles.

12. JOURNAL LICENSE

Journal license	No.
CC BY	17718
CC BY-NC-ND	3055
CC BY-NC	2396
CC BY-NC-SA	543
CC BY-SA	315
Publisher's own license	98

Table 4 reveals that a majority of 17718 journal articles have CC BY licence followed by 3055 journal articles with CC BY-NC-ND licence, 2396 with CC BY-NC and 543 with CC BY-NC-SAlicense.

13. PUBLISHERS

Publisher	No.
Copernicus Publications	11995
Technical University of Kosice	1423
Elsevier	1073
Consejo Superior de Investigaciones Científicas	944
Chinese Geoscience Union	819
De Gruyter Open	781
Università degli Studi di Milano	654
Geological Survey of Slovenia	576
União da Geomorfologia Brasileira	463
Faculty of Mining, Geology and Petroleum Engineering	432

Table 13 reveals that Copernicus Publicataions has published 11995 journal articles on geology followed by 1423 articles by Technical university of Kosice, 1073 articles by Elsevier, 819 by Chinese Geoscience Union and 576 by Geological Survey of Slovenia.

14. LANGUAGES

Full Text language	No.
English	22888
Spanish; Castilian	1651
Slovak	1423
French (1181)	1181
Portuguese (736)	736
Slovenian (576)	576
Croatian (435)	435
Italian (252)	252
Russian (237)	237
Persian (232)	232

Table 14 shows that a majority of 22888 articles are in English language followed by 1651 in Spanish language, 1423 in Slovak language and 1181 in French language.

15. YEAR OF PUBLICATION OF JOURNAL ARTICLES

Year	No.		Year	No.		Year	No.
2018	497		2002	309		1986	53
2017	2769		2001	277		1985	48
2016	2455		2000	235		1984	42
2015	2708		1999	152		1916	1
2014	2290		1998	202			
2013	1839		1997	197			
2012	1700		1996	165			
2011	1348		1995	82			
2010	1271		1994	71			
2009	955		1993	73			
2008	803		1992	79			
2007	852		1991	47			
2006	802		1990	60			
2005	594		1989	65			
2004	444		1988	46			
2003	368		1987	56			

Table 15 reveals that a majority of 2769 journal articles of 2017 are listed in DOAJ followed by 2708 journal articles of 2015 and 2455 journal articles of 2016. We could see journal articles of 36 years i.e from 1916, 1984-2018 are listed in DOAJ. While the number of journal articles on geology was less during the initial years, we could realize the increasing interest from the year 1996. Since 2010, more than 1000 articles are getting added to DIAJ.

CONCLUSION

The Directory of Open Access Journals (DOAJ) provides open access to scientific and scholarly journals, that meet high quality standard by exercising peer review and is free to all from the time of publication based on the Budapest open access initiative. DOAJ is to increase the visibility and ease of use of open access scientific and scholarly journals there by promoter their increased usage and impact. Research scholars, scientists, Professionals should browse the DOAJ site and access the free online journals on their subject areas It is also suggested that scientists and Research scholars should publish their research work in online open access journals for wider visibility of their research work and for greater impact factor and citation index (Alhamdi, Khaparde and Navghare, 2015).

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OPEN ACCESS DIGITAL REPOSITORIES ON 'LAW AND POLITICS' : A CASE STUDY OF OpenDOAR PLATFORM

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ABSTRACT

The study reports the functioning of open institutional repositories on Law & Politics as registered in OpenDOAR. OpenDOAR website and the websites of individual institutional repositories were browsed to collect the required data. The study reveals that : There are 230 institutional repositories registered in OpenDOAR having contents on the subject 'Law & Politics' as on 6-3-2018. 96 % (220) of the open access IRs are operational. 175 (76%) open access IRs belong to institutional repository type. . 157 (68%) IRs have journal articles, 51 % (118) of them have theses and dissertations, 33 % of them have conference and workshop papers and 45% of them have unpublished reports and working papers. 169(73 %) institutional repositories have contents in English language. 23(10 %) of IRs have contents in Spanish and 21 of them have contents in German. 84 IRs (37 %) use Dspace software. only 19 institutional repositories have defined their preservation policies. 124 (69%) IRs have not defined their content policies. 40 IRs (22%) have defined their submission polices. United States leads with 47 (20%) IRs followed by United Kingdom with 15 (7%) and Germany with 11(5%) IRs. European continent has a maximum of 93 (40%) IRs . It is followed by North American Continent with 52 IRs (23%) and Asian Continent with 39 (17%) IRs.

Keywords : Institutional repositories, openDOAR, content types, repository software, preservation policy, Law & Politics.

INSTITUTIONAL REPOSITORY

Institutional Repositories are digital archives that capture, organize, preserve and disseminate the intellectual assets of a single institution or a group of institutions by forming a global system of distributed and interoperable digital libraries.

An IR may be defined as an on-line locus for collecting and preserving – in digital form the intellectual output of an institution, particularly a research institution (Wikipedia).

According to Lynch (2003) an institutional repository is a "set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution."

OBJECTIVES OF AN IR

With the increasing use of ICTs and availability of open sources software packages most of the institutions are maintaining such repository or archive to collect, preserve, and make accessible the entire intellectual product created by the scholarly communities of that institutions.
Main objectives for having an IR are:

- to create global visibility for an institution's scholarly research;
- to collect content in a single location;
- to provide access to institutional research output by self-archiving it;
- to store and preserve other institutional digital assets, including unpublished or otherwise easily lost ("grey") literature (e.g., theses or technical reports).

LITERATURE REVIEW

Padma and Ramasamy (2015) reported the functioning of institutional repositories in African continent. **Ramasamy and Padma (2015)** reported the functioning of institutional repositories in Japan. **Musa, Musa and Aliyu (2014)** explored the historical development, current practices and the challenges affecting the institutional digital repositories in Nigeria. **Padma and Ramasamy (2014)** reported the functioning of institutional repositories in Malaysia. **Ramasamy and Padma (2014)** carried out a study on the functioning of institutional repositories in India. **Nazim and Mukherjee (2011)** identified the present status of IRs in the countries of Asia. **Collen and Chawner (2010)** investigated the development of institutional repositories in New Zealand, exploring factors affecting the adoption and success of institutional repositories with the help of Data from a series of interviews with library managers and the findings from a randomized national survey of academics. **Karmakar, Das and Thakuria (2010)** outlined the role and importance of various institutional repositories (IR) in India.

Padma and Ramasamy (2016) carried out a study on the status of institutional repositories as registered in OpenDOAR as on 4th December 2015 in terms of their origin, continent and country-wise distribution, types of IRs, softwares used, subjects and languages of contents and the top 20 repositories. **Dhanavandan and Tamzilchelvan (2015**) discussed about the trends and development of Institutional Repository (IR) in south Asian countries in terms of name of the repositories, size, type, content and languages and various software. **Padma and Ramasamy (2014)** undertook a study to understand the functioning of open institutional repositories on Education worldwide. **Abrizah, Noorhidawat and Kiran (2010)** highlighted the current state of open access repositories of Asian universities.

OBJECTIVES OF THE STUDY

The objectives of the present study are to study the open access IRs on Law and Politics as registered in OpenDOAR as on 06/03/2018 in terms of Operational status; Type of open access repositories; Repository software used ; Content types ; Most frequently used languages ; Availability of preservation and full-text re-use policy ; Growth rate ; Continent-wise proportion of IRs and Country-wise proportion of IRs.

METHODOLOGY

The modus operandi of our study underwent the following phases.

1. First of all, the OpenDOAR directory was browsed with the relevant narrowed down search terms to find out the IRs holding contents on the subject 'Law & Politics'.
2. The geographical area is set to be the repositories situated all over the continents.
3. Institutional repository statistics was done to get required data to answer the objectives of the study.
4. Then, the URLs of the selected IRs were browsed for cross checking and verification
5. Diagrams were utilized to present the inferences of the study.

DATA ANALYSIS AND INTERPRETATION

1.OPERATIONAL STATUS OF IRs ON LAW & POLITICS

There are 230 institutional repositories registered in OpenDOAR having contents on the subject 'Law & Politics'. Diagram 1 shows that 96 % (220) of the open access IRs are operational. While 07 (3%) Open Access IR is broken, 3 (1%) are trial repositories.

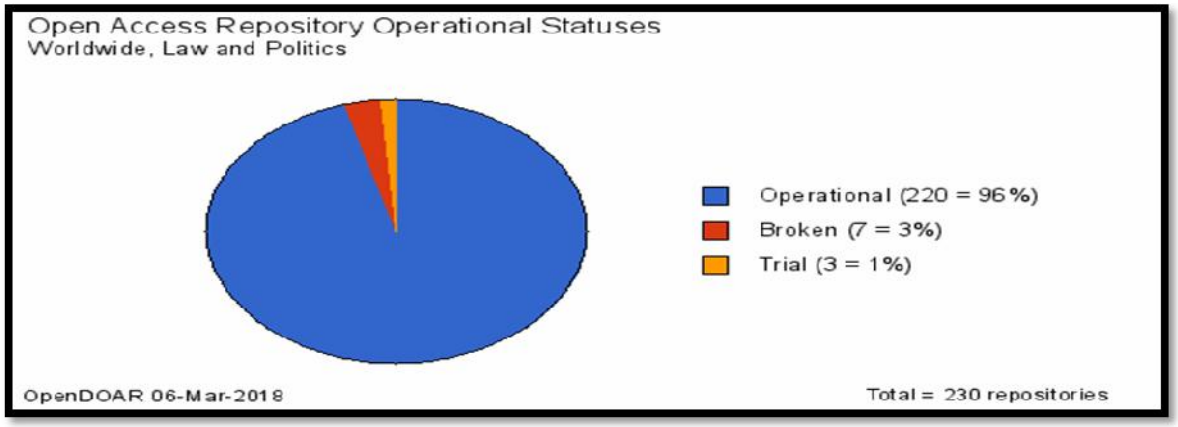

Diagram 1: Operational Status

2. TYPE OF INSTITUTIONAL REPOSITORIES

The IR may of different types : institutional (run by a institution or department), disciplinary (a cross-institutional subject repository), aggregating (an archive aggregating data from several subsidiary repositories) or a governmental (repository for government data) .

Diagram 2 shows that 175 (76%) open access IRs belong to institutional repository type. They are run by various institutes, universities or departments. While 32 of them (14%) are the discipline-oriented repositories, 15 (7%) are governmental repositories and just 08 of them (3%) are the aggregating units.

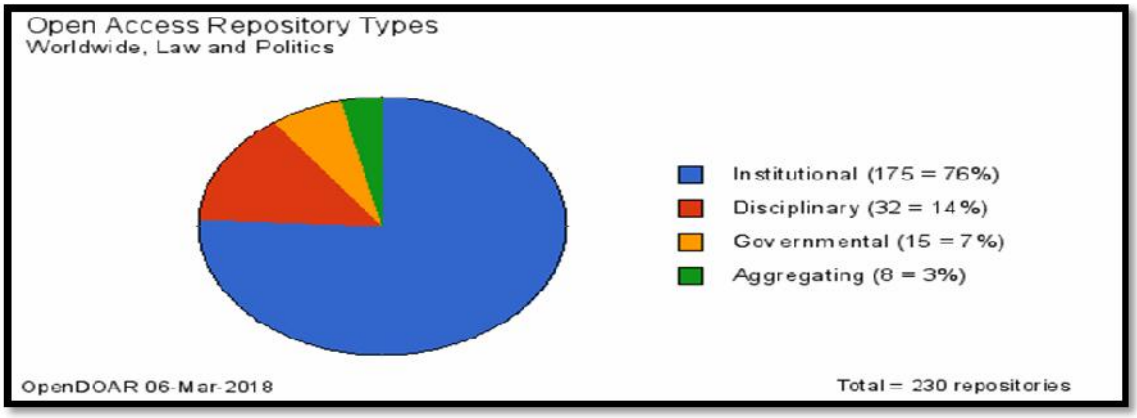

Diagram 2: Open access IR Type

3. CONTENT TYPES IN IRs

The IRs on Computers and IT possess different kinds of materials namely journal articles, conference and workshop papers, theses and dissertations, book, chapters and section, multi-media and audio-visual materials and some learning objects. 157 (68%) IRs have journal articles, 51 % (118) of them have theses and dissertations, 33 % of them have conference and workshop papers and 45% of them have unpublished reports and working papers. 93 IRs have book chapters and sections, 36 of them have learning objects and another 49 of them contain multi-media and audio-visual materials.

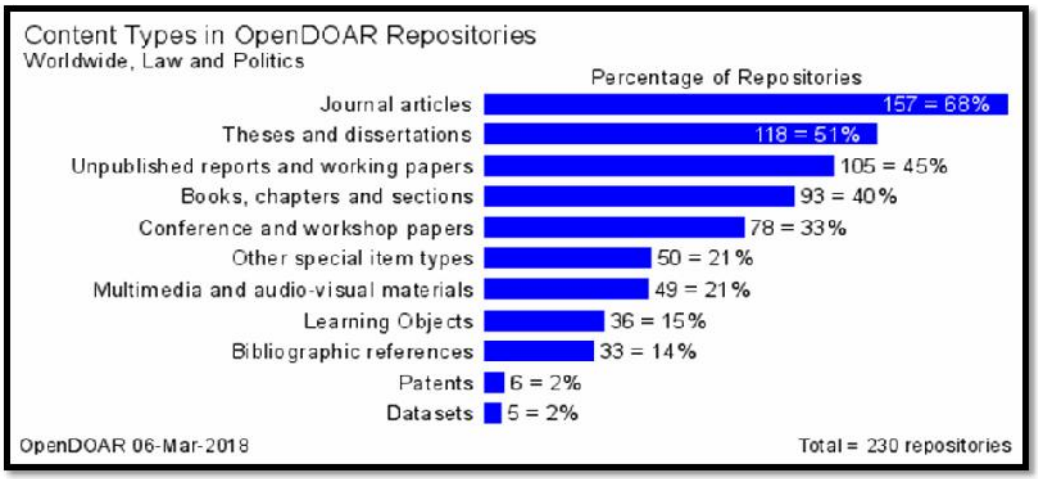

Diagram 3: Content types

4. LANGUAGE CONTENT

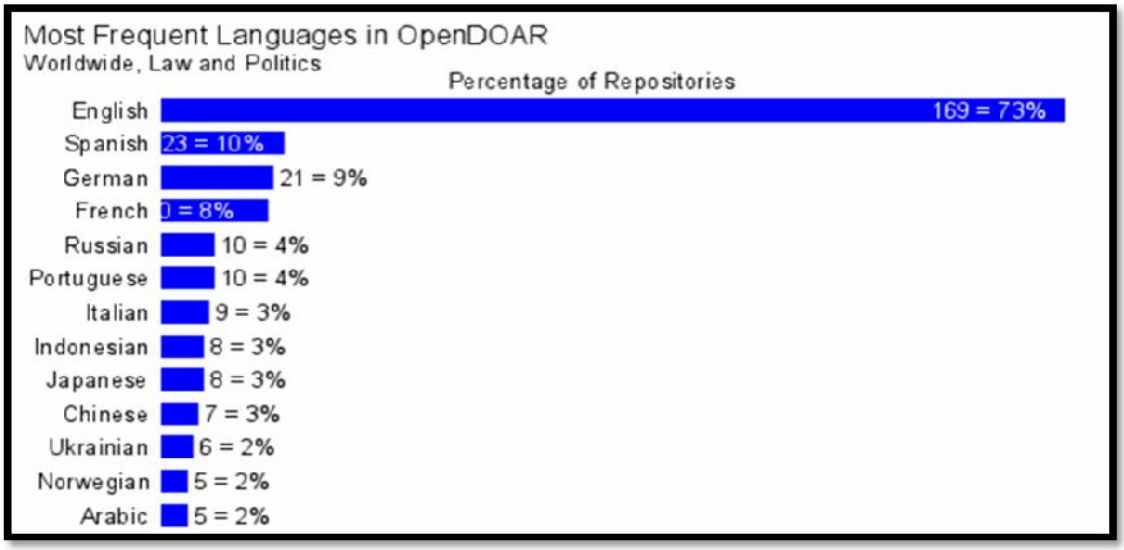

Diagram 4: Language of the contents

Diagram 4 shows that Out of 230, 169(73 %) institutional repositories have contents in English language. 23(10 %) of IRs have contents in Spanish and 21 of them have contents in German. While 10 (8%) have contents in French, just 4 of them have contents in Russian and Portuguese languages.

5. REPOSITORY SOFTWARE

Diagram 5 depicts that Dspace software has emerged as the most used IR software in these IRs. 84 IRs (37 %) use Dspace software. While 3 IRs (16%) use Eprints, 23 IRs (10%) have used Digital Commons and 9 IRs have used Greenstone.

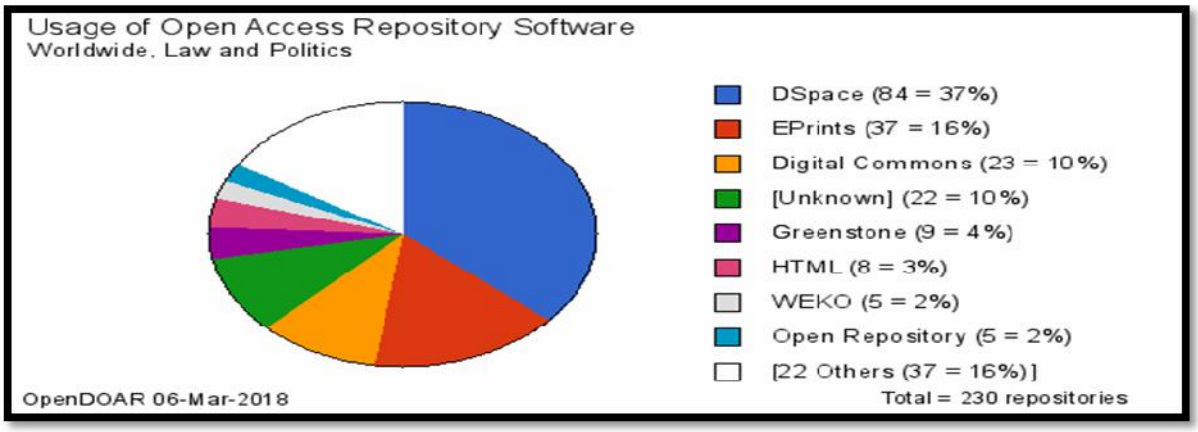

Diagram 5: Use of Repository Software

6 RECORDED POLICIES

Preservation Policies: Diagram 6 shows that only 19 institutional repositories have defined their preservation policies and made it available in their IR portal. 123 (68 %) of them have not defined their preservation policies.

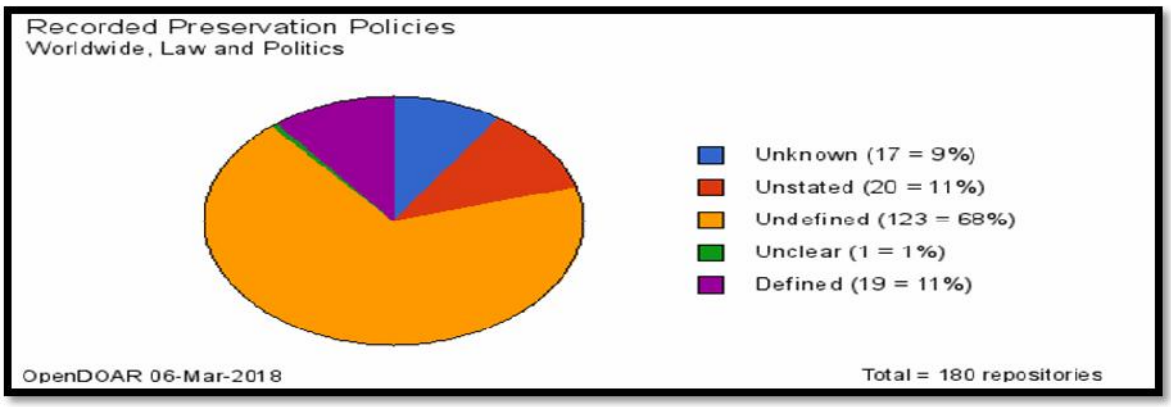

Diagram 6: Availability of Preservation policies

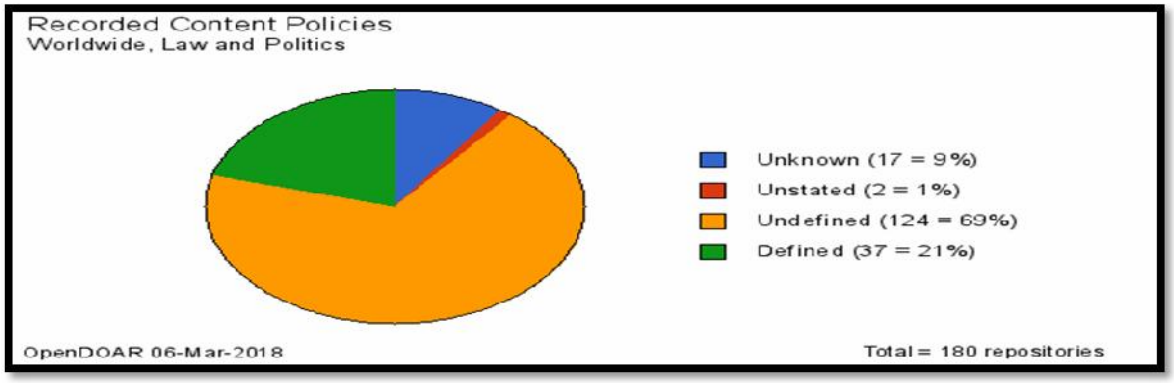

Diagram 7: Availability of Content policies

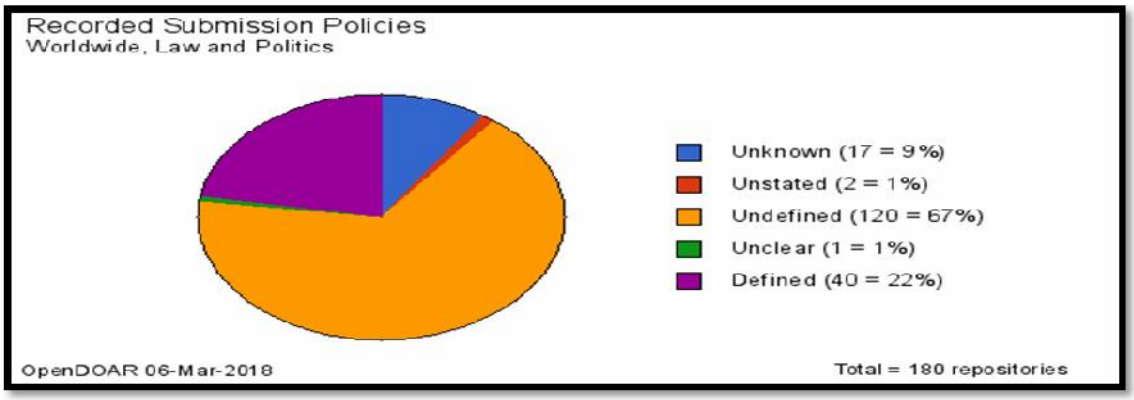

Diagram 8: Availability of Recorded Submission Policies

Content Policies: Diagram 7 shows that 37 IRs (21%) have defined their content polices while 124 (69%) IRs have not defined their content policies.

Submission Policies: Diagram 8 shows that only 40 IRs (22%) have defined their submission polices while 120 (67%) IRs have not defined their submission policies.

7. GROWTH OF OPEN ACCESS IRs ON LAW & POLITICS

Diagram 9 shows the growth of open access IRs on Law & Politics. The birth of IRs took place in the year 2005. There is no much growth in 2006-2010. 100 IRs got established in first 5.5 years. There is a steep growth during in the years 2011-2013. There is a stagnation during 2014-2015.

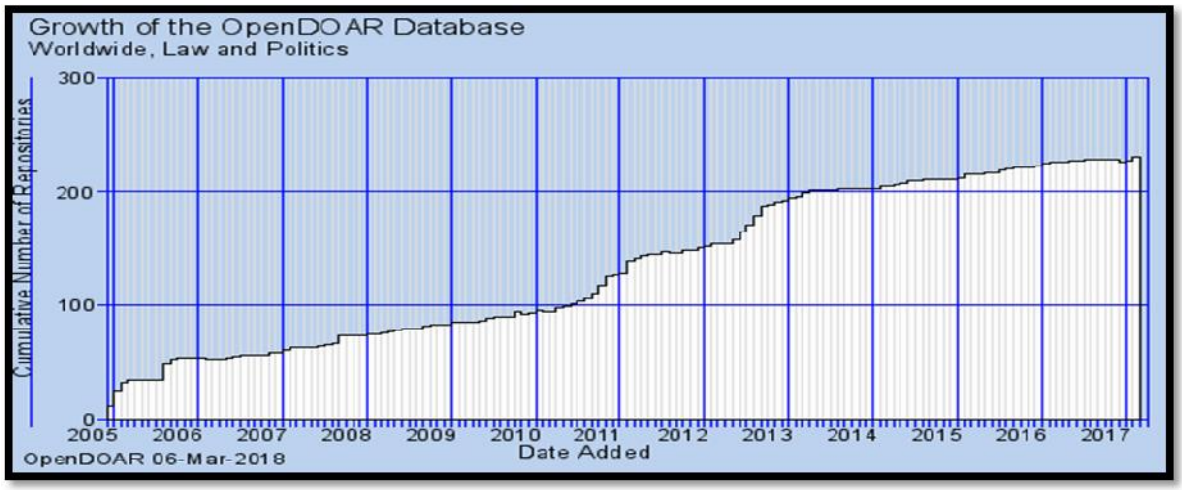

Diagram 9: Growth of the OpenDOAR Database on Law & Politics

9. PROPORTION OF REPOSITORIES BY COUNTRY

Diagram 10 portrays that 50 % of the total IRs are available in 8 countries and the remaining are available in 115 countries. United States leads with 47 (20%) IRs followed by United Kingdom with 15 (7%) and Germany with 11(5%) IRS. While Indonesia has 10 IRs, France has 9, Japan and Brazil has 8 IRs each.

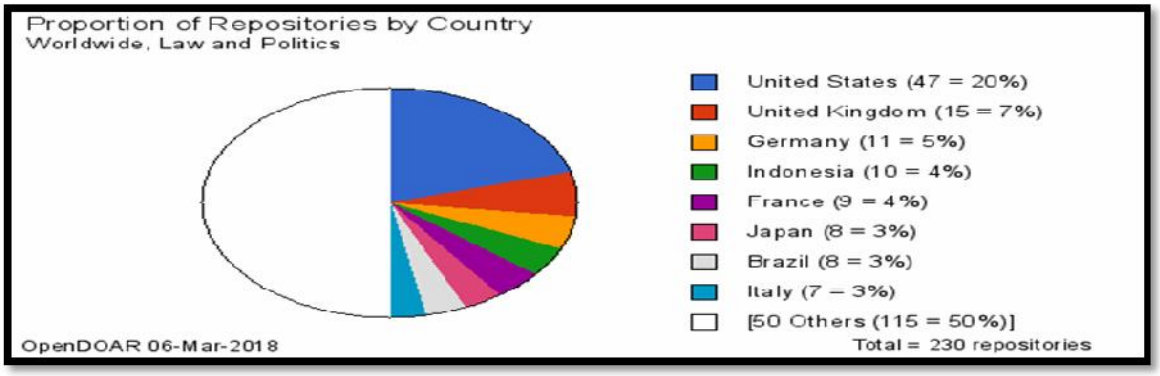

Diagram 10: Country-wise IRs

10. PROPORTION OF REPOSITORY ORGANIZATIONS BY COUNTRY

Diagram 11 shows that United States leads with 42(19%) repository organizations followed by United Kingdom with 15 (7%) and Germany and Indonesia with 10 (5%) repository organizations each. While Japan, France and Brazil have 8 repository organization each, Italy has 7 repository organizations.

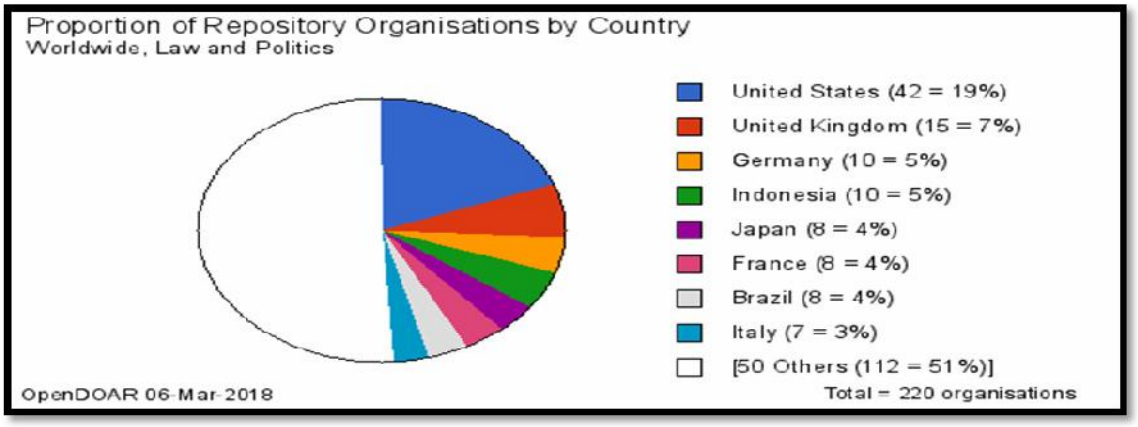

Diagram 11 : Country-wise Repository Organizations

11. PROPORTION OF REPOSITORIES BY CONTINENT

Diagram 12 portrays that European continent has a maximum of 93 (40%) IRs . It is followed by North American Continent with 52 IRs (23%) and Asian Continent with 39 (17%) IRs. South American continent has 20 (9%) IRs while African Continent has 17 (7%) IRs.

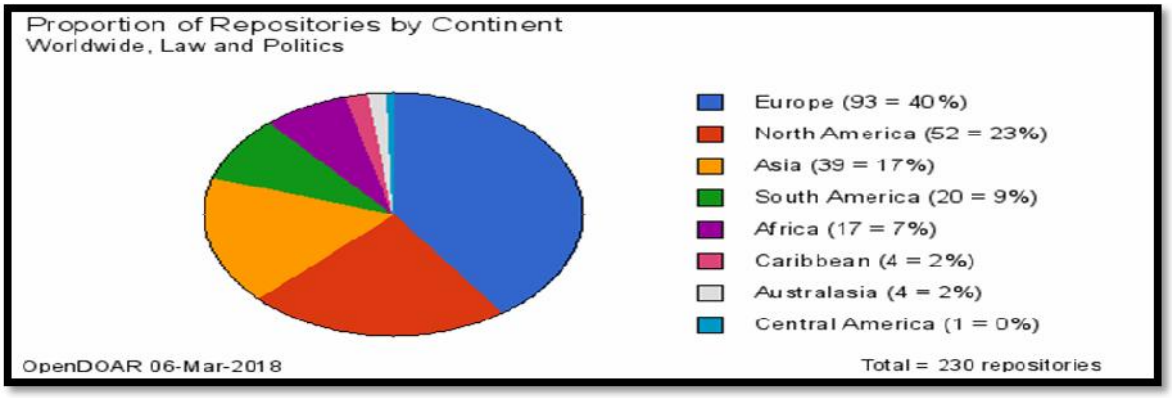

Diagram 12: Country-wise IRs

12. PROPORTION OF REPOSITORY ORGANIZATIONS BY CONTINENT

Diagram 13 shows that 41% (90) of repository organizations are from European Continent while 21% (46) of them are from North American Continent. While there are 39 (18%) repository organizations in Asia, South America has 20 (9%) and Africa has 16 (7%) repository organizations.

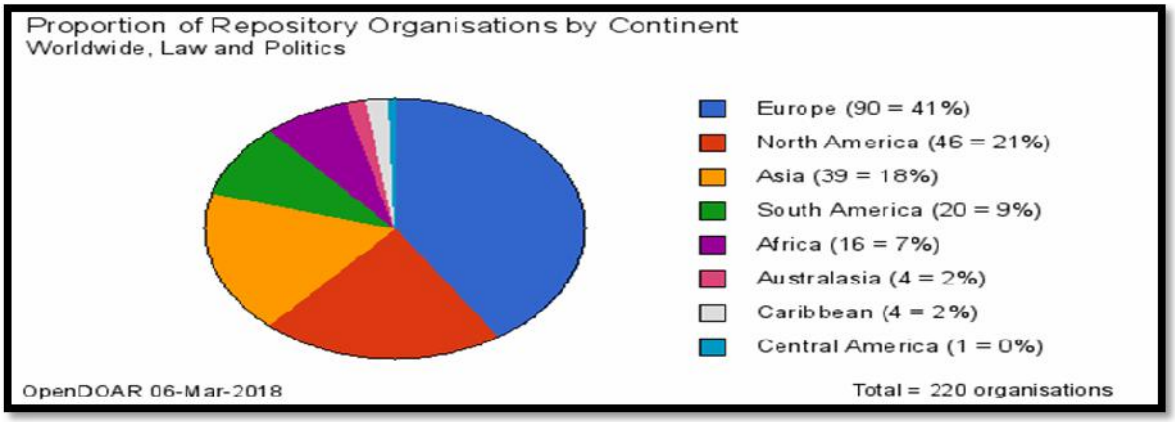

Diagram 13: Country-wise Repository Organizations

CONCLUSION

Institutional repositories are being recognized as essential vehicle for scholarship in the digital world. This is evident based on the continuous growth of IRs around the world. Manpower requirements, quality and quantity of contents, metadata standards, technical specifications, copyrights barrier, and policy issues are major concerns that need to be addressed for developing IRs as component of open access knowledge movement. IRs have become a compelling and useful tool for collecting, organizing and disseminating intellectual output of an institute. Let more and more institutions / universities come forward to make their indigenous intellectual e-resources available on the open access publishing platforms like OpenDOAR and ROAR to ensure maximum utilization of resources sharing and caring.

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GEOCHEMICAL STUDIES OF GROUND WATER IN AND AROUND KOVILUR DINDIGUL DUE TO THE IMPACT OF SEWAGE AND IRON INDUSTRY EFFLUENT

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ABSTRACT

The investigator has made an attempt to study the impact of untreated Iron Industry effluent in the groundwater sources located at kovilur. As the result the groundwater sources around different residential area like kovilur reaches high degree of pollution. Ground water analysis at four different sites at four directions reveals that the water quality parameters are higher than the permitted level. As per BIS standard specifically high turbidity, high TDS and higher Electrical conductivity values indicate that the water cannot be used for domestic purpose. The adjoining groundwater sources are mostly affected and the water becomes very salty with very high TDS. Hence the polluted water is suggested to water treatment using Reverse Osmosis System.

Keywords: Ground Water, Surface water, Iron Industry Effluent, Sewage, BIS Standard, Reverse Osmosis System.

1. INTRODUCTION

1.1. INDUSTRIAL EFFLUENT

The steel industry is one of the most important and vital Industry of the present and the future. It is the asset of a nation. Steel plants use a tremendous amount of water for waste transfer, cooling and dust control. The steel plants have sintering mills, coke plants, blast furnaces, chemical byproducts and chemical processes, water cooled rolls, pumps, extrusion experiment, transfer lines for sludges and slurries. All these plants use a tremendous amount of water to cool the products and flush the impurities away from the finished stock. (Sanjeev Kumar Sinha et al., 2014)

Wastewater is generated in huge quantity in steel industries. It contains many dissolved, undisclosed substances and chemicals in the wastewater. The steel industries produce wastewater and sludge during different industrial processes.

The development of innovative technologies for treatment of wastewaters from steel industries is a matter of alarming concern for us. Although many research papers have been reported on wastewater pollution control studies, but a very few research work is carried out for treatment of wastewater of steel industries, especially in reference to development of design of industrial effluent Treatment Plants (ETP) system. Another beneficial aspect of this research work will be recycling, reuse of water and sludge from steel industry. (Sanjeev Kumar Sinha et al., 2014)

Industrial wastes are usually generated from different industrial processes, as a result the amount and toxicity of waste released from industrial activities varies with the industrial processes. Again, among all the industrial wastes tannery effluents are ranked as the highest pollutants (Shen, 1999). It involves many physical, chemical, and biological processes that take place in a variety of physiographic and climatic settings. For many decades, studies of the interaction of ground water and surface water were directed primarily at large alluvial stream and aquifer systems (A.pandia rajan et al., 2014).

Effluent irrigation has been practiced for centuries throughout the world (Shiva et al., 1986; Tripathi et al., 2011). It provides farmers with a nutrient enriched water supply and society with a reliable and inexpensive system for wastewater treatment and disposal (Feigin et al., 1991). In India also being a cheap source of irrigation farmers are applying this water to their fields. Rapid industrialization, population explosion and more urbanization in India have created enormous problems of environmental pollution in terms of generating the variable quantity and quality of solid and liquid wastes. In developing countries, there has not been much emphasis on the installation of sewage treatment plants and all the tannery effluents are generally discharged into the sewage system. The sewage waters are used as potential source irrigation for raising vegetables and fodder crops around the sewage disposal sites which are directly or indirectly consumed by human beings.

Soil contamination by sewage and Iron industry effluents has affected adversely both soil health and crop productivity. Sewage and Iron industry effluents are the rich sources of both beneficial as well as harmful elements. Since some of these effluents are a rich source of plant nutrients,

therefore soil provides the logical sink for their disposal. But much untreated and contaminated sewage and Iron industry effluents may have a high concentration of several heavy metals such Fe, Mn, and Cr (Arora et al., 1985).

Their continuous disposal on agricultural soils has resulted in soil sickness (Narwal et al., 1988) and accumulation of some of the toxic metals in soil (Adhikari et al., 1993; Antil 2005, Gupta et al. 2002, 1998; Kharche et al., 2011) which may pose serious human and animal health. Several studies have been carried out for the treatment of industrial effluents through coagulation and flocculation process (Shouli et al., 1992).

2. SCOPE AND OBJECTIVES OF THE STUDY

The volume of sewage and Iron Industry Effluents discharged is increasing day by day. The sewage water and the Iron Industry effluent from the foundry units discharge the polluted water into the pond without any treatment. The option of treatment plant to treat the sewage water and the Iron Industry effluent may lead to spoilage of environment.

2.1. OBJECTIVES

To assess the Physico-chemical parameters of the water in kovilur, Dindigul.

To evaluate the Physico- chemical parameter of the ground water present in the well and bore wells around kovilur, Dindigul.

To suggest suitable remedial measures to treat the groundwater using RO system.

3. MATERIALS AND METHODS

The River Santhanavarthini at kovilur has become a collection of sewage water and Iron Industry effluent from various units of foundry industries, Dindigul town. Hence the water in the River as well as the ground water sources in and around the River at a radius of 2 km is completely polluted due to the continuous discharge and percolations of the sewage water and Iron Industry effluents to the ground water.

An attempt has been made to analyse the extent of water pollution by analyzing various water quality parameters for four sites. The water sample was analysed and compared with the guideline of Bureau of Indian Standards (BIS) limit for drinking water standards. Analysis of Physico-chemical characteristics of water samples were undertaken to find the water quality.

Table 1: The Water Quality Parameters standard level for (WHO & BIS)

Parameters	WHO – standard			BIS - Standard	Method of Analysis
	UNITS	HDL	MPL		
PHYSICAL PARAMETERS					
Odour	Hazen Units (Hz)	Unobjectionable		Unobjectionable	Visual comparison
Turbidity NT units	NT unit	5	10	5	Neplo turbidity meter
Total dissolved solids	mg/L	500	2000	500	Conductivity method
Electrical conductivity	Micro mhos/cm	Nil	Nil	Nil	Conductivity meter
CHEMICAL PARAMETERS					
pH	P^H unit	6.5-8.5	No relaxation	7.0-8.5	pH Meter
Alkalinity total as CaCO3	mg/L	200	600	200	EDTA titrimetric method
Total hardness as CaCO3	mg/L	300	600	300	EDTA titrimetric method
Calcium as Ca	mg/L	75	200	75	EDTA titrimetric method
Magnesium as Mg	mg/L	30	150	30	Calculation from total hardness
Sodium as Na	mg/L	Nil	Nil	Nil	-
Potassium as K	mg/L	Nil	Nil	Nil	-
Iron as Fe	mg/L	0.3	1.0	0.1	Spectrophotometer
Manganese as Mn	mg/L	0.1	0.1	0.05	
Nitrite as NO_2	mg/L	Nil	Nil	Nil	Spectrophotometer
Nitrate as NO_3	mg/L	50	No relaxation	45	Spectrophotometer
Chloride as Cl	mg/L	250	1000	200	Silver nitrate
Fluoride as F	mg/L	1.0	1.5	0.05	Colorimetric meter

Table 2 : COMPREHENSIVE TABLE OF WATER QUALITY ANALYSIS

Sample collection	units	BIS Limit	S1	S2	S3	S4
Appearance	-	-	Turbid	Clear	Clear	Clear
Colour	Hazen Units (Hz)	5	Blackish	Colourless	Blackish	Colourless
Turbidity	NT unit	5	7	6	7	5
Total dissolved solids	mg/L	500	1609	1008	1904	843
Electrical conductivity	Micro mhos/cm	-	1772	1389	2529	1060
P^H	P^H unit	7.0-8.5	7.69	7.89	8.43	7.93
Total hardness as $CaCO_3$	mg/L	300	730	468	540	672
Calcium as Ca	mg/L	75	14	64	74	61
Magnesium as Mg	mg/L	30	92	26	37	29
Sodium as Na	mg/L	_	110	124	112	78
Iron as Fe	mg/L	0.1	2.61	1.52	1.59	0.86
Ammonia as NH_3	mg/L	_	4.44	1.29	1.76	0.59
Nitrate as NO_3	mg/L	45	15	13	6	5
Chloride as Cl	mg/L	250	520	156	374	162
Fluoride as F	mg/L	1	1.3	0.4	0.8	0.4
Sulphate as SO_4	mg/L	200	127	116	76	62
Phosphate as PO_4	mg/L	_	2.30	0.90	0.72	0.63

SW-SUFACE WATER, BW- BORE WATER, OW- OPEN WELL WATER.

4. RESULTS AND DISCUSSIONS

4.1. DRINKING WATER STANDARDS

Raw water quality and standards depend upon the use. The four main uses are municipal, industrial, agricultural and recreational (fish and wildlife). As water quality is degraded day by day,

so, it becomes very important to set the drinking water standards for the safety of water of our limited resources. Different agencies have set environment standards for safe drinking water as Bureau of Indian Standards (BIS), World Health Organization (WHO 2007), and European Economic Community (EEC) etc.

Drinking water standards are regulation that Bureau of Indian Standards (BIS) set to control the level of contamination in the drinking water (DWAF 1996). Bureau of Indian Standard considers the inputs from several organization i.e. Central, State, Semi Government, Municipal Corporation, Public Health Organization, etc. throughout the standard setting process.

4.2. SENSITIVE PARAMETERS

Parameters like TDS, EC, hardness, Iron and fluoride are taken as sensitive parameters to indicate the water pollution by Iron industry effluent from different sources. It is observed that the values are higher compared the BIS Standards.

4.3.DISCUSSIONS

4.3.1.WATER QUALITY

The results of various water samples for the various Physico-chemical analysis from different sites in, the study area presented and discussed. The results obtained for pH of the water samples varies from minimum of 7.69 to maximum of 8.43. The results obtained for Total dissolved solids vary from minimum of all water samples showed higher TDS values of 1060 mg/L to maximum of 2529 mg/L. All water levels should be low. All water samples showed higher TDS values. The results obtained for the degree of hardness in water samples various from 468 mg/L to 730 mg/L during the study. The highest desirable limit prescribed by BIS (1991) is 250 mg/L for drinking purposes. The results obtained for Iron content of water ranged from 0.86mg/L to 2.61mg/L. The high range was found at river water sample. The results obtained for concentration of fluoride varies from 0.4 mg/L to 1.3mg/L. The excess of fluoride in water cause dental and skeletal fluorsis.

5. CONCLUSION

An attempt has been made to Study the impact of untreated sewage water and Iron Industry effluent in the ground water sources. The River has become a collection of sewage and Iron Industry effluent water. Hence the water in the River as well as the ground water sources around the different residential area like Kovilur, due to the high degree of pollution many sources has to be abandoned ground water analysis at four different sites at four directions reveals that the water

quality parameters are higher than the permitted level. As per BIS standard specifically high turbidity high TDS and higher Electrical conductivity values indicate that the water cannot be used for human consumption or any other use. People have to depend only on municipal water sources from Athoor village. For other uses the groundwater can be treated using R O system. The adjoining groundwater sources are mostly affected and the water becomes very salty with very high TDS. Hence the polluted water is suggested to water treatment using Reverse Osmosis System.

ACKNOWLEDGEMENT

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SYNTHESIS OF COPPER NANOPARTICLES FROM POLYALTHIA LONGIFOLIA LEAF AQUEOUS EXTRACT AND ITS ANTIBACTERIAL ACTIVITY

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ABSTRACT

Nanotechnology and Nano particles based product and application are increased now a days due to the biological effectiveness . The scope of the present study is to synthesize copper Nanoparticles and evaluate its antibacterial activity with Polyalthia longifolia extract. The objectiveof the present study is to investigate the green synthesis method used to produce the Nanoparticles. Polyalthia longifoliais an evergreen shrub or small tree in the dogbane family of Apocynaceae, toxic in all its parts. It is theonly species currently classified in the genus Polyalthia. The leaf extract of Polyalthia longifoliais used for the synthesis of Copper Nanoparticles. The scope of the present study is to synthesize copper nanoparticles and evaluate its antibacterial activity. The present study deals with synthesis ofcopper Nanoparticles and characterization of synthesized copper Nanoparticles confirmed by UV-visible spectrophotometer, FTIR analysis and also the analysis ofantimicrobial activity of copper nanoparticles.

Keywords: Antimicrobial, FTIR, Copper nanoparticles, Polyalthia longifolia, UV-spectrometer.

1.INTRODUCTION

In recent years, Nanotechnology has attracted many researchers from various fields like biotechnology, physics, chemistry, material sciences, engineering and medicine. Nano particles are synthesized by physical and chemical Methods andthese are suffering from drawbacks like expensive

reagent, hazardous reaction condition, longer time, tedious process to isolate nano particles. Hence, there is a scope to develop new methods for the synthesis of nano particles which should be required inexpensive reagent,less drastic reaction condition and eco-friendly. In recent years, Copper Nano particles have attracted much attention of researchers due to its application in wound dressings and biocidal properties, potential industrial use such as gas sensors, catalytic process, high temperatures super conductors. Polyalthia longifolia, the Ashoka native to India, is a lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution. It exhibits symmetrical pyramidal growth with willowy weeping pendulous branches and long narrow lanceolate leaves with undulate margins. The tree is known to grow over 30 ft in height. Polyalthia is derived from a combination of Greek words meaning 'many cures' with reference to the medicinal properties of the tree while Longifolia, in Latin, refers to the length of its leaves. Green synthesis of copper Nano particles was achieved by using microorganisms and plantextract.

2.SCOPE AND OBJECTIVES

The scope of the present study is to synthesize copper Nanoparticles and evaluate its antibacterial activity in polyalthia longifolia extract.The objectives of the present study is to investigate synthesis of copper Nanoparticles and to characterize the synthesized copper Nanoparticles in polyalthia longifolia extract and confirmed by UV-visible spectrophotometer and FTIR analysis.

3. MATERIALS AND METHODS

3.1 EXPERIMENTAL

The powder of Polyalthia longifolia leaf was weighed 5g and dissolved in 100ml of distilled water and boiled for 20 min at 50^0 C. The extract was filtered by Whatmann No1 filter Paper. Then the filtrate was stored in a tight seal pack under 4^0 C for further use. The reaction mixture was prepared by adding 80ml of 1mM $Cuso_4$ and 20ml of Polyalthia longifolia leaf Extract. Blank was prepared by adding 80ml of deionised water to 20ml of Polyalthia longifolia leaf extract. The formation of copper Nanoparticles (reduction of Cu^{2+} to Cu^{+} ion) was indicated by color change from light color to dark color. The addition of a certain amount of Cu^{2+} can effectively inhibit Cu^{2+} reduction into Cu^{+} during the colour changes. The conversion is act as a reversible one from the Cu^{+} to Cu^{2+} with help of electron transfer from reactant side to product side.

3.2 UV-VISIBLE SPECTROPHOTOMETER ANALYSIS

The synthesized copper Nanoparticles were characterized using UV-Vis spectrophotometer HITACHI U2300. The formation of copper Nanoparticles was Monitored by UV spectrophotometer in the range of absorbance from 250-480nm.

3.3 FOURIER TRANSFORM INFRARED SPECTROSCOPY [FTIR]

The reaction mixture containing Copper Nonoparticles prepared from Polyalthia longifolia leaf extract was poured into a petridish and kept in a hot air oven until it was getting dried off. After that the dried sample was scrubbed and the powder form of sample is stored in a sterile eppendorf. Then it was used for the FT-IR analysis in theregion of 400-4000cm^{-1}.

3.4 PREPARATION OF REACTION MEDIUM FOR THE ANALYSIS OF ANTIBACTERIAL ACTIVITY

Two different bacteria (Escherichia coli, Staphylococcus aureus) were taken from the stock cultureand dissolved in 25 ml of Nutrient bothand kept for 12 hrs incubation. The synthesizedcopper nanoparticles using Polyalthia longifolialeaf extract was tested for its antibacterialactivity by agar well diffusion methodagainst Escherichia coli and Staphylococcus aureus.

4. RESULTS AND DISCUSSIONS

4.1 ULTRAVIOLET/VISIBLE (UV/VIS) SPECTROSCOPY ANALYSIS

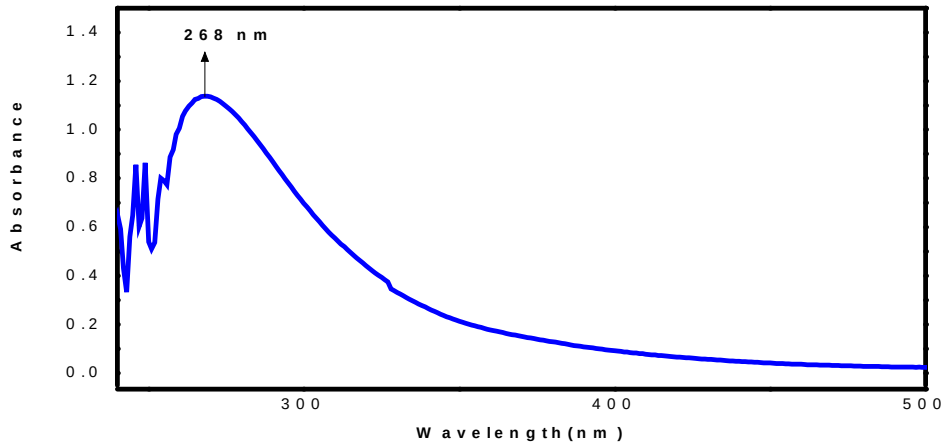

Figure 1 : ULTRAVIOLET VISIBLE SPECTROSCOPY OBTAINED FOR COPPER NANOPARTICLES

The reduction of Cu+ ions was monitored by UV- Spectrophotometer. The characterization of copper Nanoparticles in the plant extract was done by with help of UV-Spectrophotometer. The standard peak value of copper nanoparticle in UV 250-450nm[1] . Figure 1, shows that the broad peak obtained at 267- 268 nm. The peak confirms the presence of copper nanoparticle in the Polyalthia longifolia leaf extract.

4.2 FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR) ANALYSIS

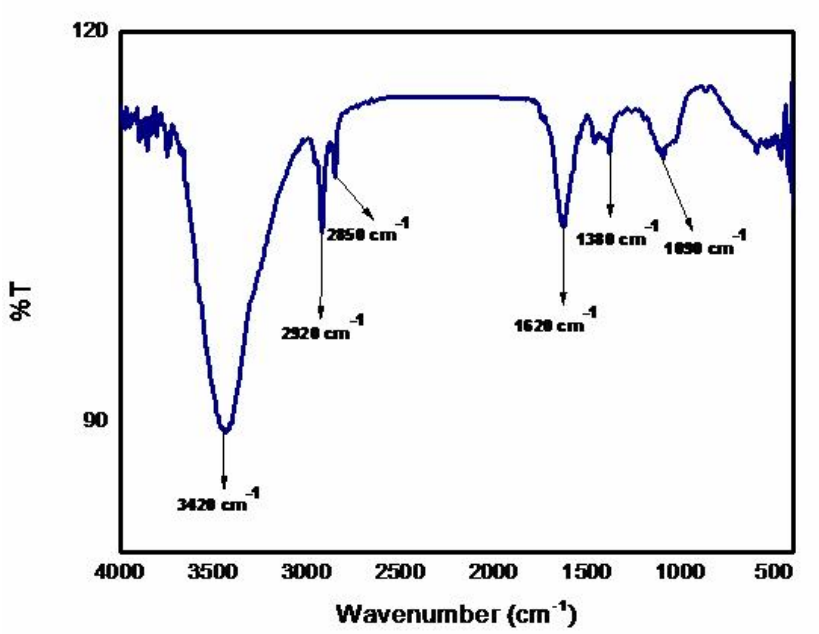

Figure 2 : FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR) OBTAINED COPPER NANOPARTICLES

The FT-IR Characterization is used to find the molecules and their functional group present in the synthesized copper Nanoparticles. Figure 2, represents the FT-IR spectra peaks at 3420cm^{-1}, 2920cm^{-1}, 2850cm^{-1}, 1650cm^{-1}, 1380cm-1, and 1090c cm^{-1} [2]. TheFTIR spectra revealed the presence ofdifferent functional groups like Alcohol (OH stretch H-bonded, free), Alkane (C-H stretch, -C-H bending)) Alkene (=C-H bending, C=C stretch) ,Amine (C-N, Strech) Nitro compounds (N-O stretch), Acid (OH, stretch) Ester, (C-O, stretch). These functional groups play a very important role in copper nanoparticle synthesis.The region of copper nanopartical in FT-IR is 400 – 4000 cm^{-1}. Different peaks obtained in FTIR specrtum confirmed the presence of copper nanoparticals in plant extract.

4.3 ANALYSIS OF ANTIMICROBIAL ACTIVITY

TABLE 1 : ANTIMICROBIAL ACTIVITY OF COPPER NANO PARTICLE

MICROORGANISM	PLANT EXTRACT WITHOUT COPPER NANO PARTICLES (30µl)	PLANT EXTRACT WITH COPPER NANO PARTICLES (30µl)	CHLOROMPHENICAL (30µl) (STANDARD)
SIZE OF ESCHERICHIA COLI (in mm)	9	10	18
SIZE OF STAPHYLOCOCCUS AUERUS (in mm)	9	10	20

Figure 3 : ANTIMICROBIAL ACTIVITY OF COPPER NANO PARTICLE

Table : 1 and Fig : 3 shows that the standard size of Escherichia coli and Staphylococcus are 18 and 20 in chloromphenical (STD). In blank solution, the size of Escherichia coli and Staphylococcus are 9. In the plant extract solution with Copper nano particles ,the size increase from 9 to 10 for both Escherichia coli and Staphylococcus and it is lesser than the standard size in chloromphenical.

5. CONCLUSION

The aqueous copper ions exposed to the Polyalthia longifolialeaf extract results in the formation of copper nanoparticles was confirmed by the change of colour. Synthesized copper nanoparticles was confirmed by UV Visible spectrum and FTIR specturm. Proven antibacterial activity against different microorganisms such as E. coli and S. aureus established. It is confirmed that the copper nanoparticals are capable of rendering high antibacterial efficacy and hence it has a great potential in the preparation of drugs used against bacterial diseases. Copper nanoparticles based on these findings leads to valuable discoveries in various fields such as medical devices and antimicrobial systems.The present study exhibit a simple method of synthesis of copper nanoparticles and it is used for industrial production of nanoparticles at room temperature with more potent antimicrobial agents.

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NANOTECHNOLOGY - APPLIED IN MEDICINE AND BIOLOGICAL PROCESS

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ABSTRACT

The article is about the various applications of nanoparticles in medicine and biology. Nanoparticles are metal particles in the size range of 1-100nm and form building blocks of nanotechnology. Nanotechnology is a multidisciplinary science comprising various aspects of research and technology. Metal nanoparticles like gold, silver and platinum have gained considerable attention in recent times due to a wide variety of potential applications in biomedical, optical and electronicfields. The wide range of applications of nanoparticles is due to their unique optical, thermal, electrical, chemical and physical properties that are due to a combination of the large proportion of high energy surface atoms compared to the bulk solid. Nanoparticles are of great scientific interest as they bridge the gap between bulk materials and atomic or molecular structures.

Their unique size-dependent properties make these materials superior and indispensable in many areas of human activity. This brief review reveals the most recent developments in the field of applied nanomaterials, in particular their application in biology and medicine, drug delivery, imaging, sensing, and for the understanding of basic biological processes.

1. INTRODUCTION

Nanotechnology is a relatively new branch of science that has found a wide range of applications that range from energy production to industrial production processes. One of the key applications of nanotechnology is in field of biology and biomedical research. Nanoparticles (NPs) can be engineered to possess unique composition and functionalities, which can provide novel tools and techniques in biomedical research (1).

2. TYPES OF NANOPARTICLES

There are many types of NP platforms with differing size, shape, compositions, and functionalities. The major characteristics and functionalities of each NP that is relevant for biomedical research.

I. LIPOSOMES

The first NP platform was the liposomes. It is one of the first NP platforms to be applied for gene and drug delivery. Liposomes are spherical vesicles that contain a single or multiple bilayered structures of lipids that self-assemble in aqueous systems. Unique advantages imparted by liposomes are their diverse range of compositions, abilities to carry and protect many types of biomolecules, as well as their biocompatibility and biodegradability (2). These advantages have led to the well-characterized and wide use of liposomes as transfection agents of genetic material into cells (lipofection) in biology research. Another major application of liposomes is their use as therapeutic carriers since their design can allow for entrapment of hydrophilic compounds within the core and hydrophobic drugs in the lipid bilayer itself (3). Today, there are twelve clinically approved liposome-based therapeutic drugs.

II. ALBUMIN-BOUND NPs

Albumin-bound NPs (nab) uses the endogenous albumin pathways to carry hydrophobic molecules in the bloodstream. Albumin naturally binds to the hydrophobic molecules with non-covalent reversible binding, avoiding solvent-based toxicities for therapeutics. As a result, this platform has been successfully adapted as drug delivery vehicle. Abraxane, a 130-nm nab paclitaxel was approved by the FDA in 2005 for the treatment of metastatic breast cancer (4). It may also target the albumin-binding protein SPARC (Secreted Protein Acidic and Rich in Cysteine), which is over expressed in certain tumors.

III. POLYMERIC NPs

Polymeric NPs formed from biocompatible and biodegradable polymers have been extensively investigated as therapeutic carriers. Polymeric NPs have been formulated to encapsulate hydrophilic and/or hydrophobic small drug molecules, as well proteins and nucleic acid macromolecules. The NP design can allow for slow and controlled release of drug at target sites (5). Polymeric NPs are usually able to improve the safety and efficacy of the drugs they carry. Another type of polymeric NP is dendrimers. Dendrimers are regularly branched macromolecules made from synthetic or natural elements including amino acids, sugars, and nucleotides. The varied combination of these components can yield dendrimers of well-defined size, shape, and branching length/density. As a result of their unique design, dendrimers can be developed as sensors as well as drug and gene delivery carriers (6).

IV. IRON OXIDE NPs

Iron oxide NPs are widely studied as a passive and active targeting imaging agent as they are mainly superparamagnetic. Currently, two SPIO agents, ferumoxides (120–180 nm) and ferucarbotran (60 nm) are clinically approved for MRI (Magnetic Resonance Imaging). SPIONs (Superparamagnetic iron oxide NPs) have also been used in molecular magnetic resonance applications such as the detection of apoptosis and gene expression. SPIONs can be functionalized with magnetic, optical, radionuclide and specific targeting ligands for multimodal imaging (7). They can also potentially be used as non-invasive diagnostic tools and as drug delivery vehicles.

V. QUANTUM DOT

First discovered in 1980, quantum dots (QDs) are semiconductor particles that are less than 10 nm in diameter. QDs display unique size-dependent electronic and optical properties. Most QDs studied consist of a cadmium selenide (CdSe) core and a zinc selenide (ZnS) cap (8). The absorption spectra of these particles are very broad and emission is confined to a narrow band. QDs can also emit bright colors, have long lifetimes, high efficiencies and are stable against photo bleaching. They can be generated to have different biochemical specificities and can be simultaneously excited and detected. As a result, QDs have several significant advantages over many organic fluorophore dyes for optical applications.

VI. GOLD NPs

Gold NPs offer many size-and-shape dependent optical and chemical properties, biocompatibility, and facile surface modification. Gold NPs can strongly enhance optical processes such as light absorption, scattering, fluorescence, and surface-enhanced Raman scattering (SERS) due to the unique interaction of the free electrons in the NP with light (9). These properties have enabled the realization of gold NPs in many applications such as biochemical sensing and detection, biological imaging, diagnostics, and therapeutic applications. Gold NP probes have also been used to detect heart disease and cancer biomarkers (10). They can also transform absorbed light into heat and therefore, have high potential for infrared phototherapy.

3. NANOPARTICLE APPLICATIONS IN BIOLOGY

The various applications of nanomaterials in biology or medicine are:

I. NANOPARTICLES FOR PATHOGEN DETECTION AND SEPARATION

Various NP platforms have been explored as sensors for detection and separation of pathogens. One of the most common methods used for the detection of bacteria has been through the use of magnetic biosensors that involve direct immunological reactions using magnetic NPs coated with antibodies against surface antigens. One group applied this immunomagnetic approach in a novel microfluidic device to attract molecules bound to magnetic NPs from one laminar flow path to another *via* a local magnetic field gradient (11). Using this device, E. coli labeled with biotinylated anti-E.coli antibody and bound to streptavidin-coated SPIONs were efficiently separated from solutions containing densities of red blood cells similar to blood.

II. NANOPARTICLES AS SENSORS

NPs have been employed in sensors for a variety of applications including detecting analytes at very low concentrations, detecting and separating pathogens, detecting and capturing cells, and detecting molecular and cellular functions.

III. NANOPARTICLES FOR ANALYTE DETECTION

The development of new sensing techniques for biological analytes such as DNA, RNA, and proteins are leading to more sensitive and efficient detection of these analytes at low concentrations. NPs have large surface area to mass ratio, small size, and composition dependent properties that can enable the use of surface ligands as a way to amplify the detection threshold or provide more rapid detection (12). The ability to easily functionalize NPs with targeting ligands can also enable specificity in binding and signaling of the analytes, allowing for more efficient detection.

IV. NANOPARTICLES FOR CELL DETECTION AND SEPARATION

NPs have been explored as sensitive tools for the detection of specific cell types and cells found in low frequency. One application of interest has been the detection and capture of circulating tumor cells (CTCs). CTCs can aid in the understanding of the biology of cancer metastasis and have been described as a strong prognostic biomarker for overall survival in patients with metastatic breast, colorectal, and prostate cancer. These techniques involve the use of magnetic NPs to target and isolate CTCs using a ligand-receptor based mechanism.

V. NANOPARTICLES AS IMAGING AGENTS

NPs have been explored as novel labels and contrast agents in molecular imaging. The unique properties of NPs can enable sensitive and specific monitoring of molecular targets as well as of cell responses associated with diseases such as cancer and cardiovascular diseases (13)

VI. NANOPARTICLES FOR TARGETED IMAGING

NPs have many promising attributes for targeted imaging. First, NPs can deliver a large number of imaging agents at a time due to their surface area, allowing for improvement in sensitivity (14). NPs may passively target tissues *in vivo* via the EPR effect or be targeted to accumulate at sites where the molecular target is expressed, increasing the local concentration of contrast agents. The high capacity for NP modification enables their use as amplifiers for *in vivo* imaging. Finally, they can deliver several different types of imaging agents to perform multimodality imaging.

4. NANOPARTICLES AS DELIVERY VEHICLES

I. DELIVERING SIRNA FOR BIOLOGICAL STUDIES

RNA interference (RNAi) is an important biological tool for use in cell culture and in living organisms. It is traditionally used to study gene functions because it allows targeted degradation of mRNA after the introduction of sequence-specific double stranded RNAs into cells. However, effective siRNA delivery can require overcoming many biological obstacles: 1) difficulty entering the cell because of high molecular weight and negative charges, 2) degradation by nucleases within the cell, 3) targeting to the appropriate cell compartment and 4) rapid clearance and instability *in vivo* (15). Recently, NPs have been used to deliver siRNA to silence genes in immune cells since these cells can have pivotal roles in homeostasis and disease. NPs have also been used as a vehicle to deliver siRNA in plant cells to study cellular pathways at the single cell level.

II. DELIVERING HYDROPHOBIC COMPOUNDS WITHOUT SOLVENT OR EXCIPIENTS

Many biologically active compounds are hydrophobic molecules and are poorly soluble in water. Utilizing such compounds in biological research can be challenging because of their poor solubility in aqueous environments. Current approaches involving using a solvent such as dimethyl sulfoxide (DMSO) or an excipient such as cremophor.

For example, wortmannin, a PI3 kinase inhibitor and a commonly utilized reagent in biological research, requires DMSO for *in vitro* applications. Moreover, NP wortmannin functioned as an effective and potent therapeutic agent *in vivo* in a mouse model of cancer.

III. DELIVERING AGENTS TO SUB CELLULAR ORGANELLES

One area of active investigation is delivering various agents to specific organelles. In particular, subcellular availability and accessibility of a target is important in effective delivery of therapeutic and imaging agents (16). Targeted NPs can bind to targets localized on the cell surface and enter the cell through endocytosis. In particular, NPs carrying oligonucleotides need to escape the endosome and then be targeted to be effective. Tools for effective subcellular targeting are emerging for targeted delivery to the nucleus, cytosol, mitochondria, endosomes, and lysosomes(17).

IV. EFFECTS OF BIOLOGY ON NPs

Understanding NP interactions with biological systems is necessary in developing effective NPs as sensing, imaging and drug delivery agents. Properties of NPs such as size, shape, functional groups, surface charge, and composition are all factors that have been shown to affect NP interactions with biological systems *in vitro* and*in vivo*. It is known that NPs are rapidly cleared by the cells of the reticulo endothelial system (RES)/mononuclear phagocyte system (MPS) in the body (18).

V. NANOPARTICLES TO STUDY BIOLOGICAL PROCESSES

The unique properties of NPs have enabled their use as promising tools to study biological processes. Many innovative techniques using NPs are being developed to activate cell signaling pathways, to induce protein production, and to improve upon current techniques used in molecular and cellular biology research. NPs such as QDs have been extensively studied for many biological applications that use fluorescence. Some of its uses include immunostaining of fixed cells and tissues, membrane proteins and cytoskeleton filaments (19). Recently, QDs have also been used to visualize the molecular dynamics of individual molecules in live cells.

5. CONCLUSION

Biological studies that employ NP techniques can provide novel insights into cell functions and molecular processes involving complex signaling pathways. Nanotechnology enable the creation of devices on the same scale as individual cells and biomolecules, creating a unique approach to imaging, sensing, drug delivery and characterizing basic biological processes. NP monitoring and

detection techniques can potentially aid in understanding the basis of biochemical pathways involved in disease and injury. Currently, there are various commercial NPs available for use as contrast agents in imaging modalities such fluorescence imaging and magnetic resonance imaging and for detection of low concentrations of analytes. Thus, careful evaluation and effects induced by different types of NP formulations in biological systems are important in employing NPs for biological applications.

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THE PSYHOLOGICAL QUEST IN MARGARET ATWOOD'S SURFACING AND ARUN JOSHI'S THE LAST LABYRINTH : A COMPARATIVE STUDY

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ABSTRACT

Modern man has been under the vicious impact of modernization and industrialization. The advancement in the field of science and technology came as a boon to him so that he could lead his life comfortable with the help of machines. The catastrophic impact of the technological revolution had been quite alarming that he found his life void. It is distinct that this ruinous state of mankind is due to lack of ethical standards and moral values. In modern society, man gets depressed and he undergoes deep personality crises. The psychological journey of the unnamed Narrator in Margaret Atwood's Surfacing undertakes three basic journeys. The psychological journey allows the narrator to reconcile her past and ultimately leads to the conclusion of the physical journey. Som Bhaskar, the narrator – protagonist of Arun Joshi's The Last Labyrinth is disillusioned and he is unable to relate himself meaningfully in his surroundings. He is a fractured personality who finds himself helpless in the indifferent social world of India. He continues to unravel the labyrinths of life. His anguish for physical pleasure gets dissolved and he understands that self-control is the first step to the attainment of spiritual freedom.

Margaret Atwood is a Canadian icon in the literary domain. Her novel Surfacing was the first to gain international attention. It relates an unnamed narrator's search for her missing father, presumed dead. It portrays the story of an invisibly visible character without name in the form of the narrator of the story. The narrator returns to her hometown i.e. Northern Quebec after several years in search of her missing father. She is at first shocked to see the sea-changes in the region and the wild nature which is caused by the tools of progress in the name of economic and material development. J. Brooks Bouson, a feminist critic remarks that "Surfacing rejects the masculinity culture- which is depicted as both rationalistic and dangerously aggressive- band idealizes a nature-identified feminity "(39).

The unnamed Narrator in Margaret Atwood's novel Surfacing returns to Quebec after years of absence in search for her missing father. She brings her boyfriend Joe, and a married couple Anna and David. On the way to a village near her father's island., the Narrator visits her father's friend, Paul. Paul can provide no new information on how to locate the narrator's father. Finally, the narrator comes to know that her father is no more. She returns to her country at last.

The Narrator undertakes three basic journeys, a physical quest to search for her lost father, a biographical journey into her past, and most importantly a psychological journey. The psychological journey allows the narrator to reconcile her past and ultimately leads to the conclusion of the physical journey. In this psychological voyage into her inner self, the narrator, while travelling from cognizant rational reasoning to subconscious dissociated really progresses through three stages. In the first stage, the narrator is in touch with reality; she lives and exists in a state of mind known in Freudian psychology. This conviction is elucidated at the end of the passage when the Narrator comments: "anesthesia, that's one technique, if it hurts invent a different pain. I'm all right ". (Atwood 13)

When she arrives, she continues to rationally attempt to solve the physical quest, her father's disappearance. However, she refuses to believe that her father could be dead, she says,I "can't accept it though, he knew too much, he was too careful" (5) She continually represses unpleasant thoughts into her subconscious. She begins to fantasize that her father is lurking in the woods, psychotic and watching her. As the truth about her father becomes revealed, she is forced to abandon her" anesthesia'. At the same time, she is undergoing flashbacks of her memory, unpleasant thoughts which she had subdued into her sub consciousness. A particularly big lie is the issue of an abortion she refuses to accept as having taken place. She states," But I couldn't have brought the child here, I never identified it as mine, I didn't name it before it was born even, the way you are supposed to. It was my husband's he imposed it on me" (37). She believes her lie that she had left her child in the city. She must believe it, it is her "anesthesia". As each fantasy is disproven, she delves further into her subconsciousness from the ugly thoughts that she must face.

The title *Surfacing* is very significant as it reveals the efforts of an individual's identification which undergoes many phases of physical troubles and mental traumas. All the efforts of the Narrator in the novel for identity come up on the surface in the midst of nature from deep conflict between self and society. The protagonist does not bear a name ultimately suggests her alienation from society and her loss of identity. Laing, a psychiatrist says "the individual seems to be the vehicle of a personality that is not his own. Someone else's personality seems to possess him and to be finding

expression through his words and actions, whereas the individual's own personality is temporarily lost or gone" (58) By depriving the protagonist of a name, Atwood has been able to portray a story of not a particular woman but the millions of women who may identify with her.

At the outset of the novel, the protagonist has revealed the fact that she has already lost her identity. Towards the end of the novel, she realizes "it's too late; I no longer have a name. I tried for all those years to be civilized but I'm not and I'm through pretending" (168). Her identity remains under a mask. Every human being needs his/her identity which helps to develop one's personality. So the quest for identity is very important for human predicament because the loss of identity would always result in utter dejection. In *Surfacing*, the protagonist's search for an explicit identity is fulfilled in the end of the novel. Her passive attitude ends up as an activist survives with dignity. Her search for identity is completed at the end of the novel when she returns to the city and decides to give birth to her second child. She is no longer a victim. Carol P. Christ opines,' The Surfacing of Women's Spiritual Quest and Vision "a male-defined world, to the greater terror and risk, and also the great potential, healing and joy, of a world defined by the heroine's own feeling and judgment" (325).

The unnamed protagonist acquires a radical perception of reality that is developed through an intense psychological journey through on the island that served as her childhood home. Truth can be taken from the narrator's viewpoint but the reader must explore the inner turmoil plaguing her in order to understand the basis of such beliefs.

Arun Joshi is one of the most significant Indian English novelists. In his novel, The *Last Labyrinth* (1981), Som Bhaskar, a young intelligent millionaire is essentially turbulent and groping through the labyrinths of life. Being a business tycoon, he is never contented with his lot. He is portrayed as an embodiment of chaos and uncertainty. He cannot believe anything and he walks tightrope between illusion and reality. He is a product of twin worlds- the western world of science and rationalism and the Indian world of faith and transcendentalism. O.P.Mathur aptly remarks," The Last Labyrinth seems to depict the vague but unmistakably reaching out for faith and understanding by a man lost in the labyrinth of desires and the vague simmering of his discontent with this type of life". (204 – 217)

Som Bhaskar is a millionaire industrialist . He is married to a woman of his choime who has borne him two children. Like his father, he is intellectually an accomplished man. An insatiable cry of "I want, I want, I want " keeps on haunting him His life remains a quest for an undefined

thing in the name of a dark labyrinth. The novel closes with his aborted attempt to end himself as he aims his revolver at his skull. But his wife , Geeta, intervenes he feels as though he has come out of a slee[. Som's arm facing Geeta,"like a traffic policeman" perhaps indicates affirmation.

Som is the battle ground between the two hungers of body and spirit. He is a fusion of two conflicting human faculties, instinct and reason. The blend of two distinctly separate sides of human faculty corresponds with the basic thematic background of the novel. Instinct is the very gound of Kama to which Som responds with a sense of immediacy. His reasoning enables him to seek the evidence of the existence of God encircled by the world of Maya. He becomes a 'sad man' (56) losing his head unable to guide himself in the direction of the right path, (i.e.) dharma.

Joshi's *The Last Labyrinth* probes into the turbulent inner world of an existential hero, Som who becomes a millionaire at the age of thirty. His personality reveals the fact that he is suffering from insecurity and hollowness and that they propel him from one goal to another. His doubtfulness in the serene company of his wife Geeta gets multiplied not only because of his terrible loneliness but also because of the lack of relevance in life. He is absolutely driven by undefined worldly hungers – hunger for money hunger for fame and so on. He does not find happiness in the company of his wife Geeta. His attempts to win his owner's concubine Anuradha end in failure. He goes to Europe with his wife Geeta hoping to get rid of his obsession with "Benares, Aftab, Anuradha, their Haveli- all were bores, frogs shock in their marshy wells. What I wanted, I Decided, was to go abroad, get the hell away from this land of obsession" (113). But Anuradha disappears, conveying the idea that one has to sacrifice something to gain anything.

Anuradha's disappearance makes him plead to God that he is not happy because of his spiritual hollowness. R.S. Pathak considers Som as a "western, educated, affluent young man who while feverishly searching for his roots discovers in the process a haunting emptiness and void". (139). Som gets mentally shattered and physically exhausted with dreams and insomnia. Though he could look at himself in the mirror, "lean, crow-footed, graying, I could not, then, see the hunger but there was the boredom and the endless depths of it. I woke up in the middle of the night, depressed, the taste of tranquillizers in my mouth" (21). His knowledge has done him "Blessed little good". (129). He finds life absurd and there is no solution to his problem. He is the embodiment of chaos and uncertainty. He is puzzled between the scientific reasoning of the philosophers – Jung, Freud and Darwin and the faith and trust of his mother and wife Geeta. He does not attempt to

solve the problems through faith and he continues to remain alienated. Despair overtakes him and he continues to remain alienated. Despair overtakes him and he tries to put an end to this tortured existence. Geeta, his understanding wife prevents him from doing so.

In *The Last Labyrinth*, the humanizing call is presented on a more intense level of experience. Som, the protagonist relates the events of his life in flashback. He belongs to the upper crust of life. He has a morbid urge for identifying last labyrinth of life. The very first sentence of the novel expresses the motto of Som's life. "Above all, I have a score to settle. I forget nothing, forgive no one" (1). He can find neither truth nor the remedy for his suffering. He is alienated from society and from himself. The frequently related expression" I want, I want, I want" (78) defines the structural principle of the narrative.

Som, the narrator finds himself in the shattered mirror and in each fragmented piece; he is deformed with funny voice. Devinder Mohan is of the view that Joshi, like Camus, is a novelist of sensibility and he has encountered the dangers of isolation and madness. He calls Joshi, a 'naturalistic rebel' (194) who work out the language of interior monologue with psychological acceptance of facts as facts.

This novel deals with the journey of man from the temporal to the immutable centre and it suggests the path of human salvation. It is hinted that true faith can take over the difficulties of the mundane affairs and temporal values of life. The title of the novel *The last labyrinth* is highly significant. It stands for the great mystery that hangs about the labyrinth which is itself a matter of great inquiry. The structure of the novel is like that of labyrinth. Joshi extends the metaphor of labyrinth to the world, to Som Bhaskar's labyrinthine wanderings and to human beings in general. The novel is divided into three parts, with eleven, three and five chapters and the setting of each chapter shifts almost as frequently as Som does think. Like a lost person wandering endlessly in the labyrinth till the very end, the action of the novel shifts from one place to the other till the novel comes to an end. Joshi's protagonist shifts aimlessly form one place to the other as if playing the game of hide and seek.

The novel's action is mainly set in Lal Haveli. It is the arena of the whole action and it symbolizes death and desolation. This potent and obvious symbol runs like a thread all through the novel which ultimately justifies the title. .Joshi uses this as a symbolic setting for Som who gropes through the labyrinth of life and death. The dark rooms form the apt backdrop for Som's own journey into the dark night of his soul. He finds within himself "nothing but an empty roaring, like

the roar of the sea in a conch" (115). Joshi's broad humanistic, outlook is demonstrated through his moral vision in his novel. "The passage he patently conveys through his fiction is that man can draw great sustenance from his spiritual and moral womb even as he lies groaning on the debris of the shattered moral and spiritual values". (Sharma 123)

Joshi is concerned with the decaying upper crust of the Indian society. His novel reveals his remarkable inwardness with the language and poise. The weight of his Indian experience is successfully carried by his language which is a keen device to probe psychological states. It adequately conveys the frenzied outcry of the erring individuals and their inner thoughts.

Both novels deal with the journey of man from the temporal to the immutable centre. They suggest the path of human salvation. True faith can take over the difficulties of the mundane affairs and temporal values of life are the central message of the novelist. The unnamed protagonist of Surfacing takes her inner journey, which is depicted in tow different ways, first as a dive into the lake, where at the lake's bottom; she confronts her father's body and the memory of her aborted fetus. Som is an apt symbol of the rational man. He lacks human understanding,, charity, tolerance and kindness. Moreover, he is selfish and egoistic. The opening words of the novel reveal his nature. "Above all, I have a score to settle. I forget nothing, forgive no one". 5) His disturbed psyche brings ruin and chaos on Anuradha, Aftab and himself also. In the same way, the unnamed protagonist affects the other characters.

In both novels , similar images like loneliness, separation, hypocrisy, coldness, corruption, disease, death and the absence of individuality, honesty and universal human values. These images help in creating an atmosphere of alienation. Thereby, they facilitate the work of the artist in depicting such alienated characters.

Both protagonists of Atwood and Joshi are not religious or saintly. But they are humble enough to learn lessons taught to them by life's problems. They try to face the challenges of their meaningless life by outstripping the narrow confines of their distraught selves. Joshi looks upon his novels basically as attempts at self-expression and self-understanding. In his Interview to M.R. Dua, Joshi says:

"My novels are essentially attempts towards a better understanding of the world and of myself……. If I did not write, I imagine I would use some other medium to carry on my exploration". (Dhawan 18)

One becomes aware of one's responsibility as an agent in the face of situations such as death, struggle, guilt, or anxiety. Through commitment man provides a reason for his existence and this helps him to integrate society. Identity crisis is in general refers to psychological stress or anxiety about the sense of identity. A person undergoes this psychologically distressing experience when he feels that his personal identity is being spoiled or threatened. Identity crisis means the feeling of the loss of a sense of personal identity or depersonalization. Two types of experiences generally represent threats to personal identity. They are violation of self expectations and changes in the self in whole or in part.

A person who does not have or dissembles an identity often becomes neurotic, even schizophrenic. His feeling of split personality is both painful and troublesome. Having lost the sense of personal identity, such a man feels alienated and lonely. Gradually, he makes frantic efforts to seek, organize and affirm his sense of identity. His affiliation with the group of his choice, his acceptance and recognition as a person as a career role in the society, his commitment to definite values in life will produce feelings of belonging and reaffirmations of his lost identity. The term "Affirmation" means confirmation of anything established; to declare something true positively or firmly.

The hero of Joshi's novel adopts a cynical attitude towards life due to social pressures, dissolution of old faiths and dogmas and uncertain loyalties. He gets alienated and from the society gradually. The urge for alienation arises out of emotional insecurity. Uncertainty leads to the quest for identity on the part of the alienated self. Joshi never accepts alienation as the ultimate condition of life. It is a transitional phase in the protagonist's quest for self-knowledge. The spiral pattern of CHAOS – ALIENATION- ORDER is in consonance with the novels of Joshi. Similarly, the novel *Surfacing* is well balanced in the tree part division: rising action, climax and falling action. The problem of the disappearance of her father, a tree survivor and botanist, results in rising action as she sets out searching for the clues. Joshi's protagonist and the angst ridden narrator of Margaret Atwood arrive at self-realization and discover the higher values of life by discovering through self-probing and self- exploration.

Any great writer's works should hold out great promise for the future generation. In this context, the contribution of Atwood and Joshi is an added significance to literature. The three planes of existence – physical or material, intellectual and the spiritual correspond to the three

states of matter, called in Sanskrit Sattva, Rajas and Tamas. Both protagonists are affected by these three states of matter. They choose the right path of life for themselves, to lead a life of dignity, peace and happiness.

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TOURISTS ATTRACTION IN KODAIKANAL

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INTRODUCTION

Tourism is travel for recreational leisure or business purposes. The world tourism organization defines to tourists as people who "travel to and stay in places outside their usual environment for more than twenty - four hours and not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited."

From the very inception of life travel has fascinated man travel and tourism have been important social activities of human beings from time immemorial. The urge to explore new places with in one's own country or outside and seek a change of environment and experience has been experienced form ancient times. Tourism is one of the world's most rapidly growing industries. Much of its growth is due higher disposable incomes, increased leisure time and falling costs of travel. As airports become more enjoyable places to pass through, as travel agency services become increasingly automated and as tourists find it easier to get information on places they want to visit, tourism grows. This new trend has made the tourism job very challenging. The holiday makers want a good rate of return on their investment They are to be lured with value additions and improved customer service.

Tourism today is much more than Just developing products It is more about quality, Insightful thinking and ability to have global information about technology, Partners, contacts and responding quickly to global and regional trends. The Fundamental task before Tourism promotion is to components in the tourism trade as active participates in the nation's social and cultural life. There is a long road ahead.

TOURISM IN DINDIGUL DISTRICT

There are several places of interest in Dindigul District. Palani hills with the famous temple of lord Muruga Dhanayuthapani Temple, Begampur Mosque, Sirmalai Hills, Kodaikanal, Parappalar Dam, Varadhamanedhi Dem, Mariamman Temple and Nadupatti, Anjaneyar temple are places of tourist interest in the district. The famous Kodaikanal Hill station is also located in Dindigul District. An attration of this hill station is the kurinji flowers that bloom once in twelve years.

TOURISTS ATTRACTION OF KOADIANAL

The Palani Hill has an area of 2068sq k.m It is one of the ancient hills in the world A part of the Palani hill is known as kodai hill. The term koadi hill refers to the hill resort, Kodaikanal and the city region in and around it. In 1899 the kodai hill area became a municipal Unit and in 1960 it became a separate municipality and the total area of the municipality now is 21.45 sqkm.

The kodai hill is a popular resort in South India. The Climate here attracts millions of tourists, all over the world, since many natural places of attraction are seen abundantly in kodaikanal. When Compared with other hill resorts in simila, Darjeeling Ooty and kodaikanal is still preserving its environs and natured beauty the process of Urbanization the development of tourism and falling kodaikanal is a hill station on the southern tip of the upper palani Hills, In Dindigul District of the State of Tamil Nadu in Southern India, Kodai is also a major tourist attraction and many of the local make their living through tourist services. Kodaikanal is sometimes referred to as "Princess of Hill station."

KODAIKANAL CLIMATE

Its temperature is never too hot or cold, though night temperatures drop to freezing, point in January and thin layer of ice in seen on the edges of the road. In summer (March to May) the temperatures range is from $^{20.c}$ to $^{11.c}$ and in winter (Dec-Feb) $^{17.3.c}$ to $^{8.3.c.}$ An average of 165 cm s of rain falls every year. Mostly. When north east monsoon occurs from June to September.

TOURIST PLACES OF KODAIKANAL

- **SILVER FALLS**

Silver Cascade Falls, one of the most famous waterfalls, is the first attraction that unfolds to tourist, located on the Madurai - Kodaikanal road, on way to Kodaikanal. This waterfall is the result of excess water in the Kodai Lake, which comes down as a fall. Silver Cascade Falls is located at a distance of around 8 km from Kodaikanal.

- **KODAIKANAL LAKE**

Kodaikanal Lake is a man-made water body that covers an expanse of 60 acres. Visited and re-visited by countless tourists every year, this star-shaped lake lies in the Dindigul

district of Tamil Nadu. The north-western Palani Hills in the surroundings complement the beauty of the lake. By far the most iconic geographical landmark of the hill station- Kodaikanal Lake was created in the year 1863 by Sir Vere Henry Levinge, The lake is fed by the waters that roll down from the Palani Hills, which receive an annual rainfall of 1650 mm. The surface elevation of the lake is 6911 feet above sea level, and boasts of a shore length of 9 km. The maximum and average depth of this water body is 35.6 feet and 9.7 feet, respectively. The outflow from this lake forms a beautiful waterfall called Silver Cascade. Measuring 180 feet in height, The aqua fauna of this lake is unique and worth-mentioning. Macophytes of many types can be found in the lake. In addition to these, there are aquatic insects, Danio aequipinnatus, Rasbora daniconius and Gambusia affinis. Among the fishes, rainbow trout and common carp are widely found.

- **BOAT CLUB**

Boating in the Kodai Lake is one of the important parts of every Kodaikanal tour. Boat Club in Kodaikanal offers boats of various kinds on rent, making the experience of boating a lot easier. Enjoy boating at the serene Kodai Lake, with pristine water around you and an enchanting view to admire while the cool weather soothes you. It will be an experience worth remembering.

- **BEAR SHOLA FALLS**

Kodaikanal, a popular tourist spots is one of the best places to spend few relaxed days of your lives. The hill station has varied kinds of options to keep its tourist engaged. One of the best examples of the same is Bear Shola Falls. Located at a distance of 2 km from the Kodaikanal Lake, the falls are 3 kilometres away from the bus-stand. Located in the Reserve forest, Bear Shola Falls is a perfect picnic spot offering a setting to just relax with your loved ones amidst lush greenery

- **BRYANT PARK**

Kodaikanal, a hill station in the state of Tamil Nadu in the Palani Hills is a place worth visiting at least once in life time. Kodaikanal tour offers you with many tourist spots. One of the most popular ones is Bryant Park. Situated on the eastern side of Kodaikanal Lake, Bryant Park is a botanical park and a blessing on the hill station for those interested in botany. The park is known for many kinds of flowers, hybrids and grafts. Cut flowers from the park are also used for exporting because of their good quality and wide range of variety. The park also has a glass house with many fine varieties of flowers which adds on to the overall charm of the place.

In the month of May, a flower show also conducted in the park which is a part of the summer festival attracting many tourists and not just for those interested in botany. The show is organised by the department of Horticulture and showcases many kinds of vegetables and flowers which are brought from neighbouring villages and compete for various prizes.

- **COKER'S WALK**

One of the popular tourist spots in Kodaikanal, Coaker's Walk is something worth visiting during your Kodaikanal tour. Constructed by Lt. Coaker in 1872 on whom it has been named, Coaker's Walk is a narrow pedestrian path which is approximately one km in length. This mountain road is just half kilometre away from the Kodaikanal Lake. Running along the slope edges on the southern of the Kodai Road, the Coaker's Walk starts near the van Allen hospital and joins the main road above St. Peter's Church. The places offer tourists with a refreshing setting along with breath taking view of the plains.

One can have the opportunity to have clear view of the Dolphin's nose which is located in the south, valley of the Pambar River in South East. You also get a distant view of the Periyakulam along with a view of Madurai city. However, if you happen to visit on a cloudy day, you might not get a clear picture of these.

- **TELESCOPE HOUSE**

A refreshing break from the pressure of hectic day to day life is something we all look forward to. The hill station of Kodaikanal presents its tourists with mesmerising natural settings, refreshing and soothing environment, adventurous activities, luxurious accommodation facilities and umpteen numbers of tourist spots. One of the best examples of tourist spots in Kodaikanal is **Telescope House**. The **Telescope** is located at the northern tip of the Coaker's Walk. It was constructed so as to make it easier for tourists to have amazing view of the valley. An entrance fee is collected per head. Visitors get mesmerising view of the surrounding areas especially of Sothupparai Dam, Vaigai Dam, Periyakulam and Varaha River. The Kodaikanal Terrestrial Telescope has been constructed at an appropriate place and attracts hordes of tourists.

- **KURUNJI ANDAVAR TEMPLE**

Located at a distance of 3 km from the Kodaikanal Lake, Kurinji Andavar Temple is the place worth visiting not just for religious tourists. Dedicated to Lord Muruga, the temple holds an important position amongst Hindu devotes. Lord Muruga is referred as 'God of hill'. In Tamil

language, the word Kurinji means 'hill region' and Andavar means 'God'. Thus the name itself symbolises its connection with the hill and the God of the hill. The temple has also connection with the Kurinji flower which blooms on the hill once in 12 years. It is said that the flower bloomed last in the year of 2004. According some, the honey from this place during the year when the Kurinji flower booms has medicinal value.

- **CHETTIYAR PARK**

Kodaikanal, one of the most beautiful hill stations in the country is often called the "Princess of Hill Stations", Kodaikanal present its tourists with amazing holidaying options. From trekking to sightseeing to relaxing to photography, Kodaikanal tour has something for each and every one. One of the important tourist spots in Kodaikanal is Chettiar Park. Located at a distance of 3.2 km from the Bus Stand and on the north east corner of Kodaikanal, the park is on the way to popular Kurunji Temple.

- **SHENBAGANUR MUSEUM**

One of the popular tourist spots in Kodaikanal, Shenbaganur Museum is a place that makes for an interesting visit. Located at a distance of 5.6 Km from the Kodaikanal Lake, the museum is one of the best orchidoriums in the country. It is now maintained by the Sacred Heart College – Theological Seminary which was founded in year of 1895. The Museum came into its present being because of the efforts of a Spanish Father E. Ugarthe. He took control in 1951 from its creator A. Anglade. A compilation of past collections along with of butterflies, moths and birds by teams of students was initiated. A brief description of the museum's assets was given by Ugarte in the year of 1963 which has been published as 'A Museum of the Palanis'. Before this, there was a record called 'The Botanical inventory in the Museum' which was by Father KM Mathew in 1954.

- **SOLAR ASTROPHYSICAL OBSERVATORY**

The Kodaikanal Solar Observatory is a solar observatory owned and operated by the Indian Institute of Astrophysics. It is on the southern tip of the Palani Hills 4 km from Kodaikanal town, Dindigul district, Tamil Nadu state, South India. The Evershed effect was first detected at this observatory in January 1909. Solar data collected by the lab is the oldest continuous series of its kind in India. Precise observations of the equatorial electrojet are made here due to the unique geography of Kodaikanal. Ionospheric soundings, geomagnetic,

F region vertical drift and surface observations are made here regularly. Summaries of the data obtained are sent to national (India Meteorological Department) and global (World Meteorological Organization, Global Atmosphere Watch) data centers.[1]

- **GOLF CLUB**

A private membership club with a history of more than 100 years behind it, Kodaikanal Golf Club is another popular place to visit in Kodaikanal. This golf club, located around 6 km away from the center of hill station is perfect example of recreation amid the best of natural setting. It is located near to other popular sightseeing places in Kodaikanal such as Suicide Point/Green Valley View and Pillar Rocks.

Kodaikanal Golf club boasts of 18 holes par 71 golf course. Presenting an ideal location for golf lovers, it is surrounded by breathtaking beauty and pleasant weather that makes the game even more exciting.

- **PILLAR ROCK**

Located 8 Kms away from the lake, Pillar rocks constitutes of three granite boulders and each of a height of 400 feet standing shoulder to shoulder. It also makes for an interesting picnic spot. The chamber between the two pillars is called Devil's kitchen.

- **GREEN VALLEY VIEW**

No matter where are we travelling, we all look forward to visiting popular tourist spots on the places we are visiting. The hill station of Kodaikanal presents tourists with amazing places to go for sightseeing. One of the best examples for the same is **Green Valley View.** As the name suggest, it offers tourists with amazing view of the plains, valleys and hills. Breath taking view of the Vaigai dam makes for an experience worth remembering. The green valley View is formerly called as Suicide Point. It received its name because of the dangerous valley which is deep and dense. The valley below the point is more than 5000 feet drop. The best time to visit the Valley View is between 10 am and 3 pm as the valley gets covered by mist as the day advances making it difficult to have a clear view.

Tourist arrival Statistics from July-2015 to January 2016 (Kodikanal)

S.No	Month	Domestic	Foreigners	Total
1	July-2015	259907	3627	263534
2	August-2015	263436	2619	266055
3	September-2015	236715	2116	238831
4	October-2015	206172	2438	208610
5	November-2015	142736	948	143684
6	December-2015	280898	2325	283223
7	January-2016	218369	2035	220404

Sources : Tourism Department, Kodaikanal

Kodaikanal has Several Scenic natural attraction which are enjoyed by its visitors and made it a popular romantic destination for newlyweds. Kodaikanal means the gift of the forests. It stands true to its name as the place is blessed with different varieties of green, luscious trees, the enormous, beautiful rocks formation and enchanting waterfalls. Beautiful Spraralling Ghats overlooking the greenery of this hill station is perfect for finding peace and Tranquillity while relishing the beauty of nature.

The name Kodaikanal means gift of the forest and the dense forest with many varieties of trees the huge rocks in the wilderness and the enchanting waterfalls, make it a real gift for the tourists visiting this place An area blessed by its location in the Palani hills in the western Ghats, it creates landscapes and natural beauty that one doesn't want to miss. To make the most of the enchanting Surroundings one can undertake various activities such as trekking, boating, horse, riding etc…

RESTAURANTS AND LOCAL FOOD IN KODAIKANAL

Hotel Tamilnadu was located inside of the city and easy to locate. Appearance of the hotel was excellent from interior and exterior.Garden facility available all amentities were available in

the hotel and functioning properly food taken from the hotel was excellent in quantity and quality breakfast services were good overall super to stay

Chocolates, Sandwiches, Brownies, Cheeses and some hot 'chai' are the most sought after eateries of Kodaikanal. Other than these, there is a lot that stands out in this town such as locally produced organic foods, a rich and spicy dash of Punjabi cuisine, popular items of Tibetan cuisine, an absolutely lip –smacking variety of Biriyanis, as an well as elaborate Gujarati Platter, Find local and traditional Platters here too, with essentials like Dosa, idly, Upma, Parota,Sambar, Rasam, Payasam, Kesari, Sweet Pongal and lots more.

IMPACT OF TOURISM DEVELOPMENT AT KODAIKANAL

Kodaikanal situated in Tamilnadu state is one of the hill stations in India.the increase in the tourist arrival has made kodaikanal to be always crowded to attract more number of foreigntourists.the tourist products must be improved accordingly to the necessitythere is a healthy awareness in the world

NEGATIVE IMPACT

Tourists get a lot of limitation from the street venotors and their business activities on the roadside and other areas

CONCLUSION

Abundant in natural beauty, Kodaikanal is an ideal spot for the family trips, honeymooners, adventure freaks and also for those who love to explore the untouched places. Kodaikanal is a place to be for every kind of traveler.

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PERFORMING ART FORMS OF KERALA

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ABSTRACT

Kerala is one of the most Colourful and culturally rich states of India. Dance and artforms are integral parts of a religion's culture. "God's own Country" Kerala boasts of its several forms of dances and art. Some of the folk dances which are native to the state have gained popularity. In Kerala, the folk dances are accompanied by splendid costumes and ornanents Perfectly adorning the performers. There are nearly fifty dance forms performed in Kerala, prominent ones are Thiruvathiraikali, Theyyam, Koodiyattam, Chakyar Koothu & Ottamthullal. Kerala is renowned for its two indigenous forms of classical dances "Kathakali" and "Mohiniyatam".

Keywords : Kerala, Dance, Trissur, Kathakali, Mohiniyattam.

Art is a diverse range of human activities in creating visual, auditory or performing artifacts(art works), expressing the author's imaginative or technical skill, intend to be appreciated for their beauty or emotional power. Art is a global activity which encompasses a host of disciplines , as evidenced by the range of words and phrases which have been invented to describe its various forms. The oldest documented forms of art are visual arts, which include creation of images or objects in fields including today painting, sculpture, printmaking, photography, and other visual media. Examples of such phraseology include, "Fine Arts", "Liberal Arts" , "Visual arts", "Decorative Arts" , "Applied Arts", "Design", "Crafts", "Performing Arts", etc.,

Kerala is sand witched between the Lakshadweep sea and the Western Ghats. It's a bustling little green and silver , Cocounts and water state on the west coast of India. It is bounded by Karnataka to the north, Tamilnadu to the east and the Arabian Sea to the west. Every district in Kerala has its own Unique culture and characteristics. Trivandrum is known for its beach kovalam, the SriPadmanabaswamy temple and various museums and Palaces, Alapuzha for its back waters, kottayam for its ancient churches and Trissur – the Cultural Capital.

The Phrase “God’s own Country” is Perhaps the most apt way of describing Kerala. Kerala with its crisp and fresh air, its absolutely pure and green environs and the nature trails that take to a strikingly beautiful world , as though God picked up his painting brush and palate and created this wonderful and soothing painting for you to realize and appreciate the fact that ‘ Life is beautiful’. Kerala one of the meeting place of many cultures. Kerala has a particulary rich heritage of dance and drama (Kathakali, Koothu Mohini attam and other temple arts originated here).

PERFORMING ARTSFORMS OF KERALA

KATHAKALI

Kathakali is the most popular sacred dance drama of Kerala. Kathakali evolved across the last 400 years. Kerala owes its transnational fame to this nearly 300 years old classical dance form from which combines facets of ballet, Opera, masque and the pantomime. It is said to have evolved from other performing arts like koodiyattam, krishanattam and kalarippayattu.

Kathakali explicates ideas and stories from the Indian epcis and puranas. Presented in the temple precincts after dusk falls kathakali is her aided by the kelikottu or beating of drums in accompaniment of the chengila. The riches of a happy blending of colour, expressions , music, drama and dance is unparalled in any other art form.

MOHINIYATTAM

Mohiniyattam is usually performed as a solo dance and is very lyrical in its rendering. The origin of Mohiniyattam is rooted in Hindu mythology. Once the ocean of milk was churned by the gods and demons to Lord Vishnu came to the rescue of the panicky gods and assumed the female form of an amorous celestial dame mohini. Captivating the demons with her charms, mohini stole the elixir from them and restored it to the gods, slow , graceful , swaying movements of the body and iimbs and highly emotioned eye and hand gestures are unique to this dance form. The simple, elegant gold filigreed dress, in pure white for ivory, akin to the traditional attire of the women of Kerala. This dance was adopted by the Devadasi or temple dances, hence also the name Tjasiattam which was very popular during the chera region from 9^{th} to 12^{th} century.

THULLAL

Thullal is a classical solo dance from of Kerala, which comes closer to contemporary life and is market for its simplicity, wit and humour. Staged during temple festivals, the performer

explicates the verses through expressive gestures. The themes are based on mythology. This satiric art from was introduced in the 18th century by the renowned poet Kunchan Nambiar. Make up, though simple, is very much akin to that of Kathakali. The Thullal dancer is supported by a singer who repeats the verses and is accompanied by an orchestra of mridangam and cymbals. There are three related forms of thullal ottanthullal, seethankathullal and parayanthullal of which the first is the most popular.

KOODIYATTAM

Koodiyattam literally means 'acting together' . This is the earlist classical dramatic art form of kerala. Based on sage Bharatha's "Natyasasthra" who lived in the second century, kodiyattam evolved in the 9th century A.D. Koodiyattam is enacted inside the temple theatre, there are two or more characters onstage at the same time, with the chakkiars, providing the male cast and the Nangiars playing the female roles. The nangiars beat the cymbals and recite verses in Sanskrit, while in the back ground nambiars play the mizhavu, a large copper drum. The koodal manichkyam temple at Irinjalakkuda and the Vadakkumnatha temple at Trissur are the main centers where Kootiyattam is still performed annually. Ammannoor Madhava Chakkiar is and unrivalled maestro of this rare art the leader of the group sings the lead, while the others form the chorus and move in circles. Duffumutu can be performed at any time of the day and has no fixed time limit.

KALARIPAYATTU – MOTHER OF ALL MARTAIL ARTS

"Kalarf" is a school of martial arts derivative of the Sanskrit word 'Kholoorika' meaning of military training centre and "Payattu" the fight. It is a form of material arts practiced by Hindus. It is believed that sage Parasurama who built temples along south India introduced this art. There are historical evidences of kalari dated back to the 12th century and historians belive that it is the oldest form of martial art in the world. Kalaripayattu training is imparted in side the karali, which is rectangular in design and always aligned, east west, with idols of all the presding deities of the art each corner of the begning of the practice with all rituals singing of hymns as in a temple.

This art includes seven shasthras(sciences) like Vastu, Jyothi, Marma ,Ayurveda, Asana, Tantra and Mantra. The pupils are trained in self – discipline and physical culture. Initially the student body is toned pliable , agile and versatile by regular massage by feet and hands with medicated oil. Then trained to wield Kuruvadi (short sticks), spear, dagger, sword, shield , etc. The most advanced course of traning is wielding of "Urumi" a thin springly three – meter long double –

edged sword worn around the waist locked like a belt. It can be drawn unwouned in a flick of a moment when required. It is highly lethal for an adept wielder can aim it to swirl around the neck of the opponent and, at the slightest jerk, the head will roll on the floor of the arens. Flying feats daring onslaughts and dodging with dexterity are the ways in combat. Defensive and offensive strikes with lighting speed are its peculiarity. There are customarily eighteen 'adavu'(tricks) in this warfare. Seventeen , fighting with all the weapons one by one , the eighteenth being Toozhikkadakah, a feat producing a cover of whirlwind of dust around the combatant by stamping the earth and swift circular movement to camouflage him from the opponent and to take him by surprise with sudden retaliatory death blows.

MARAKKAM KALI

It is a counterpart of Thiruvathira Kali played by women belonging to the Christian community. The dancers attired in traditional white mundu (dothi), chatta (Jacket),rich jewellary including Mekkamothirm (on ornamental ring worn by the Christian ladies on the upper lobe of the ear, now considered old fashioned). The dancers sing in praise of Jesus Christ to the varying rhythms of drum beating.

PULIKALI – TIGER DANCE

Pulikali or 'Kaduvakalai' (the dance of the tiger) is usually performed during the Onam festival. Groups of three or more dancers with pastes smeared over their energetic dances. The Pulikalai once performed all over the State is now seen only in some parts of Trissur and Palakkad districts. The scenes enacted include the tiger catching a goat , being hunted down and so on. This dance is accompanied by the loud beating of traditional percussion instruments like the udukku, thakil and chenda.

PAANA

This art form is popular in the district of Trissur , Palakkad and Malappuram. Paana is performed to propitiate the goddess Bhadrakali. It is a part of three – day festival. A canopy is made supported by 64 poles cut out from Paala tree (Alstonia scholairs) and adorned with trende palm leaves. A stump of paala tree is ceremonially brought to the site and planted. A non – figurative Kolam (rangoli) is drawn in the centre using coloured powders. A ceremonial sword is placed on a

red cloth under the tree stump to signify the Presence of the goddess. At the last stages of rites, the oracle arrives and moves in a trance around the canopy. The Para, a variation of the Chenda (drum) is the main percussion.

MUDIYETTU

Mudiyettu is a ritual dance performed in Kaali temples of Ernakulam and Kottayam. This dance is to celebrate the victory of Goddess over the demon Daarikan. This dance is performed by Kuruppu and Marar community of Kerala.

The performers of Mudiyettu are all heavily made up and wear gorgeous attire with conventional facial paintings, tall headgears etc, to give a touch of the supernatural. The wodden headgear has a mask of Kaali. An ornamental red vest and a while dhoti complete the attrie.

KUMMATTIKALI

Kummattikali is a mask dance popular in some of the northern districts of Kerala. The dancers, wearing painted wooden masks and sporting springs of leaves and grass, go for dancing from house. A popular Kummatti character is Thalia or the witch; the others represent various Hindu gods and goddess. The songs deal with devotional themes and are accompanied by a bow like instrument called Ona-villu. No formal training is required to perform the Kummattikkali, and often the spectators join the performance.

KRISHANANTTOM

A spectacle for both the scholar and the simple rustic. The visual effect is enhanced by varied ans colourful facial makeup with larger than life masks, made of light wood and cloth padding for certain characters. The characters who do not wear masks have specific facial colours capplied within the frame of a white chutti. The predominant colours used are dark green, flesh tint and deep rose. The characters of Krishna, Arjuna and Garuda wear dark blue vests. The traditional performance lasts for eight days and covers the whole span of Krishna's life from his birth to ' Swargaroham' or ascension to the heavens. Orchestral accompainments are Maddalam, Uathalam and Chengila.

Kerala is an established tourist destination for both Indians and non-Indians alike. Tourism contributes to nearly 10% of the state's GSDP. Tourists mostly visit the performing arts and folk dances. It will increase the economical level of Kerala tourism. Kerala has always been a melting

pot of various cultures. Being ruled by several dynasties, it adopted different lifestyle patterns and evolved with a unique colourful and vibrant culture.

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தோடா இனப் பழங்குடிகளின் வாழ்வியல் சடங்குகள்

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முன்னுரை

நவீன அறிவியல் புகாத பல்லாயிரம் ஆண்டுகளுக்கு முன்பு இயற்கையைச் சார்ந்து வாழ்தலும், வளர்தலும் குறித்து நம் முன்னோர்கள் கொண்ட அணுகுமுறைகளின் வெளிப்பாடாகச் சடங்குகள் அமைந்துள்ளன. இயற்கை மற்றும் சமூகச் சிக்கலை எதிர்கொள்ளும் முகமாகச் சடங்குகள் உருவாக்கப்பட்டன. இவை வாழ்தலின் போது நல்ல விளைவுகளை எதிர்நோக்கியே உருவாக்கப்பட்டிருக்கின்றன. நம்பிக்கையின் அடிப்படையில் பிறந்த பல்வகைச் சடங்குகள் இயற்கைச் சீற்றத்திற்கும் மாற்றத்திற்கும் ஒரு பதிலடியாக ஏற்படத்தப்பட்டவை என்றும் கூறலாம்.

அன்று முதல் இன்று வரை பண்பாடு என்பதை இன்ன தன்மையது என்று ஒரு குறிப்பிட்ட வரையறைக்குள் பொருத்திக்காண இயலாது. இப்பண்பாடு உள்ளமையில் தான் இந்த உலகம் நிலைத்து நிற்கிறது. அத்தகைய பண்பாடு ஒன்று இல்லையெனில் உலகம் இல்லை. உலகில் உயிர்களின் வாழ்வும் அர்த்தமற்றுப் போகிறது. அத்தகைய பண்பாட்டுடன் தொடர்புடையதாக ஒவ்வொரு சமூகத்தினரின் வாழ்வியல் சடங்குகளும் அமைந்திருக்கின்றன. இத்தகைய சடங்குகள் தோடர்களின் வாழ்வோடு எவ்வாறு பின்னிப் பிணைந்து நிற்கின்றன என்பதைப் பற்றியும் குறிப்பாக பிறப்பு, காதுகுத்துதல், மற்றும் திருமணத்தின்போது செய்யப்படும் சடங்குகளைப் பற்றியும் அறிந்து கொள்வது இக்கட்டுரையின் நோக்கமாகும்.

வாழ்வியல் சடங்குகள்

வாழ்வியல் சடங்குகள் அனைத்தும் பிறப்பு மற்றும் இறப்பை மையமாக கொண்டு அமைகின்றன. மனிதனின் பிறப்பு முதல் இறப்பு வரையிலான ஒவ்வொரு பருவ மாற்றத்தின் போதும் செய்யப்படும் சடங்குகளே வாழ்க்கை வட்டச் சடங்குகள். வாழ்வின் புதிய தகுதிப் பெயர்வினை அடையாளப் படுத்தும் வகையில் நிகழ்த்தப்படும் முறையான செய்முறைகளே இச்சடங்குகள் ஆகும்.

"ஆங்கிலத்தில் 'Ceremonial' 'சடங்கு வினை முறை' என்றும், 'Ceremony' 'Farewel' விடைபெறு விழா என்றும், 'Ceremoney Funeral' நீத்தார் சடங்கு, 'Ceremoney nubiliby' 'பூப்புனித நீராட்டு விழா' என்றும் மானிடவியல் கலைச் சொல்லகராதி பொருள் தருகிறது".[1]

"ஆதிகாலத்திலிருந்து தோன்றிய சடங்குகள் மனித வாழ்வின் ஒவ்வொரு படிநிலையிலும் உடலியலின் நலன் கருதிய வளமைச் சடங்குகளாகவே செய்யப்பட்டு வந்துள்ளன. அவற்றைப் பழங்குடிகளிடமும், தாழ்த்தப்பட்ட மக்களிடமும் காணலாம்".[2]

இவ்வாறாக வாழ்வியல் சடங்குகள் அனைத்தும் ஒவ்வொரு மனிதனின் வாழ்விலும் பின்னிப் பிணைந்துக் காணப்படுகின்றன. அது போன்றே தோடர் இன மக்களும் தங்களின் பிறப்பு முதல் இறப்பு வரை பலவகையான சடங்குகளைச் செய்கின்றனர்.

தோடர்களின் வாழ்வியல் சடங்குகள்

நீலகரியில் வாழும் தோடா இனப் பழங்குடிமக்கள் தங்களுக்கெனத் தனிக் கலாச்சாரத்தையும், சடங்குகளையும் பின்பற்றி மற்ற பழங்குடியினரிடமிருந்து வேறுபட்டு வாழ்கின்றனர். இவர்கள் குழந்தைப் பிறப்பு முதல் அவர்கள் வளர்ந்து பெரியவர்களாகித், திருமணப் பருவம் எய்தி இறுதியில் நோய்வாய்ப்பட்டு இறக்கும் வரையிலும் பல்வேறு வாழ்க்கை வட்டச் சடங்கு முறைகளைப் பின்பற்றி வருகின்றனர்.

இவர்களின் வாழ்வியல் சடங்குகளை ஆறு நிலையில் பகுத்துக் காணலாம்.

(1) குழந்தை பிறத்தல் மற்றும் பெயர் வைத்தல்.
(2) ஆண்களுக்குக் காது குத்துதல்.
(3) பெண்கள் பூப்பெய்துதல்.
(4) திருமணம்.
(5) நோய்வாய்ப் படுதல் மற்றும் இறப்பு.
(6) கோவில் திருவிழா.

என்பனவாகும். இந்நிகழ்வுகளின் போது இவர்களின் பல்வேறு வகையான சடங்கு முறைகளைப் பின்பற்றுகின்றனர்.

குழந்தை பிறத்தலும் பெயரிடுதலும்

குழந்தை பிறந்தவுடன் ஒரு குடிசைக்கு எடுத்துச் செல்லப்பட்டு அடுத்த அம்மாவாசை வரை அங்கேயே வளர்க்கப்படுகிறது. பெண் குழந்தைகளுக்குப் பிறப்பின் போதும், பெயர் வைக்கும் போதும் எவ்விதச் சடங்குகளும் செய்யப்படுவதில்லை. ஆண்குழந்தைகள் பிறந்தால் மட்டும் யார் கண்ணும் படாமல் மூன்று மாதம் வரை முகத்தை யாரும் பார்க்காதவாறு மறைத்து வைக்கின்றனர். மூன்று மாதங்களுக்குப் பிறகு அக்குழந்தைக்கு பெயர் வைக்கும் ஒரு நாளைப் பெற்றோர்களே முடிவு செய்கின்றனர். அத்தினத்தன்று எல்லா மந்திலும் இருப்பவர்கள் இந்நிகழ்விற்கு வருகின்றனர். இச்சடங்கின் போது அவ்வூர் கோயிலில் (மந்து கோவில்) விளக்கின் ஒளி காட்டப்படுகிறது. அக்குழந்தையை வாழ்த்துவது பற்றி வாக்கர் குறிப்பிடுகையில்,

"இக்குழந்தை நல்ல ஆரோக்கியத்துடனும், வருங்காலத்தில் திடக்காத்திரத்துடனும், நிறைய எருமைகளை பிடிக்கவும் (அதாவது இறுதிச் சடங்கில் எருமைகளை அடக்குதல்) அவன் வேகமாக ஓடுபவனாகவும் அதிக புத்திரர்களைப் பெறுபவனாகவும், பெரிய பணக்காரனாகவும் எல்லா முக்கியமான கோயில்களுக்குச் செல்பவனாக இருக்கவும், நன்றாக வளர வேண்டும்". என்று வாழ்துவார்கள் எனக் கூறுகின்றார்.[3]

காது குத்துதல் எனும் இச்சடங்கு தோடர் இன ஆண்களுக்கென நடத்தப்படுவதாகும். ஆண்களின் வயது முதிர்ச்சியை காட்ட இச்சடங்கு நடத்தப்படுகிறது. கோவில் பூசாரியாக இருப்பவர்களும், பூசாரிகளுக்கு உதவி செய்பவர்களும் கட்டாயம் காது குத்துதல் சடங்கைச் செய்திருக்க வேண்டும். இக்காது குத்தும் சடங்கு 10 முதல் 15 வயதிலிருக்கும் ஆண்களுக்கு நடத்தப்படுகிறது.

"பெண்களுக்கு காதுகுத்தும் போது வழக்கமான எந்தவித சடங்குகளுமில்லாமல், குறிப்பிட்ட நபர்களுடன் செய்யப்படுகிறது. தற்போது உதகமண்டலத்தில் அமைந்துள்ள மாரியம்மன் கோயிலில் தாய்மாமன் அல்லது மாமன் உறவுள்ளவர்களால் ஆண்களுக்கும் காது குத்துவது போல் பெண்களுக்கும் காது குத்துகின்றனர். அப்போது பெண்ணின் தந்தை தேங்காய், பழம், பூ, ஊதுபத்தி, வெற்றிலைபாக்கு ஆகியவற்றை வைத்து கோயில் பூசாரிக்குக் கொடுப்பர்".[4]

என்பதை வாக்கர் குறிப்பிடுகிறார். இவ்வழக்கம் மரபு வழக்கமாக அன்றி புதிய வழக்கமாக பின்பற்றுகின்றனர்.

பெண்கள் பூப்பெய்துதல்

பெண்கள் பருவமடைந்தவுடன் அப்பெண்ணைத் தனிக் குடிசையில் வைக்கின்றனர். பருவமடைந்த நாளிலிருந்து அடுத்த அம்மாவாசை நாள் வரும்வரை பெண் அக்குடிசையில் இருக்க வேண்டும். வீட்டில் எந்த வேலையும் அவள் செய்யக் கூடாது. அப்பெண்ணுக்கு அவள் வீட்டிலிருந்து உணவு கொண்டு வந்து கொடுப்பார்கள். இச்சமயத்தில் பால், மோர், வெண்ணெய் போன்றவற்றை இவள் உண்ணக் கூடாது. நெய் மட்டும் கொடுப்பர். ஒரு வயதான பெண் இரவு நேரத்தில் அப்பெண்ணுக்குத் துணையாக இருப்பர்.

அடுத்த அம்மாவாசை வரம் வரை அவர்கள் அங்கு இருப்பார்கள். அம்மாவாசை அன்று குளித்து விட்டுத், தீட்டுக் கழித்து வீட்டிற்கு அழைத்து வருகிறார்கள். இம்முறை தென்னிந்தியாவில் பல சமுதாய மக்களிடையே காணப்படுகின்ற ஒன்றாகும். இச்சடங்கிற்குப் பின் பெண்கள் அன்றாட வேலைகளில் ஈடுபடுகின்றனர்.

அக்காலத்தில் பூப்பெய்துதலுக்குப் பிறகு பச்சைக் குத்தும் பழக்கம் வழக்கத்தில் இருந்துள்ளது.

திருமணச் சடங்குகள்

"ஒரு நம்பியும் ஒரு நங்கையும் கூடித் தொடங்கும் இல்வாழ்க்கையானது திருமணத்தின் மூலம் தான் தொடங்குகிறது. இது எல்லா மதத்தவர், எல்லா இனத்தவர், எல்லா சாதியினர், ஏன் எல்லா நாட்டினருக்குமான பொது நியதியும் சமூக நீதியுமாகும்".[5] என்ற வரிகள், திருமணத்தை மக்கள் எவ்வாறு போற்றிக் காத்துள்ளனர் என்பதை அறிய வைக்கிறது. பொதுவாக, இது போன்ற திருமணங்கள் தான் சமூகத்தில் அதிக அளவில் நடை பெறுகின்றன. ஆனால் தோடர் சமூகத்தில் திருமணம் என்பது பிற திருமண முறைகளிலிருந்து வேறுபட்டதாகக் காணப்படுகிறது. தோடர்கள் அந்தக் காலத்திலிருந்து இவர்களின் சடங்குப்படி நடக்கும், திருமணங்களையே ஏற்றுக் கொண்டுள்ளனர். காதல் திருமணங்களை, ஏற்றுக் கொள்வதில்லை.

தோடர்களின் திருமணம்

உலகில் பலவகையான திருமணங்கள் நடந்து வருகின்றன. புதிய புதிய முறைகளில் திருமணங்களை, அறிமுகப்படுத்திக் கொண்டே இருக்கின்றனர். ஆனால் திருமணங்கள் பொது வகையில் மூன்றே மூன்று முறைகளால் தான் நடத்தப்பகின்றன.

"உலகின் மூன்று வகையான திருமணமுறைகள் தாம் பெரும்பாலும் இன்றும் நடைமுறையில் உள்ளன. அவை ஒரு பெண் பல ஆண்களை மணக்கும் முறை, ஒரு ஆண் பல பெண்களை மணக்கும் முறை, தம் வாழ்நாளில் ஒரு பெண்ணை மட்டும் மணந்து கொள்வது (அந்த பெண் தன் கணவரைத் தவிர வேறு யாரையும் மணக்காமல் இருப்பது. அதாவது ஒருவனுக்கு ஒருத்தி என்னும் பிரபலமான திருமண முறை)".[6] என்று அறிஞர்கள் குறிப்பிடுகின்றனர். இவற்றில் தோடர்களின் திருமணம் ஒரு பெண் பல ஆண்களை மணக்கும் முறையை கொண்டதாகும். இதனை 'பல்கணவ மனம்' என்று மானிடவியலார் குறிப்பிடுவார்.

தோடர்கள் தங்களைப் பஞ்சபாண்டவர்களின் வம்சம் என்று கூறிக் கொள்வதும், பஞ்சபாண்டவர்களை வணங்குவதிலிருந்தும் அவர்கள் திரௌபதி பஞ்ச பாண்டவர்களுக்கு மனைவியாக இருந்ததை நினைவு கூறுவதாக அமைகின்றது. இவ்வகையான திருமணங்கள் மற்ற நாடுகளிலும் காணப்படுகின்றன.

திருமணம் நிச்சயிக்கப்படுதல்

தோடர்கள் பெண் குழந்தை பிறந்த இரண்டு, மூன்று ஆண்டுகளிலேயே அப்பெண்ணுக்கு பையன் ஒருவனை நிச்சயம் செய்து கொள்கின்றனர். இதற்கு அவர்கள் மொழியில் 'நிசம் கிஸ்பினி' என்று பெயர். பொதுவாக அத்தை மகனையோ, மாமன் மகளையோ திருமணத்துக்கென முடிவு செய்கின்றனர்.

"பால்ய விவாகத்தில் பெண்ணுக்குத் துணி கொடுத்து வருங்கால மாமனாரை வணங்குவதுடன் சடங்கு முடிகிறது".

ஒரு பெருங்கால் வழியைச் சார்ந்த தோடர்கள் மற்ற பெருங்கால் வழியில் உள்ளவர்களிடையே திருமணம் செய்வதில்லை. அதே போன்று ஒரு மந்தில் உள்ள ஆண்களும் பெண்களும் உடன் பிறந்தவர் போல் கருதப்படுவதால் தங்கள் மந்துக்குள் திருமணம் செய்து கொள்வதில்லை. இம்முறை நீலகிரிப் படகர் இன மக்களிடமும் காணப்படுகிறது.

திருமணப் பெண்ணை அழைத்து வரல்

நிச்சயிக்கப்பட்ட பெண் பருவமடையும் வரை காத்திருந்து, அப்பெண்ணைப் பெரியவர்கள் சென்று நிச்சயிக்கப்பட்ட ஆணின் மந்துக்கு அழைத்து வருவர். அவ்வாறு அழைத்து வரப்படும் நாளில் எளிமையாகச் சடங்குகள் நடைப்பெறுகின்றன. மணமக்கள் புத்தாடை அணிந்து பெரியோர்களின் காலில் விழுந்து வணங்குவர். வயதில் பெரியவர்கள் வாழ்த்தும் போது தங்களது காலைத் தூக்கிச் சிறியவர்கள் நெற்றியில் வைத்து 'பொதுக் பொதுக்' எனக் கூறி வாழ்த்திப் பணமும் கொடுப்பார்கள். இது தோடர்களுக்கே உரிய தனிப்பட்ட வழக்கமாக இருக்கிறது. வீட்டின் முன் பகுதியில் தண்ணீரும் பூவும் வைத்திருப்பார்கள். அதை எடுத்துக் கொண்டு மணமக்கள் இருவரும் குடிசைக்குள் நுழைவார்கள். அன்று விருந்தும் நடனமும் நடைபெறும்.

" தோடர்களிடையே, திருமணம் என்பது புனிதச் சடங்காகவோ காலமெல்லாம் போற்றிக்காக்க வேண்டிய ஒன்றாகவோ இருப்பதில்லை".

வில்லம்புச் சடங்கு

பெண் கர்ப்பமடைந்த ஏழாவது மாதம் வில்லம்புச் சடங்கு நடத்துகின்றனர். இச்சடங்கினைத் தான் தோடர்கள் சிறப்பாகக் கொண்டாடுகிறார்கள். இச்சடங்கு நிகழ்வுகள் இரண்டு நாட்கள் நிகழ்கின்றன.

திருமணநாள் குறித்தல்

பொதுவாகத் தோடர்கள் திருமணம் செய்ய உகந்தாக அம்மாவாசை நாளையே தேர்ந்தெடுக்கின்றனர். அம்மாவாசைக்கு முன் பின் என இரண்டு நாட்களில் இச்சடங்குகள் செய்யப்படுகின்றன. ஜோதிடம் பார்க்கும் வழக்கம் இல்லையெனினும் சாமியாடிக் குறிகூறுவது உண்டு. இவர்களிடையே நல்ல நாள் என்பது அம்மாவாசையையே குறிக்கிறது. ஒரு அம்மாவாசையில் தடைப்பட்ட திருமணங்கள் அடுத்த அம்மாவாசையில் நடைபெறுகின்றன.

முதல் நாள் சடங்கு - விளக்கேற்றுதல்

திருமண ஏற்பாடு செய்த முதல் நாள் இரவு திருமணப் பெண் அம்மந்திலுள்ள நாகமரத்தில் சிறிய மாடம் ஒன்றினைச் செய்து அதில் மண்ணால் செய்யப்பட்ட விளக்கில் எருமை நெய்யைவிட்டு விளக்கேற்றுவாள். வசதி படைத்தவர்களில் இப்போது பித்தளை விளக்கேற்றுவதும் உண்டு. இவ்வாறு துளையிட்ட விளக்கு மாடங்களைக் கொண்டு எத்தனை திருமணங்கள் அந்த மந்தில் நடந்துள்ளன, என்பதை அறிந்து கொள்ளலாம். இம்மரத்தை இவர்கள் 'நகாமரம்' என்று அழைக்கின்றனர்.

திருமண தெய்வத்திற்கு உணவு சமைத்தல்

மணவிழா நடக்கும் இடத்தைச் சுத்தம் செய்து வழிபாடு செய்கின்றனர். இரண்டு குச்சிகளை நட்டு வைத்து அதற்கு கருப்புத் துணியை ஆடைகளாகப் போர்த்துவர். இந்த இரண்டு குச்சிகளும் ஆண், பெண் தெய்வங்களாகும். ஆணை 'பீரின்' என்றும் பெண்னை 'பீர்' என்றும் கூறுவர். மணப்பெண் சிறிய பானையில் உணவு சமைத்து தன் கையைத் திருப்பி உணவினைப் படைப்பர்.

கையில் சூடுபோடுதல்

உணவு சமைத்தலுக்கு இடையில் மணமகளுக்கு சூடுபோடும் சடங்கு ஒன்றினை செய்கினறனர். முதியவள் ஒருத்தி தங்களின் பாரம்பரிய உடையான பூத்துக் குளியின் ஒரு பகுதியைக் கிழித்து அதில் ஏழு திரிகளைச் செய்து உணவு சமைக்கும் அடுப்பில் கையின் மணிக்கட்டுப் பகுதியின் மேல் சூடிடுவாள். இந்நிகழ்ச்சியைப் பற்றி க. ரத்தினம் அவர்கள் குறிப்பிடும்போது "தோடர் குடும்பத்தில் முதன் குழந்தையின் பிறப்பினை எதிர் பார்ப்பவர்கள் அடுத்துவரும் அம்மாவாசையின் போது 'உர் எவர்ட் பிம்பி' என்ற சடங்கினை நிகழ்த்துவர். அச்சடங்கின் போது முதியவள் ஒருத்தி பழந்துணி ஒன்றினைத் திரிபோலச் சுருட்டி எண்ணெயில் தேய்த்து தீ பற்ற வைத்துக் கருத்தரித்துள்ள பெண்ணின் வலது மற்றும் இடது கைபெருவிரலிலும் இரு கைகளின் மணிக் கட்டிலுமாக நான்கிடங்களிலும் சூடிடுவாள்" என்கிறார்.

மேலும் சில சமயங்களில் அதிகம் காய்ச்சலுக்கு உள்ளாகுபவர்களுக்கும், உயிரிழக்கும் நிலையில் உள்ளவர்களைக் காப்பாற்றவும், சூடிடுவதை, ஒரு வழக்கமாகக் கொண்டுள்ளனர். அவ்வாறு சூடிடக் கண்ணாடி வளையல் துண்டு, தோல், வேப்பங்குச்சி, மஞ்சள் துண்டு ஆகியவற்றில் ஏதாவதொன்றை இவர்கள் பயன்படுத்துகின்றனர்.

விளக்கேற்றுதல், தெய்வத்திற்கு உணவுப் படைத்தல், கையில் சூடுபோடுதல் போன்று முதல் நாள் சடங்குகள் பெண்களுக்கு மட்டுமே செய்யப்படுகின்றன. ஆண்கள் மந்துகளுக்கு எதிரே இருக்கும் வீரக்கல்லை இருகரங்களிலும் எடுத்து, அதனை மார்பகத்திற்கு மேல் உயர்த்திச் சுமப்பது வீர விளையாட்டாகக் கருதப்படுகிறது. இவ்வாறு சுமப்பவர்களை திருமணத்திற்கு

தகுதிவாய்ந்தவர்களாகக் கருதுவர். தற்போது தோடர்களிடையே இச்சடங்கும் மெல்ல மெல்ல மறைந்து வருகிறது. சிறுவயதிலேயே இல்வாழ்வில் ஈடுபட்டு விடுவதால் இச்சடங்கினைச் செய்வதில்லை என்று இவ்வினப் பெரியவர்கள் கூறுகின்றனர்.

வில்லம்புச் சடங்கு

இரண்டாம் நாளின் முக்கிய நிகழ்வாக நடத்தப்படுவது இச்சடங்காகும். மணமகன் அருகில் இருக்கும் காட்டிற்கு சென்று திவிரிசெடி என்று அழைக்கப்படும் ஒரு வகை கொடியினை பறித்து வில் அம்பு போன்ற ஒன்றினை செய்து வருவான். அதுவரையில் மணப்பெண் நாகமரத்தின் அடியில் விளக்கினை உற்று நோக்கி காத்திருப்பாள். மணமகன் அவ்வில் அம்பினை நாகமரத்தின் சாட்சியாக அவளிடம் கொடுப்பான். அன்றிலிருந்து அப்பெண்ணிற்கு அவன் மரபுப்படி கணவனாகிறான். மணமக்களை தனிமையில் விட்டு அனைவரும் சென்று விடுவர். அன்று விருந்தும் நடனமும் நடைபெறும். அத்துடன் மணமக்கள் பெரியவர்களிடம் ஆசிபெறுவர்.

திருமண முறிவும் இவர்களின் விருப்பப்படி நிகழ்கிறது. மதம் மாறிய கிறித்துவ தோடர்களும் கிறித்துவ முறைப்படி திருமணம் செய்துகொள்கின்றனர்.

தொகுப்புரை

குழந்தைப் பிறப்பின் போதும், காது குத்தும் சடங்கின் போதும் பெண்களுக்கு முக்கியத்துவம் கொடுப்பதில்லை. தோடர்களின் திருமணம் பல்கணவ முறையைச் சார்ந்ததாகும். திருமண நிகழ்வினை இரண்டு நாட்கள் நடத்துகின்றனர். திருமண நிகழ்வின் முக்கிய நிகழ்வாக கையில் சூடுபோடுதல், நாகமரத்தில் விளக்கு வைத்தல், வில் அம்பு கொடுத்தல் போன்றவை முக்கிய நிகழ்வாகும். அனைத்து சடங்குகளின் போதும் விருந்தும் நடனமும் தங்களது கலாச்சார ஆடையில் நடைப்பெறுவது சிறப்பானதாகும்.

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வைரமுத்து நாவல்களில் நாட்டுப்புறக் கூறுகள்

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முன்னுரை

கூட்டுச் சமூகமாக வாழ்ந்த மனிதன் கருத்தைப் புலப்படுத்த மொழியைக் கண்டுப்பிடித்தான். முதலில் ஒலி வடிவமாகத் தொடங்கிப் பின் வரிவடிவமாக மாற்றம் பெறத் தொடங்கியது. இதன் தொடர்ச்சியாக முதலில் வாய்மொழி இலக்கியமாகத் தொடங்கிப் பின் எழுத்து இலக்கியங்களாக வளரத் தொடங்கியது. அவ்வாறு வாய்மொழி இலக்கியங்களாகத் தொடங்கிய இலக்கியங்களே நாட்டுப்புற இலக்கியங்கள் என அழைக்கப்படுகின்றன. மக்களின் பழக்க வழக்கங்களையும், பண்பாடுகளையும் வெளிப்படுத்தும் கருத்துப் பெட்டமாகத் திகழ்வது அந்த மக்கள் வாழ்ந்த காலத்தில் தோன்றிய இலக்கியங்களே. அவ்வாறு வைரமுத்துவின் நாவல்களில் இடம்பெறும் நாட்டுப்புறக் கூறுகள் அந்த வட்டாரத்தில் வாழும் மக்களின் பழக்க வழக்கங்களையும், பண்பாடுகளையும் அறிந்து கொள்வதை இக்கட்டுரையில் காணலாம்

நாட்டுப்புறக் கூறுகள்

1. நாட்டுப்புறப் பாடல்கள்
2. நாட்டுப்புற மருத்துவம்
3. பழமொழிகள்
4. விடுகதைகள்

நாட்டுப்புறப் பாடல்கள்

'நாட்டுப்புறம்' என்பது கற்காத கிராமப்புறத்தையே குறித்தது. அதில் நாட்டுப்புறப் பாடல்கள் என்பது கற்காத கிராமப்புற மக்கள் தங்கள் வேலை செய்யும் போது வேலையின் சுமை தெரியாமல் இருக்க பாடல்கள் பாடிக்கொண்டு வேலை செய்வது வழக்கம். இந்தப் பாடல்களே நாட்டுப்புறப்பாடல்கள் என்று அழைக்கப்பட்டது. இந்நாட்டுபுறப் பாடல்கள், 1. தாலட்டுப் பாடல்கள், 2.தொழில் பாடல்கள், 3.காதல் பாடல்கள், 4.விளையாட்டுப் பாடல்கள், 5.ஒப்பாரிப் பாடல்கள் எனப் பலவகையாக வகைபடுத்தப்படுகிறது.

கிராமத்தில் தோன்றிக் கிராமியப் பண்பைத் தழுவி நாட்டுப்புற மரபில் பாடல்கள் எழுதுவதில் வெற்றி கண்டவர் கவிஞர் வைரமுத்து அவர் தன்னை **"நான் நாட்டுப்பாடல்களின் காதலன்"**[1] என்று கூறிக்கொள்கிறார்.

கவிஞர் வைரமுத்து வாய்ப்புக் கிடைக்கும் போதெல்லாம் தன்னுடைய படைப்புகளில் நாட்டுப்புறப் பாடல்களைப் பயன்படுத்திக் கொள்ள தவறுவது இல்லை.

"பாசம் புடிக்கும் தண்ணி
பலபேரும் குடிக்கும் தண்ணி
சிறுக்கிமக குளிக்கையில
சீனித்தண்ணி ஆச்சுதடி"[2]

இவ்வாறு காதல் மயக்கத்தில் புலம்புகின்றான் ஒருவன். பாசம் புடிச்சு நாத்தம் அடிக்கும் தண்ணீர் கூட தான் காதலிக்கும் பெண் குளிக்கும் போது அந்தத் தண்ணியே சீனித்தண்ணியாக மாறி இனிப்பதாகப் புலம்புகின்றான் காதலன். இவ்வாறு புத்திமாறாட்டம் ஆகி புலம்பித் தவிக்கிறான்.

"பொன் விளையுங் காடு
பூர்வீகப் பெருங்காடு
நல்ல பலிகாடு
நாளைக்கு என்னதில்ல"[3]

இவ்வாறு அவர்கள் செய்யும் வேலையின் சுமை தெரியாமல் இருக்க அந்தந்தத் தொழிலுக்கு ஏற்றவாறு பாடல்கள் பாடுவது வழக்கம்.

மனிதனுக்கும் இசைக்கும் உள்ள தொடர்பை, அவன் பிறப்பு தாலட்டால் சிறப்பிக்கப்படுவதையும், அவன் சிறப்பு ஒப்பாரியால் உணர்த்தப்படுவதையும் நோக்கும் போது அறிந்து கொள்ளலாம்.

"காக்கா பறக்காத
கள்ளிக்காட்டு பூமியில
கர்ணன் வந்து பெறந்தீரே
காளையனார் ரூபத்துல"[4]

இவ்வாறு ஆண்டாண்டு தோறும் அழுது புரண்டாலும் மாண்டார் வாரார் என்றாலும் கூடத் துயரங்கள் வெடித்தெழும் போது அறிவினைத் தூங்கவைத்துவிட்டு உள்ளங்கள் உரக்கப் பாட ஆரம்பித்து விடுகின்றனர். அப்போது துன்பியல் இலக்கிய வகையான கையறுநிலைப் பாக்கள் போன்ற பாடல் வகைகள் தோன்றுகின்றன.

நாட்டுப்புற மருத்துவம்

கிராமப்புற மக்களால் பயன்படுத்தப்பட்டு வந்த 'கைவைத்திய முறையே" நாட்டுப்புற மருத்துவம் என்று கூறப்படுகிறது. இவர்கள் மருத்துவ குணம் கொண்ட உணவுப் பொருட்களை அதிகம் உணவில் பயன்படுத்தியதால் நோயற்றவர்களாகவும், நோய் எதிர்ப்பு சக்தி உள்ளவர்களாகவும் வாழ்ந்தனர்.

வீடுதோறும் உள்ள முதியவர்களும் அனுபவசாலிகளும் சிறந்த நாட்டுப்புற மருத்துவர்களாக விளங்குகின்றனர் இன்றைய அறிவியல் கண்டுபிடிப்பின் காரணமாகப் பல புதிய மருந்துகள் கண்டுபிடிக்கப்பட்டாலும் அவைகள் பக்க விளைவுகளை ஏற்படுத்துவதாலும், விலைமதிப்புள்ளதாக இருப்பதாலும் கிராமப்புறங்களில் வாழும் மக்கள் இம்மருத்துவ முறையையே பெரிதும் விரும்புகின்றனர்.

(i) இருமல்

இருமல் மற்றும் சளிக்கு ஆங்கில மருத்துவ முறையில் தற்காலிகமான தீர்வே உண்டு. ஆனால் கிராமப்புற மருத்துவ முறையில் காலதாமதமானாலும் நிரந்தர தீர்வு காணமுடியும்

இடைவிடாத இருமலுக்கு சுக்கு, மிளகு, திப்பிலி, தூதுவளைக் கசாயம், மிளகாய், வெல்லம், லேகியம், நாட்டுக்கோழி, நண்டுச்சாறு இவற்றைச் சாப்பிடுவதால் சளிக்குத் தீர்வு ஏற்படுகிறது.

இதற்கும் கட்டுப்படாத சளிக்கு "நரித்தோலச் சுட்டுத் தேன்ல கொழச்சுக் குடு அண்ணாச்சி ஆயுசுக்கும் இருமல் அத்துப் போகுமில்ல"[5]

இவ்வாறு ஆங்கில மருத்துவ முறைக்குக் கட்டுப்படாத பல நோய்களை இந்த நாட்டுப்புற வைத்திய முறை கட்டுப்படுத்தியது.

3. பழமொழிகள்

பழமொழி என்பது பழமையான அனுபவமிக்க மொழி என்று பொருள்படுகின்றது. கிராமத்து மக்கள் தங்களுக்கு நேர்ந்த அனுபவம் மற்றவர்களுக்கு நேரும் போது இந்தச் சொல்லோவியங்களைப் பயன்படுத்துகின்றனர். இவ்வாறு அனுபவத்தினால் ஏற்பட்ட பழமையான மொழியே பழமொழி என அழைக்கப்படுகிறது.

"நுண்மையும் சுருக்கமும் ஒளியுடைமையும்
மென்மையும் என்று இவை விளங்கத் தோன்றிக்
குறித்த பொருளை முடித்தற்கு வருஉம்
ஏது நுதலிய முதுமொழி என்ப"[6]

என்று தொல்காப்பியர் காலத்திலேயே பழமொழிகள் வழக்கில் இருந்ததை அறிய முடிகின்றது.

வைரமுத்துவின் நாவல்களில் இடம் பெறும் பழமொழிகளை விவசாயம் தொடர்பானது. சமூகம் தொடர்பானது என்ற இரு வகையினுள் அடக்கலாம்

(i) விவசாயம் தொடர்பான பழமொழிகள்

கிராமப்புற மக்களின் பிரதான தொழிலாக விவசாயமே இருந்து வருகின்றது. உலக உயிர்களுக்குச் சோறிடும் விவசாயத்தைத் தங்கள் உயிரினும் மேலானதாகப் போற்றுகின்றனர்.

"நண்டூர நெல்லு
நரியோடக் கரும்பு
வண்டியோட வா(ை)ழ
தேரோடத் தென்ன"[7]

நெல்லு நட்டா ரெண்டு நாத்துக்கு மத்தியில நண்டோடணும்கரும்பு நட்டா ரெண்டு கரும்புக்கு மத்தியில நரியோடனும். வாழ நட்டா ரெண்டு வாழைக்கும் மத்தியில வண்டியோடனும் தென்ன நட்டா ரெண்டு தென்னைக்கும் மத்தியில தேரோடணும்.

என்று விவசாயம் பண்ணும் முறைக்கே பழமொழி கண்டவர்கள் நம் கிராமத்து மக்கள்.

(ii) சமூகம் சார்ந்த பழமொழிகள்

ஒருவன் தனக்கு நேர்ந்த அனுபவம் மற்றவர்களுக்கு நேரும் பொழுதும், ஒருவருக்கு அறிவுரை கூற எண்ணும் பொழுதும் கிராமப்புறங்களில் மக்கள் பழமொழிகளைப் பயன்படுத்துவர்.

"நெல்லு சிந்தினா அள்ளலாம் - சொல்லு
சிந்தினா அள்ள முடியாது."[8]

என்ற பழமொழியைத் தன்னைப் பற்றித் தவறாகப் பேசும் ஒருவனிடம் பயன்படுத்துகின்றனர். இப்பழமொழி வள்ளுவர் கூறிய

"தீயினால் சுட்டபுண் உள்ளாறும் ஆறாதே
நாவினால் சுட்ட வடு"[9]

என்ற திருக்குறளை ஒத்திருப்பதைக் காண முடிகின்றது.

இவ்வாறு பழமொழிகள் அவர்களின் அனுபவம் சார்ந்த மொழியாகவே இருக்கிறது.

விடுகதை

கிராமப்புற மக்களின் அறிவுக்கும், சிந்தனைக்கும் சவாலாக அமைவது இந்த விடுகதைகளே, விடுகதை என்றால் விடுவிக்கப்பட வேண்டிய கதை என்பது பொருளாகும்.

"ஒப்பொடு புணர்ந்த உவமத் தானும்
தோன்றுவது கிளந்த துணிவினானும்
என்று இருவகைத்தே பிசிவகை நிலையே"[10]

என்று தொல்காப்பியர் காலத்திலேயே விடுகதை வழக்கில் இருந்ததை அறிய முடிகிறது.

கிராமத்து மக்கள் சில நேரங்களில் தங்கள் அறிவுத்திறனைக் காட்ட விரும்புகின்றனர். அப்போது சில புதிர்களைப் போட்டு அவிழ்க்கும்படி வேண்டுகின்றனர் இப்புதிர்களே விடுகதைகள். இதைப் பிசி என்பார் தொல்காப்பியர், 'அழிப்பான் கதை' என்பார்கள் நெல்லை மாவட்டத்தார், 'வெடி போடுதல்' என்பார்கள் ஆற்காடு மாவட்டத்தார்டு, புதுமைகளைக் காணும் அவாவே மனிதனுக்கு இதுபோன்ற புதிர்களைப் போடுமாறு தூண்டுகின்றன, விடுகதைகளைப் போன்றே விடுகணக்குகளும் கிராமங்களில் உண்டு"[11]

விடுகதை போடுகின்றவன் விடையை மனதில் வைத்துக்கொண்டு பதில் கேட்பவனைத் திக்குமுக்காடச் செய்வதே விடுகதையாகும். இது கிராமப்புறங்களில் பெரும்பாலும் தங்களின் அறிவுத்திறனைக் காட்டவே இவ்விடுகதைகளை அதிகமாகப் பயன்படுத்துகின்றனர்.

"கத்திபோல் எலையிருக்கும்
கவரிமான் பூப்பூக்கும்
திங்கப் பழம் பழுக்கும்
திங்காத காய் காய்க்கும்"[12]

"ஒலகத்துல இளமையான பாட்டி யாருன்னு சொல்லுங்க பார்ப்போம் என்று விடுகதையைப் போட்டு அங்கிருந்து பதில் எதுவும் வராததால் 'வப்பாட்டி' என்று அவரே சொல்லி வாய்விட்டுச் சிரிப்பார்"[13]

கிராமப்புறங்களில் பெண்கள் போடும் விடுகதைக்கு ஆண்கள் பதில் கூறத் தவறும் போது அதை ஆண்கள் ஒரு அவமானமாகவே கருதுகின்றனர். அறிவிலும், அனுபவத்திலும் பெண்கள் தங்களுக்குக் கீழாகவே இருக்க வேண்டும் என்ற ஆணாதிக்க மனோபாவமே இங்கு வெளிப்படுகின்றது.

தொகுப்புரை

ஒரு சமூகத்தின் பண்பாட்டினை அறிந்து கொள்வதற்கு நமக்குப் பெரிதும் பயன்படுவது சமூக மக்களின் பழக்கவழக்கங்களும், அவர்கள் பின்பற்றும் வாழ்வியல் கூறுகளுமே அவர்களது பண்பாட்டினைத் தெளிவாகக் காட்டுகிறது.

வேலை செய்யும் போது பாடிய பாடல்களைப் பல வகையாகப் பகுத்து அவற்றைத் தாலாட்டு, தொழில், காதல், விளையாட்டு, ஒப்பாரி எனப் பல பெயரிட்டு அழைத்தனர்.

மனிதனின் பிறப்பு எவ்வாறு தாலாட்டால் கூறப்படுகிறதோ அதே போல் அவனது இறப்பு ஒப்பாரியால் சிறப்பிக்கப்படுகிறது என்பதை இக்கட்டுரை எடுத்துக்காட்டுகிறது.

"நோயற்ற வாழ்வே குறைவற்ற செல்வம்" என்ற பழமொழிக்கிணங்க வாழ்ந்தவர்கள் கிராமப்புற மக்கள் என்பதையும், அவர்கள் மருந்துப் பொருட்களையே உட்கொள்ளும் உணவாக பயன்படுத்துவதையும், எல்லா நோய்களுக்கும் மருந்துகளை அறிந்து வைத்திருப்பதையும் இக்கட்டுரையிலிருந்து அறிந்துகொள்ள முடிகிறது.

கிராமப்புற மக்களின் அனுபவத்தின் பொக்கிஷமாகத் திகழ்வது அவர்கள் பயன்படுத்திய பழமொழிகளே. இப்பழமொழிகளைக் கூறிப் பேசும் பேச்சுக் கேட்போரைக் கவரக்கூடியதாகவும், பேச்சு சுவையுடையதாக இருப்பதையும் அறிய முடிகிறது.

விடுகதை கிராமப்புற மக்களின் பொழுது போக்கு நிகழ்வுகளில் ஒன்றாக இடம்பெறுவதையும், இது மக்கள் தங்களின் அறிவுத்திறனைக் காட்டிக் கொள்வதற்குப் பயன்படுவதையும், இவ்விடுகதைகள் ஆள்வேறுபாடின்றி சிறியோர் முதல் பெரியோர் வரை அனைவராலும் பயன்படுத்தப்படுவதையும் இக்கட்டுரையில் இருந்து அறிந்து கொள்ள முடிகிறது.

குறிப்புகள்

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CULTURAL CONFLICT IN CHITRA BANERJEE DIVAKARUNI'S THE WORD LOVE

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ABSTRACT

Chitra Baneerjee Divakaruni is one of the most popular diasporic writers from India who settled in America. Divakaruni strongly believes that writers have a social responsibility and in her writings she focuses on the life of immigrants. She portrays the characters those are caught between the two worlds, i.e., the country of their birth and life. This paper aims at an analysis of Chitra Banerjee Divakaruni's short story, The Word Love so as to bring out her treatment of the dilemma faced by an immigrant young woman in the U.S.A., between the maternal love of her Indian mother and the infatuation for her American lover. In fact her mother's love towards her has over come her infatuation for the lover at the end. In this short story, the writer has employed the second person narration which is a rarity in the fiction world.

Chitra Banerjee Divakaruni was born in Calcutta on 29th July1956. She studied at Loreto House, a convent school sun by the rish nuns. In 1976 she earned her Bachelor's degree in English from Presidency College, University of Calcutta. At the age of 19, Divakaruni migrated to the United States. She received her master's degree from Wright state University, Dayton, Ohio and a PhD in English renaissance literature from the University of California at Berkeley, in 1984. Divakaruni's stories are set both in India and America. She gives innate insight in narrating story, plot and lyrical description to give readers a many –layered look at her characters and their respective worlds which are filled with fear, hope and discovery. Most of her works are partially autobiographical and based on the lives of Indian immigrants.

Divakaruni begins the story with the dilemma of a young Indian woman protagonist who tries to tell about her affair with an American to her loving mother in India. She feels afraid of her mother so she rehearses many times infront of the mirror about what and how she should begin the matter with her mother. She always remembers how her mother brought her up in India. This makes her ashamed of her for having committed the sin of physical relationship with a foreigner

before marriage. Indian Culture prescribes this as a sin. On Seeing the protagonist's love and affection towards her mother, her American lover Rex is irritated. Here Chitra clearly portrays the cultural difference and says, "So don't tell her, he said that you're living in sin.' With a foreigner, no less. Someone whose favourite food is sacred cow steak and Budweiser. Who pops a pill now and then when he gets depressed. The shock'll probably do her in "(59). The protagonist feels guilty of having physical relationship with her American lover and struggles to convey it to her mother.

The Culture of Inida is totally different from the Culture of America Being the daughter of a traditional Indian mother, the protagonist painfully thinks about her mother. Her mother met her husband that is her father, only at the time of her wedding. Before marriage the bride and the bridegroom could not meet in the past. Unfortunately her father died in his young age and her mother became widow.To describe the pathetic condition of her mother Divakaruni says:

"You tried to tell him about your mother, how she'd seen her husband's face for the first time at her wedding. How, when he died (you were two years old then), she had taken off her jewellery and put on widow's white and dedicated rest of her life to the business of bringing you up. We Only have each other, she often told you." (58).

The protagonist is closely attached with her mother. Whenever she feels guilty of her sin, She remembers the true love of her mother. Her mother shows all her love on her and she is her only comfort and consolation. Like all the Indian mothers, she takes a lot of care to bring up her fatherless daughter. She is a typical Indian mother and she does not allow the protagonist to go to movies which are frivolous and decadent.Once the protagonist went to watch a film with her friends without the knowledge of her mother. But her Mother sensed it. She did not allow her into her house and make her stand outside for a long time along with her clothes in s suitcase. She said, "Better no daughter than a disobedient one, a shame to the family"(62). This proves how the mother shows care and concern for the future of her daughter.

After long hours the mother allowed the protagonist to come in with a stern warning. Both the mother and daughter embraced and cried. The mother soaked the feet of the daughter in hot water with boric soda; she wiped them gently which had experienced numbness due to her standing outside the home for a long time. It shows the depth of her love and affection for her daughter.

The protagonists can differenciate the love of her mother with the love of her American lover. She is very much attracted towards the physical beauty of her lover especially towards the violet colour of his eyes. She enjoys his company at Grizzly Peak and Bay area. She is moved when narrates his childhood experiences. He shares all his childhood experiences with her particularly how he was shunted between his divorced parents till he was old enough to move out. She accepts

to share the bed with him and they have started living together for the past three months. Her American lovers cannot digest the Closeness of the protagonist with her mother. He feels jealousy on the special bond between the mother and the daughter.

Every week her mother calls her on Saturdays. The protagonist tries her best in convey her affair with an American to her mother. But she is not courageous enough to tell this secret to her mother. As expected, one Saturday, she receives a call from her mother. In the telephonic conversation, the mother informs her that her cousin, Leela's marriage has been fixed and her aunt Arati expects her Presence at the marriage. She also urges her to complete her PhD and return to India soon. Now the protagonist is caught between the maternal love of her mother and the physical attraction of her lover.

Now the protagonist is in a dilemma that is whether to continue her affair with her lover or to return to her mother. She clearly knows that the bond of love between her mother and her self is stronger than her bond of love with her American lover. She remembers her mother's happiness in sitting in the front row at her high school graduation, bathing together at the gates of the holy river Ganges and eating the curried potatoes wrapped in hot puris. She fondly recollects her mother's teaching of how to write and hold the chalk. When she thinks of her loving mother on the bed, she feels the warmth of her lover: "And suddenly his arm feels terribly heavy. You are suffocating beneath its weight, its muscular, hairy maleness"(63) She enjoys the company of her lovers and at the same time considers her acts as a sin.

The protagonists' cousin Leela is going to marry a good Brahmin boy who is an executive in an accounting concern. The mother expects the arrival of her daughter for the marriage but the daughter is reluctant to attend the marriage. This makes her furious and she cannot digest her daughter's negative response to her invitation. After this the mother never calls the daughter. She even has changed the telephone number to avoid talking to her daughter. This disturbs the daughter and she cannot show interest in her studies.

Her lack of concentration in the relationship with her lover creates new avenues for him. He advises her to come out of the state of guilty consciousness. She becomes unhappy when he asks her to cut the relationship of her mother. Now she can realise the shallow love of her lover towards his family especially towards his mother. She says: "What did he know, you thought, about families, about (yes) love. He'd left home the day he turned eighteen. He calls his mother only on Mother's Day and if he remembered, her birthday" (68).

She writes a letter to her mother about her coming back to India. But the letter is returned to her with a note of decline: "Not accepted. Return to sender" (69). Her lover slowly moves away

from her and it is understood from his conduct that he has developed a new affair with a red -haired waitress at the Mexican Restaurant. Her infatuation towards him slowly vanishes. Her partner is completely dissatisfied with her. He is no longer interested in her deep attachment towards her mother and the native culture. At last without waiting for her answer, he leaves her. Now the protagonist realizes the insignificance of the physical love for her lover and the worth of her mother's love and the value of the native culture.

Chitra Banerjee Divakaruni skillfully portrays the change that takes place in the heart of protagonist by the image of rain:

"And a work comes to you out of the opening sky.The word love. You see that you had never understood it before. It is like rain, and when you lift your face to it like rain it washes away inessentials, learning you hollow, clean, ready to begin"(71). This shows her realization that mother's love is greater than any forms of love. The love for native culture is stronger than any other cultures. The protagonist at last decides to begin a new life and wants to come to India and is ready to marry anyone who is the choice of her mother.

From the analysis of the short Story 'The word Love', it is understood that mother's love is always superior to the physical love. Divakaruni highlights the cultural conflict of the protagonist excellently and the greatness of the love of an Indian mother earnestly. Infact, the maternal love of the Indian mother succeeds the physical love of the American lover. Divakaruni's treatment of the issues related to the life of the immigrants such as the cultural conflict has made her an exceptional diasporic writer in the arena of Indian Writing in English.

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EFFECT OF WEED EXTRACT ON CARBOHYDRATE METABOLISM OF PEARL MILLET (*PENNISETUM GLAUCUM* L.R.BR.,)

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ABSTRACT

Aqueous extract of Bryophyllum, Calotropis, Kalanchoe andTephrosia screened for their growth promoting role harp on converting the otherwise troublesome weeds into an effective green manure. The present study is an attempt to develop a simple and low cost strategy to enrich the seedling growth and boost up production of pearl millet with leaf extracts. Seedlings from seeds treated with extracts were analyzed for parameters such as carbohydrate content, reducing sugars, starch accumulation, amylase activity, nitrogen and chlorophyll estimation. Green manuring with low concentration of leaf extracts from common weeds thus proves beneficial to the growth of pearl millet.

Keywords: Aqueous extract, Green manure, seedlings

INTRODUCTION

Today, the world wide yield loss of major crops is estimated to be around 51.8%, of which 11.2% is by pests, 16.6 % diseases and a major share of 24% is due to weeds (Oerke and Steiner, 1996). Weed infestation is certainly a major problem in field conditions. Weed species compete with crops for nutrients, light and soil moisture. They may have harmful effects on crops because of the chemical substances they release from their leaves and roots into the environment. These substances may have deleterious impact on other plant species while in some cases the effect is beneficial.

Weeds are the plants that grow where they are not wanted. They grow in the crop fields faster and thus reduce crop yields (Tata, 1980). Agro-chemicals used for controlling pest and weeds leave behind negative impact on environment that is too serious to be ignored. In the context of

vexing weed problems and growing impetus on organic farming the preposition of effectively converting the constituent weeds of agroecosystem as a biomanure receives special emphasis. It is suggested that an optimum combination of organic sources can meet the requirement of stepping up higher yield without sacrificing the quality of crop. It is reported that bio-contents present in the leaf powders can synergistically interact with aminoacids, especially tryptophan (the precursor of Indole Acetic Acid) in favoring germination, seedling establishment and enhancement in vegetative growth and yield (Krishnasamy, 2004)

This study is primarily undertaken to evaluate the potential of few weeds as biomanure. With an intent of ascertaining the impact of the decomposing bio-content of weeds and to assign positive role, if there be any, this study is focused to evaluate the effects of leaf extracts of *Bryophyllumpinnatum, Calotropisgigantea, Kalanchoepinnata* and*Tephrosiapurpurea* on the germination, vegetative growth and flowering of pearl millet (*Pennisetumglaucum* L.R.Br.,)

Pearl millet (*Pennisetumglaucum*L.R.Br.,) is one of the most drought tolerant cereal crops grown in arid and semiarid regions of the world. It is the important source of diet for the major portion of Indian and African people. It can produce some grains even under most adverse farming condition and therefore it is preferred by farmers as a low cost risk option not only by choice but also by necessity. For increasing the productivity of pearl millet hybrids, it is essential to grow them with high yield.

MATERIALS AND METHODS

COLLECTION OF PLANT MATERIALS FOR EXTRACTION

Plant materials such as *Bryophyllumpinnatum, Calotropisgigantea,Kalanchoepinnata* and *Tephrosiapurpurea* leaves were collected from Thiagarajar College Campus, Madurai. Mature fresh leaves without any disease are collected for extraction.

PREPARATION OF THE EXTRACT

Ten gram leaves of *B. pinnatum C. gigantea, K .pinnata* and *T .purpurea* was washed with tap water and then the leaves were ground with pestle and mortar. 20ml of distilled water is added and made into slurry. After 24 hours chilling, the slurry was filtered through whatman filter paper I. 2ml of extract were taken from the filtrate and the final volume was made up to 100ml.

BAJRA – THE TEST PLANT

Bajra, popularly known as pearl millet, variety ICMV 221, were collected from Farm aid Service, Madurai. Seeds were graded and uniform size of seeds was used for experiments in pot cultures.1 g of seed lot contained 82 seeds.

BIO- CHEMICAL PARAMETERS UNDER CONSIDERATION

Bio chemical parameters such as carbohydrate, reducing sugars, starch, amylase activity, chlorophyll and nitrogen were estimated. Total Soluble Carbohydrates was estimated with Anthrone reagent (Witham, *et al*., 1971). Reducing Sugars was estimated by 3, 5 Di-nitro salicylic acid method (Lindsey, 1973). Starch was estimated by Acid hydrolysis method (McReady*et al*., 1950). Amylase activity was estimated by the method of Bernfeld , 1955. Estimation of Chlorophyll was done bythe method of Arnon, 1949. Nitrogen was estimated by Micro Kjeldhal method (Umbriet*et al.*, 1972)

RESULTS AND DISCUSSIONS

On quantifying bio chemical parameters such as total soluble carbohydrates, reducing sugars, starch and amylase activity some insights could be drawn on carbohydrate metabolism. This with nitrogen and chlorophyll estimations showed the manner in which the presoaking treatments influenced the plant metabolism. Compared with the untreated control leaf extracts of the weeds had a direct and beneficial effect. The results of the experiment revealed a considerable increase in total soluble carbohydrate content in *Bryophyllum* treatment. An increase of 91.3% was recorded in the treatment with this said class of extract (T2), followed by 87% with *Kalanchoe* (T4). The lowest carbohydrate content was recorded in the control where the soaking did not involve any extract (T1).

Cultivable land in the tropics is infested with a wide range of weeds which impose and direct or indirect problems to crop production and there fore it is imperative that we scan the issue again and come up with alternatives to deal with weed menace.On the basis of parameters such as carbohydrate, reducing sugar and starch content, and the estimation of nitrogen and chlorophyll composition and amylase activity, it is found that the treated plants were benefited by the application of extracts. The present study show a relatively a lesser growth promoting potential to the extract from this species than the other taxa tested. Though the leaf sap of this latex rich weed affected a marginal increase in growth, plants raised in the treatment showed increased amounts of nitrogen and photosynthetic pigments. That the seeds presoaked in the extract of this common weed showed minimal accumulation of starch and sugars against the afore said metabolites suggests that biocontents of *Calotropis*might have a preferential role on nitrogen metabolism as against a positive interference with carbohydrate synthesis and utilization.

Higher value (21.9%) of reducing sugars was recorded in *Bryophyllum*extract (T2) treated seedlings, as *Kalanchoe*treatment (T4) registered 15.1%. The lowest content of reducing sugars which is actually less than control (-10.1%) was noticed in the *Tephrosia* (T5) extract (Table-5). Starch content was lower by -51.6% in the treatment of *Bryophyllum* (T2) extract and by -38.9% in *Calotropis (*T3)) extract treatment. When compared with that of the other treatments and the control *Tephrosia* (T5) treatments showed higher amount of starch content in the seedlings (Table-1).

Amylase activity of seedlings calculated in terms of the rate of starch degradation *in vitro* showed that seedlings in *Bryophyllum*treatment (T2) were with higher amylase activity (68.4%) than the control. Enzyme activity was low in *Kalanchoe* and *Tephrosia* extract with 31.6% and 15.8% respectively (Table-2).Contrarily seeds treated with *Bryophyllum* extract showed higher amount of carbohydrate, reducing sugars, and chlorophyll content. Similar result was earlier reported by Mini, *et al.,* (1999) they observed that the treatments with *Bryophyllum* where the extract showed higher amount of carbohydrate content. The level of starch content was lower in plants treated in the treatment of *Bryophyllum* extract. Chinoy, *et al.*, (1999) had reported that the starch depletion associated with simultaneous increase in sugar concentration indicates a higher level of hydrolytic activity. It is possible that on a similar basis total soluble carbohydrates and reducing sugars were higher in our treated plants. That the amylase activity was higher in *Calotropis*and *Bryophyllum* extract treated seedlings holds substance to this view.

Data obtained on pigment composition and nitrogen content in treated plants. It may be found that the chlorophyll level as well as nitrogen status is higher in treatments fortified by the supplementation of plant extracts. Treatments with *Bryophyllum* (T2) (27.8%) and *Calotropis* (T3) (26.4%) extracts showed significant promotery effect on chlorophyll content compared with those of *Kalanchoe* (T4) (10.8%) and *Tephrosia* (T5) (16.9%) extract treatment and the control (T1) (Table-3).

Seeds treated with *Tephrosia*extract gave rise to plants with increased nitrogen content. This is can be correlated directly the high nitrogen fixing potential as leguminous plant species are proven green manure for a wide variety of crops (Wood stock, 1988). An analogous situation is quite likely in treatments where germination was higher and faster. From the results presented on the morphometric traits and biochemical parameters it may be concluded that extract of *Tephrosia* and*Kalanchoe* were relatively more suitable for increasing the productivity and growth of pearl millet.

Table 1 : Effect of weed leaf extract on Carbohydrate,Reducing sugar and starch content (mg/g. of fresh leaves**) *of Pearl millet***

Treatments	Carbohydrate	Reducing sugar	Starch
T_1	46^a	73^b	950^e
T_2	88^d	89^c	460^a
T_3	74^b	66^a	580^b
T_4	86^d	84^c	630^c
T_5	78^c	65^a	740^d

Means followed by a common letter(s) in the same column are not significantly different at the 5 % level by DMRT

Treatment:

T1 Control; T2 Bryophyllum;T3 Calotropis ; T4 Kalanchoe; T5 Tephrosia

Table 2 : Effect of weed leaf extract on Amylaseactivity (mg maltose liberated/g. fresh wt./h. **) *of Pearl millet***

Treatments	Amylase activity
T_1	38
T_2	12
T_3	15
T_4	26
T_5	32

Means followed by a common letter(s) in the same column are not significantly different at the 5 % level by DMRT

Treatment:

T1 Control; T2 Bryophyllum;T3 Calotropis ; T4 Kalanchoe; T5 Tephrosia

Table 3 : Effect of weed leaf extract on Chlorophyll, and nitrogen content (mg/g. of fresh leaves**) *of Pearl millet***

Treatments	Total chlorophyll (mg/g. of fresh leaves)	Chlorophyll(a) (mg/g. of fresh leaves)	Chlorophyll(b) (mg/g. of fresh leaves)	Nitrogen (mg/g. of dry leaves)
T_1	5.90[b]	4.29[a]	3.36[a]	32[a]
T_2	7.54[c]	5.53[b]	4.23[b]	84[b]
T_3	7.46[c]	5.53b	4.27[b]	108[d]
T_4	6.54[a]	4.70[a]	3.73[a]	94[c]
T_5	6.90[b]	5.13[b]	3.86[a]	132[e]

Means followed by a common letter(s) in the same column are not significantly different at the 5 % level by DMRT

Treatment:

T1 Control; T2 Bryophyllum;T3 Calotropis ; T4 Kalanchoe; T5 Tephrosia

CONCLUSION

- In the present investigation involving four types of leaf extracts on seed germination and growth of seedlings in pearl millet, each leaf extract had its own characteristic influence in increasing or decreasing a particular parameter.
- *Bryophyllum* extract treated seedlings showed maximum carbohydrate, reducing sugar, and amylase activity. Chlorophyll content of plants emerging from pre sowing treatments were high in emergent plants while nutrient profile of the soil sprayed with this extract remained rich.

- *Calotropis*extract treated seedlings showed higher value of chlorophyll content.
- *Kalanchoe* extract treated seedlings revealed low level of amylase activity.
- Seeds treated with *Tephrosia*extract favorable to starch amylase activity and high nitrogen levels.
- The positive influences on biochemical parameters comply well with growth promotive effects of extracts.
- Green manuring with low concentration of leaf extracts from common weeds thus proves beneficial to the growth of pearl millet. Therefore the preposition of utilizing weed plants in organic farming that holds promise in downsizing the use of agro chemicals demands further research and more detailed investigations.

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