

# **A RESEARCH COMPENDIUM**

**Interdisciplinary & Multilingual** 

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Antony

Dr. Neethu S. Arrakal

Erudition- A Research Co

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# Editors Dr. Mariamma Antony Dr. Neethu S.Arrakal

ERUDITION: A Research Compendium, Investigates the concealed precisions of existence of the current ideologies that sustain the scholarly occurrence through observation, analysis and representation. Discourse of knowledge is a keen medium which cross examine the secrets of survival on the terrain. It is exploratory in its original sense and identifies the imperative conclusions that have made human beings budge towards enlightment. Various fields of studies have unquestionably created an understanding of life and the intricacies adjacent to existence. Research with a definite intention has created miracles in the evolution of rational detections. All disciplines of studies have taken different paths towards understanding the unique concept of Truth.

ERUDITION is a compilation of Research Analysis presented by the Faculty Members of Little Flower College, Guruvayur, challenging to create an insight towards the interpretation of innovative intellect.



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Editors Dr. Mariamma Antony Dr. Neethu S. Arrakal

A Reasearch Publication, Little Flower College, Guruvayur

# **ERUDITION**

A Research Compendium

Edited by Dr. MARIAMMA ANTONY Dr. NEETHU S. ARRAKAL



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#### ERUDITION

Edited by Dr. MARIAMMA ANTONY, Dr. NEETHU S. ARRAKAL

Compiled and Published by **Dr. Sr. VALSA M.A. (Dr. Sr. JEESMA THERESE)** Principal, Little Flower College, Guruvayoor in association with **Turn Books Kottayam.** 

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First Published - March 2022

Cover Design : Joseph Francis, Pala Type Setting : M.G. Saji Teekoy

Printed in India Vibgyor Imprints, Calicut - 673 004

### Publishers

Turn Books, P.B. No.1, Teekoy Kottayam, Kerala - 686 580, India Email: turnbooks4u@gmail.com Web Site: www.turnbooksgroup.com Tel: 9495200006

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ISBN: 978 - 93 - 87709 - 82 - 9

Price : ₹150

000020211814215151119000030000072017015492091513600010000000150

# **EDITORIAL**

Dear Readers,

We are proud to present the fourth annual volume of the Research Compendium, Erudition. As always we are grateful to Sr Dr Valsa M.A., our Principal for her warmth and fine skills in managing the process of pulling this volume together, to the editorial team for their careful reading and commenting on the papers and finally to the research minds who have contributed immensely to shape up this journal and to those who have enriched this particular issue. The compilation of research papers of faculty in arts and science has helped to enrich further a discourse on both streams among the young research aspirants of Little Flower College. We present to you a fresh approach towards content thus laying the platform for an in depth analysis and refined version of the study topic. The Journal established in 2019 is set on the track of success through the intellectual generosity of its readers and contributors. The gap is addressed in each stage of evolutionary process of the publication. This is a promising sign. Above all we want Erudition to make a difference; not just among our students and faculty but among the entire scholarly community. That's a tall order. But with your constructive suggestions and advice we will make it happen. We wish all our readers to develop an inquisitive and intellectual mind to further add fuel to this fire.

Thank you.

Dr.Mariamma Antony & Dr.Neethu S.Arrakal -

# FOREWORD

'Research' is a 're-search' to delve into new perspectives, which enhance the teaching-learning process and enrich the discipline by its publications. By being a 'researcher', the teacher remains ever-fresh in his or her subject area, updated with new visions and ideologies. This provides a momentum in the strife of the individual in his or her journey to conquer the realm of knowledge.

This book is a compilation of research articles from science and humanities fields, which holds behind it a treasure of knowledge for young minds and the door to new horizons for subject scholars going deep into the content of these articles help us to look out the world through a new light- a new perspective. Beyond the lines, it has the power to re-read and re-construct the society and culture with an eye open towards the constantly changing world. Above all, everything aims at the prosperity of humanity through the intellectual contribution of ignited minds.

Research, being the beckoning call for the development and enrichment of the knowledge exciting in the world, may this book being rich with novel ideas help emerging scholars. Let this publication mould a young generation with an aptitude to research. May every article in this compilation touch you with a new spark. Hope the surveys, data analyses, lab works all other findings published in this book open for you a new room to inquire for more.

I am immensely proud to present this compendium of multifaceted research for the world to pursue and ruminate upon. On this occasion, I place my appreciation and gratitude for the editorial team whose relentless efforts culminated on the publication of this edition of the journal.

Let this be an enriching reading experience for all our readers.

Dr.Sr.Valsa M.A Principal Little Flower College,Guruvayoor

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# COMPARISON OF CATIONIC AND NEUTRAL COMPLEXES OF TERBIUM (III) DERIVED FROM DIMEDONE BIS (ANTHRANILIC ACID)

### **DR. LALI THOMAS KOTTURAN**

Dept.of Chemistry, Little Flower College, Guruvayoor

### Abstract

Dimedone (5,5 Dimethyl 1,3 cyclohexane dione) is treated with anthranilic acid to form a Schiff base ligand named dimedonebis(anthranilic acid) (5,5DMe1,3CHAA). The ligand 5,5DMe1,3CHDAA form neutral and ionic complexes with Terbium ion, a rare earth metal, depending on the medium of reaction. The structure of the ligand and complexes are elucidated by elemental analysis, infrared spectroscopy, conductance measurements, magnetic studies, and electronic spectroscopy.

### **Keywords**

5,5DMe1,3CHAA;  $[Tb_2(5,5-DMe1,3CHAA)((NO_3)_2(H_2O)_4]$ ;  $[Tb(5,5-DMe1,3CHAAH_2)_2((NO_3)_2]$  NO<sub>3</sub>; infrared spectra, NMR spectra, magnetism, conductance measurements.

### **1.1 Introduction**

The ligand dimedone(bis anthranilic acid) was prepared and analyzed for the structures. The ligand is a flexidentate ligand with ligand cites -N of -C=N and O of -COO- groups. The ligand is chelated with Terbium(III) forming a neutral dimeric complex or cationic complex based on the method of their preparation. Both complexes are paramagnetic in nature, the cationic complex being The  $[Tb_{2}(5,5$ more magnetic one. complex the DMe1,3CHAA)( $(NO_3)_2(H_2O)_4$ ] (hereafter called as complex 1) was found to be nonconducting and [Tb(5,5-DMe1,3CHAAH<sub>2</sub>)<sub>2</sub>((NO<sub>3</sub>)<sub>2</sub>]  $NO_3$  (complex 2) is conducting in 10<sup>-3</sup>M in nitrobenzene solution. The infrared spectra of the complexes clearly confirm that the ligand is tetradentate, bivalent in the neutral complex while it is bidentate, zerovalent in the cationic complex. The -COOH group is inactive in the cationic complex. Both the complexes are hexacoordinated

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ISBN: 978 -93 -87709 - 82 - 9

octahedral around the Tb(III) ion while the neutral complex is a dimeric one.

### 2. Experimental

The laboratory procedure for the preparation of ligands, the complexes, and the experimental ways for the analysis of structures are explained below.

## 2.1 Synthesis of Ligands 5,5DMe1,3CHDAA.

Dimedone (5,5-dimethyl1,3cyclohexanedione) in alcohol(1.40g;0.01M) and anthranilic acid(2.74g;0.02 M) were mixed and refluxed on a water bath for 12 hours. The resulting solutions are concentrated and cooled when slight yellow crystals are separated, filtered, and recrystallized from a minimum amount of ethanol. The melting point of ligand  $(L^{1}H_{2})$  dimedonebis(anthranilic acid) (5,5DMe1,3CHDAA), is found to be 140°C.

## 2.2.a. Synthesis of $[Tb_{2}(5,5DMe1,3CHDAA)_{2}(NO_{3})_{4}(H_{2}O)_{4}]$ .

To a magnetically stirred and warmed ethanolic solution of terbium nitrate (0.006M) hot ethanolic solution of the ligand 5,5-DMe1,3CHDAA added and refluxed for half an hour. The pH of the solution is adjusted to 7 by adding dilute ammonium hydroxide dropwise and continued stirring for 1 hr. more. The precipitate formed is filtered washed with alcohol and dried in a vacuum. **2.2. b. Synthesis of [Tb(5,5DMe1,3CHDAAH**<sub>2</sub>),(NO<sub>4</sub>),]NO<sub>4</sub>

0.75 gm of the ligand (0.002M) in acetone is mixed with 0.001 mol of Terbium (III)nitrate in acetone and concentrated on a water bath to half the initial volume. The resulting solution was cooled and the excess of the ligand was washed off with benzene. The viscous mass is washed several times with water when it gets solidified. The ether was finally decanted off and the complex was dried in a vacuum desiccator over anhydrous  $P_4O_{10}$ .

## 2.3 Physicochemical analysis.

The complexes tested for CHN, metal percentage and reported in Table 1. The metal percentage was determined by standard procedure (Furman,1962).  $10^{-3}$ M solution of the complexes in nitrobenzene is measured using a conductivity bridge. The magnetic measurements are found out by the Guoy method (Figgis,1964), taking Hg[Co(NCS)<sub>4</sub>] as standard. Diamagnetic corrections applied as per Pascal (Figgis1959). Both the complexes are paramagnetic. The values are reported in Table1. Infrared spectra of the complexes are recorded in the region 400-4000cm<sup>-1</sup> by the KBr technique. <sup>1</sup>H NMR spectra of the ligand and complexes are recorded and analyzed for the structure.

3. Discussion of Results.

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The results of elemental analysis of the ligands and complexes are given in Table1. The neutral complex of Terbium (III) ion is pale yellow while the cationic one is pink in color.

## 3.1. Magnetism

The  $\hat{i}_{eff}$  of complex 1 is 9.87 while that of complex 2 is 10.10. (Table 1). The deviation from the spin-only value of Tb(III) (9.33) is due to the shielding of 4f electrons by  $5s^2$  and  $5p^6$  electronic arrangement allowing significant orbital contribution.

Character	5,5DMe1,3CHDAA = (LH <sub>2</sub> )	[Tb <sub>2</sub> (L) <sub>2</sub> (NO <sub>3</sub> ) <sub>4</sub> (H <sub>2</sub> O) <sub>4</sub> ]	[Tb(LH <sub>2</sub> ) <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> ]NO 3
Colour	Pale yellow	Pale yellow	pink
M%	S	33.15 (31.33)	14.02 (14.42)
C%	68.85 (69.82)	27.13 (26.05)	48.54 (47.96)
H%	5.96 (5.80)	3.68 (2.70)	3.58 (3.99)
N%	7.19 (7.40)	8.83 (8.28)	9.86 (8.89)
Conductance( ohm <sup>-1</sup> mol <sup>-</sup> ¢cm <sup>2</sup> )	-	2.98	141
Meff	-	9.87	10.10

Table 1. The characteristics of ligand and complexe

### **3.2. Infrared spectral studies**

All the significant peaks and the corresponding assignments are given in Table 2. Complex 1 showed broad bands in the region 3500-3100 cm<sup>-1</sup> which is assigned due to the dimeric acid group following Bellamy(1978). This band disappears in complexes due to deprotonation of acid group and bonding of carboxylate group to the metal ion. According to Bellamy (1978), the broadband between 3300-3500 cm<sup>-1</sup> is due to the presence of coordinated water molecules

Frequency v cm <sup>-1</sup>	5,5DMe1,3CHDAA = (LH <sub>2</sub> )	[Tb <sub>2</sub> (L) <sub>2</sub> (NO <sub>3</sub> ) <sub>4</sub> (H <sub>2</sub> O) <sub>4</sub> ]	[Tb(LH <sub>2</sub> ) <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub> ]NO <sub>3</sub>	
H <sub>2</sub> O sy	-	3300-3500	-	
-COO <sup>-</sup> asy	1680	1600	1680	
-COO sy	1420	1395	1420	
C=N 1600		1530	1570	
M-N -		473	470	
M-O -		410	-	
Anionic – - NO <sub>3</sub>			1370	
-NO <sub>3</sub> sym	-	1290	1290	
-NO3 asy	2	1380	1380	
-NO -		1030,740	1030,740	

Table 2. Selected infrared frequencies of ligand and complexes.

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which is further supported by the appearance of the rocking mode of medium intensity bands at S 860 cm<sup>-1</sup>. The absence of these bands in complex 2 indicates the reluctance of the -COOH group to bond to metal in complex 2. In addition to this, a band at 1700 cm<sup>-1</sup> in complex 2 compared to complex 1 again confirms the nonbonding through -COO<sup>-1</sup>. The medium-strong band atS 1680 cm<sup>-1</sup> in the ligand is due to asymmetric carbonyl stretch and S 1600 cm<sup>-1</sup> is due to – C=N stretching frequency (Table 2). The band is due to-C=N shifts to lower frequencies in both the complexes indicating the chelation of the ligands to the metal ions through the azomethine nitrogen (B.D.sharma (1955) and Nakamoto (1966). Curtis (1968) assigns the monodentate behavior of carboxylate groups to the peaks at S 1620cm<sup>-1</sup> and S 1440 cm<sup>-1</sup> due to asymmetric stretching and symmetric stretching which is present in complex 1. Both complexes showed bands at about 1376 and 1290 cm<sup>-1</sup> due to asymmetric and symmetric stretching frequencies of the -NO<sub>2</sub> groups (Gatehouse, 1957). The weak or medium bands at 545 and 410 cm<sup>-1</sup> are assigned to M-N and M-O bonds. The medium peak at 880 is due to the in-plane deformation band and the peaks at S 750 and 725 cm<sup>-</sup> <sup>1</sup> are out of plane deformation bands. If the gap between the highest frequencies is less than 150 indicates the monodentate character of NO<sub>2</sub> according to J.C.D.Brand (1955). In complex 2 a band is seen at 1370 cm<sup>-1</sup> which can be assigned to the anionic NO<sub>3</sub> group. (Lali & Geetha, 1992).

### 3.2. <sup>1</sup>H Nuclear magnetic resonance

To confirm whether the –COOH group is coordinating through the carboxylate group the NMR spectra of the ligand and the cationic complex are recorded in DMSO- d6. The NMR signals of the ligands and complexes were the same except that the singlet at 9.5ä in the ligand is shifted to 10.9 ä in the complex which is due to –COOH proton. The aromatic protons in both the ligand and complex gave the signals at ä values 6.2 and 8.2. The signals due to two –CH<sub>3</sub> groups appeared at about 2.4ä

Based on all the above-mentioned physicochemical studies done the complexes are given the structures as shown in fig.1 and fig.2. where Ln= Tb(III).

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Fig.1- [Tb2(L)2(NO3)4(H2O)4]

Fig.2- [Tb(LH2)2(NO3)2]NO3

### 4. Conclusion

The ligand 5,5 dimethy1,3cyclohexane dione is a poly flexidentate ligand that is capable of forming different chelate compounds with the same inner transition metal ion Terbium (III) based on conditions of chelation. In aqueous media, the ligand shows tetra dentate character forming an octahedral neutral dimeric complex. In organic solvents, the ligand shows bidentate character coordinating through only two N of -C=N linkages forming an anionic octahedral complex.

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ISBN: 978 -93 -87709 - 82 - 9

# AQUAPONICS – FEASIBILTY IN VEG-ETABLES & ORNAMENTALS

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## Abstract

Aquaponics is the combination of aquaculture (fish farming) and hydroponics (soilless plant culture). The analysis was carried out to compare the growth, flowering and fruiting of three types of plants, viz, leafy plant-Amaranth, Ornamental – *Portulaca* and fruiting plant – *Capsicum*. An NFT system of aquaponics was set and the plants were grown which was compared with plants grown in the field conditions. emphasizes on the relevance of popularizing the aquaponics in the wake of an era with reduced space and soil but increased demand of food and nutrition.

Keywords:- Aquaponics, Portulaca, Amaranth, Capsicum

**Introduction**- Agriculture has substantial environmental impact on natural resources: the conversion of natural land to agriculture, nutrient leaching and the use of chemicals are all serious issues (Tillman *et al*, 2002). In the last 20 years nitrogen use in chemical fertilizers has exceeded by 20 times the nitrogen content in the oceans (Downing *et al.*, 1999) and brought severe eutrophication to water bodies (National Research Council, 1999). Closing the loop between crops and animals is therefore seen as the only way to improve water and nutrient efficiency and reduce wastes. Aquaponics, by combining fish and vegetable production and maximising land, water and

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ISBN: 978 -93 -87709 - 82 - 9

nutrient use efficiency, appears to offer a possible way forward in this regard, and has particular attractions in locations where water is scarce and/or soil is poor, and where there is strong demand for both fish and vegetables. It is a form of sustainable agriculture that combines fish and plants in a closed re-circulating system. In the present study, it was tried to analyse the difference between growth of plants in soil and aquaponics system using Tilapia and gold fish and plants selected were *–Capsicum annuum, Amaranthus spinosus* and *Portulaca dioica*.

Materials and methods- The requirements for setting up aquaponics system are: A tank, Pebbles, Water pump, 3 m of plastic tubing that fits the outlet on water pump, aquarium air pump, Plastic PVC Pipe with both ends closed with holes for water inlet and water outlet and made holes on upper side for placing plant pots, Growing Medium of coconut coir to fill the grow bed, Fish and plants. Fish: Tilapia can survive wider ranges in pH, temperature, and ammonia than many other fish species, and they quickly adapt to varying conditions. Tilapia are fast growing and efficient at converting food into body mass. Gold fish was also tried alongwith. Plant: 1. Flowering plant : *Portulaca dioica*, 2. Leafy : *Amaranthus spinosus*, 3. Fruited vegetable : *Capsicum annuum*. The system was set up with water pump, pH checked in as 7, Allow the unit to sit for 24 hours to be sure all chlorine has dissipated from the water. Add your fish to the fish tank. After one week just add plant to the system.

The only daily input in this system is fish food. Frequent small feedings are better than fewer large feedings. The system relies on fish waste to provide organic food and nutrients to help the plants grown; in turn, the plants clean, filter, and recycle the water back to the fish creating a symbiotic relationship (Dunn, 2012). Fish produce ammonia as a major waste product of respiration and their general metabolic processes. While ultimately deadly to fish, this chemical is a potential boon for plants. Nitrifying bacteria convert fish wastes into plant-available nutrients. The plants use these nutrients as their main nutrient supply. The fish benefit from this process also, as the water is filtered by the plants, giving the fish clean water to live in. With Aquaponics, both the fish and the plants not only grow well, they flourish. The plants grown in the field were also used for comparative analysis.

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ISBN: 978 -93 -87709 - 82 - 9

March 2022

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Review of literature – Research papers on aquaponic systems and their properties are comparatively less as compared to other biological topics. The studies are almost on the practical implications of the system few references are available from open access articles in the web. A detailed description of methods to integrate hydroponics with aquaculture was given by Diver and Rinehardt (2010). Klinger & Naylor (2012) proposed some methods for modifying the aquaculture systems which involved the introduction of plants for growth in the system. Sonneveld & Voogt. in 2009 gave directives on plant nutrition in green houses. Gagnon *et al.* (2010) explained treatment of hydroponics wastewater using constructed wetlands in winter conditions. Endut *et al.* (2014) analysed the nitrogen budget and supply to plants in aquaponics.

Results & Discussion – The plants grown in the field conditions and the aquaponics were compared for growth, flowering & fruiting. The growth of leafy amaranth was almost similar in both conditions the plant showed average growth rate. The plant in the field conditions was provided with two different situations- one in direct sunlight and other in shade. The one in the direct sunlight wilting and less vigour and other in the shade showed chlorosis. At the same time, the plant in the aquaponics system developed green leaves although the growth rate was slow.

The fruiting vegetable, Capsicum annuum grown in the field developed flowers and fruits normally. The plant in the aquaponics system, developed fresh shoots and flowers. The fruit development was less as compared to the field conditions. The flowering plant, *Portulaca dioica* showed luxuriant growth in the aquaponic system with large bright flowers when compared to the field conditions. On overall comparison, the plants in the aquaponics system showed above average development than field conditions. The negative points we felt in the work was less growth rate for *Amaranth* and reduced fruit development for *Capsicum*. The system showed one more drawback as there was a sudden decrease in the fish population, more than expected. Fish release ammonia through their waste, and high levels of this waste product can be toxic to the fish. This may be the reason, there was a drastic loss in the population of the fish. However, literature reveals that, these levels can be reduced through the process of

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ISBN: 978 -93 -87709 - 82 - 9

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nitrification. Nitrifying bacteria convert ammonia to nitrite, then nitrate, a form of nitrogen that can be utilized by plants. Thus, when the water returns to the fish tanks, nitrogen levels are tolerable for the fish (Rakocy *et al.*, 2006). These nitrifying bacteria are said to be present in the coconut fibre which can carry out the process. At higher levels of ammonia, effects are immediate and numerous deaths can occur rapidly. However, lower levels over a long period can still result in fish stress, increased incidence of disease and more fish loss (Somerville *et al*, 2014).

In the present study, the plant Portulaca needs larger amounts of water than others, which is still provided by the even and constant flow of water in the NFT in soil. This may be the reason of luxuriant growth of the plant in the aquaponic system. Soil has the ability to supply the plants with enough water without becoming overly saturated. It does not hold on to water to tightly where there is no air in the soil. Some of the spaces are filled with air, so there is an aerobic environment, which is best for plant growth (McCauley et al., 2005). The surplus supply of oxygen in the root may also be a reason for the positive growth of amaranth, but the adverse environmental conditions of the field reduced the growth rate. When the media becomes overly saturated, it causes poor aeration and anaerobic conditions for the roots and reduces overall growth (Denckia, 2003). The plant Amaranthus spinosus in the present study may have showed moder-The Plant Capsicum ate growth because of this reason. annuum showed normal growth in field and aquaponics but reduced fruiting in the latter. This may be due to the lack of pollinating agents to effect fertilization.

In Kerala hydroponic cultivation has considerable potential in future. In metropolitan areas land is not available for cultivation. Less Attention has been given to improving the sandy, acidic soil or the damaged soil of the south in Kerala state, where the blackish water of the Arabian Sea has invaded the land. Soilless culture can be adopted in such areas to overcome this problem (Reshmika *et al*, 2016).

The constraints faced in the present study ie, drastic reduction in the fish population may be due to accumulation of ammonia in the water which can be overcome by the introduction of nitrifying bacte-

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ISBN: 978 -93 -87709 - 82 - 9

ria in the fish tank; leaching out of components from the coconut fibre causing the discolouration of water which may have contributed to the fish death can be overcome by changing the growth media to inert aerated compounds like silica, quartz etc.; easy susceptibility for contamination may be due to the uninterrupted supply of water which further can cause the leaching of colouring component from fibre and this can be overcome by interrupted supply of water; the reduction in fruit yield of *Capsicum* may be due to the high nutritional requirement of the plant that can be overcome by increasing the amount of fish waste which be magnanimously increased by providing fish feed as special compound pellets rather than the normal fish feed available in the market.

Summary - Aquaponics may be regarded as the integration of two relatively well established production technologies. Aquaponics is the ideal answer to a fish farmers problem of disposing of nutrient rich water and a hydroponic growers need for nutrient rich water. In the present study, the analysis was carried out to compare the growth, flowering and fruiting of three types of plants, viz, leafy plant- Amaranth, Ornamental – Portulaca and fruiting plant – Capsicum. An NFT system of aquaponics was set and the plants were grown which was compared with plants grown in the field conditions. The plant Portulaca showed commendable growth over the field plant, Capsicum showed comparable growth with field plant but reduced fruiting and Amaranthus showed reduced growth rate in both conditions. The project emphasizes on the relevance of popularizing the aquaponics in the wake of an era with reduced space and soil but increased demand of food and nutrition. The system, if properly maintained and judiciously worked out, can deliver miracles in the field of nutrition and food safety for the underdeveloped nations as well as the under privileged populations.

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ISBN: 978 -93 -87709 - 82 - 9

# A REVIEW THROUGH THE ICHTHYOLOGICAL STUDIES OF INDIA

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### Abstract

Aristotle's attempt to discern between aquatic mammals and fish kicks off the study of fish. Kautilya's Arthashasthra and King Someswara's Manasallosa both contain fish literature. Bloch published his groundbreaking work on Indian fishes in 1785. Francis Day originally examined the fishes of Kerala in 1865, and his book is still considered the bible for fish taxonomy students. Numerous research followed, and they are currently ongoing. Fish The faunal variations of each river and waterbody are currently being studied, and there is a wealth of literature to draw from.

Keywords: fishes, India, Kerala, vedas, freshwater Review Paper

The study of fish begins with Aristotle (BC 384-322) by his attempt to distinguish between aquatic mammals and fish. There is hardly any water body devoid of some variety of fish which aroused the curiosity among mankind from the Vedic times in India. The ancient Indians classified fish, based on shape and structure and their knowledge from keen observations are remarkable as seen from Kautilya's Arthashasthra (300 BC) and King Someswara's

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ISBN: 978 -93 -87709 - 82 - 9

Manasallosa (1127 AD) (Jayaram, 1999). Fishes formed a part of Indian mythology where one of the incarnations of Lord Vishnu was in the form of fish (Matsyavathara) to rescue Vedas from Asuras. Hindus keep fish as an object of adoration. Many references are available for Indian classics and epics about how Hindus had considered fish as sacred and protected them with reverence. (Easa & Shaji, 2003)

The pioneering work in the field of scientific studies on Indian fish was done by Bloch through his work "Naturgeschichte der Auslaendischen Fische" published in 1785. Later on the studies on fish was continued by Schneider's "Ichthyologiae", 1801; Lacepede's "Histoire des Poissons", 1798-1803; Russell's "Fishes of Vizagapatanam", 1803; Francis Buchanan - Hamilton "Fishes of Ganges", 1822 describing about 269 species, Cuvier and Valenciennes's "Histoire Naturelle des Poissons" 1828-1849; John McClelland's "Indian Cyprinidae", 1839, described 138 species, W H Sykes's "Fishes of Dukhum", 1841; Jerdon's "Fishes of Southern India", 1849, described 150 species of which 55 was new species, "Ichthyological Gleanings in Madras", 1851, described 391 species, Bleeker's paper on "Ichthyologische fauna van Bengalen", 1853, described 162 species, Blyth's "Fishes from Calcutta",1858; Gunther's 8 volumes of *"Catalogue of the Fishes in the Collections"* of British Museum", 1859-1870, defined 6843 fishes and Beevan's book on freshwater fishes of India, 1877, gave an idea on the distribution pattern of some Malayan species found in Peninsular India. Day (1878) had reported 392 species in India. (Albert & Gunther, 1880)

Foremost amongst those who studied the fishes of Kerala was Dr. Francis Day who published his works as "The Fishes of Malabar" (1865), "The Fishes of India being a Natural History of the fishes known to inhabit the Seas and Freshwaters of India, Burma and Ceylon" (1878) and the Fauna of British India (1889) still remains a flagship name in the list of fish taxonomists in Kerala. The book 'The Fishes of Malabar' described 66 freshwater fishes, which were common in all rivers and adjacent freshwater bodies of Malabar region. In the book "Fishes of India, being a natural history of the fishes known to inhabit the seas of India, Burma and Ceylon", he

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ISBN: 978 -93 -87709 - 82 - 9

described 1418 species under 342 genera of freshwater and marine origin. This book still remains as the Bible for fish taxonomy students. No taxonomic work in ichthyology is complete without this book.

Many ichthyologic literatures were published following the work of Day. Works of Pillay (1929), Hora (1951) and Silas (1950) gave the list of fish of Travancore region. Other notable works include Hora (1942); Kulkarni (1940); Silas (1951, 1953, 1958, 1959) and Hora and Silas (1952) which mainly concentrated southern India. The 90's saw a huge leap in the fresh water fish taxonomic studies resulting in a vast array of literature in the field including some reference texts. The "Inland Fishes of India and Adjacent Countries" by Talwar and Jhingran (1991) in two Volumes which describes 2546 species from 969 genera, 254 families and 40 orders and "The Freshwater Fishes of Indian Region" by Jayaram (1999) reporting 742 species under 233 genera, 64 families and 16 orders form the main references. Other remarkable works during this time period were Menon (1992, 1999); Kowtal (1994); Kottelat and Whitten (1996); Arunachalam et al., (1997); Ajithkumar (1997); Easa & Shaji (1997); Arun (1999); Shaji et al., (2000); Gopi (2000); Rema Devi et al., (2000) mainly concentrated on Western Ghats region of peninsular India.

Dayal and Kapoor (2000) conducted a survey on the existing database for endangered fish species of peninsular India. Daniels (2001) studied the endemic fishes of Western Ghats. Thomas (2002) reported the hill stream fishes of south Kerala south of Palakkad gap of Western Ghats along with the habitat preferences of fishes and conditions of the stream. Easa and Shaji (2003) described 172 freshwater fishes inhabiting in rivers and inland water bodies of Kerala as a part of biodiversity documentation series for Kerala. Ajithkumar *et al.*, (2003) gave a checklist of 148 species of fresh water fishes of Kerala belonging to 23 families coming under 7 orders based on literature up to 2002 giving information about the major river systems of Kerala and its topography and notes and prevailing climatic patterns. Biju (2003) documented the distribution of hill stream fishes of north Kerala north of Palakkad gap of Western Ghats as a part of his Ph.D studies. Kurup and Radhakrishnan (2006) studied the fish and fish-

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eries of Periyar Lake giving 36 species belonging to 10 families and 21 genera of which 6 are endemic to the region. Johnson and Arunachalam (2009) recorded 60 species of primary freshwater fish in their studies on streams of south Western Ghats of which 39 species were Western Ghats endemic. Ramachandran and Jameela Beevi (2009) asserted the checklist of freshwater fishes collected from Ernakulum district citing 69 species with species availability and abundance. Ajithkumar and Vijayan (1988), Vijayan (1991) reported on the fish diversity of wetlands of Keoladeo National Park, Bharatpur. Radhakrishnan and Kurup (2010) resurveyed Periyar Tiger Reserve Lake along with its adjoining streams revealed the occurrence of 54 species belonging to 6 orders and 19 families stating an addition of 17 species to earlier list of 36 species.

Renjithkumar et al., (2011) studied on the exploited fishery resources of Pampa River reporting 60 species of which 26 species contributed to the exploited fisheries. Dahanukar et al., (2011) reported about the status and distribution of fresh water fishes of the Western Ghats giving their conservation status, list of critically endangered and endangered endemic species of the region. NBFGR has developed a database on Indian fish diversity comprising 2358 indigenous and 291 exotic fish giving a consolidated list of fresh water fishes of Western Ghats and North Eastern Hills (Jena et al., 2011). Pethiyagoda et al., (2012) put forward a synopsis of south Asian fish referred to Puntius through an examination of external morphology, osteology and analysis of 16S ribosomal RNA and cytochrome b gene fragments and proposed three new genera like Dawkinsia, Pethia and Dravidia in addition to Puntius. Lal et al., (2013) surveyed the biodiversity status of Vattakayal, a part of Ashtamudi Lake, Kollam district, describing 22 species under 10 orders and 17 families along with its conservation status. Sreekantha (2016) compiled the checklist of fresh water fishes in Western Ghats region which sum up with 318 species of which 42.8% (136 species) are endemic to the region.

List of fresh water fishes reported from India given in Fishbase.org includes 938 species currently present in the country (endemic, native, introduced, reintroduced) along with 30species possibly present in the country and 3 species thought to be absent; sum up to a total of

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ISBN: 978 -93 -87709 - 82 - 9

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971 species. The whooping list of fishes of India includes 2410 species coming under 39 orders and 231 families of both marine and freshwater fish present in the country (https://en.wikipedia.org).

Freshwater fish faunal studies concentrated around the Thrissur district started with the work of Thobias (1973) who made a detailed account of the fishes inhabiting in paddy fields and rivers of Thrissur district, while Antony (1977) studied the hill stream fishes in the same area. Inasu (1991) studied the systematics and bionomics of some inland fishes in Thrissur District reporting 98 species. Kadhar (1993) described 151 species belonging to 56 families in which 88 species where brackish water migrating between estuaries and seas and 67 freshwater species from the inland waters of Thrissur District. Kurup (1994b) gave an account of threatened fishes of the river systems flowing through Kerala. Easa and Shaji (1996) made a description about the distribution of stream fishes in Thrissur District. Ajith Kumar et al., (1999) studied fish resources of Chalakudy River and studied the distribution of fish fauna. Thomas (2006) reported 112 fishes belonging to 57 genera of 26 families from 10 orders from the rivers flowing through Thrissur district. Thomas et al., (2003) has stated the presence of 29 species of fishes from the Muriyad part of Kole wetlands. Mini (2006) reported 41 species of fishes from the Elthuruth Kole area. Nameer (2010) listed out 43 species of fishes from Kole lands of Kerala. Moncey (2011) came up with the report showing the presence of 63 fishes from Kole lands of central Kerala. Johny et al., (2012) reported ichthyofaunal diversity of Kole lands reporting the presence of 54 species belonging to 40 genera. Dominic and Inasu (2013) studied the ichthyofaunal diversity of Puzhakkal River system of Thrissur district reporting 71 species belonging to 48 genera, 26 families and 11 orders. Francis (2015) studied the Kole lands of Thrissur district for its avifauna and found out the presence of 59 fish species belonging to 47 genera and 31 families from 10 orders, as a part of its feeding. Johny (2018) reported the presence of 107 species of fishes belonging to 14 orders 40 families and 75 genera in her studies of Kole wetlands of Kerala.

This paper sheds light on the history of ichthyological studies in India, taking into account the studies from Kerala including Thrissur district.

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ISBN: 978 -93 -87709 - 82 - 9

# APPLICATIONS OF RANDOM SUMS OF RANDOM VARIABLES

## Dr. Mariamma Antony

Department of Statistics, Little Flower College, Guruvayoor Abstract

Random summation scheme appears naturally in various fields, such as Physics, Biology, Economics, Reliability and Queuing Theory. In this paper some practical applications of random summation are discussed.

**Key Words**: Normal Law, Stable Laws, Random summation **1.Applications of Random sums of random variables** 

The most widely known and used theorem in various areas of science is the Central Limit Theorem, which gives necessary and sufficient conditions for the convergence of sums of independent and identically distributed random variables to the normal law. Consequently, many scientists believe that if the number of summands is large, their sum can always be approximated by a normal distribution. This, however may not be the case. If the summands have infinite variance, then the sum may converge only to a stable non-Gaussian law. Moreover, even if the variables are independent and normally distributed, the sum of their random number may not be distributed according to the normal law, as is illustrated by the following example ( see Kruglov and Korolev (1990 ) ).

### **EXAMPLE 1.1**

Let  $X_k$ , k = 1, 2, ... be independent and identically distributed ran dom variables with the standard normal distribution. Consider

the sum of Xk's up to a random moment  $\mathcal{V}_n$ , where the distribu-

tion of  $V_n$  is uniform on the set of integers  $\{1, 2, ..., n\}$ . Then, the characteristic function of the normalized random sum

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ISBN: 978 -93 -87709 - 82 - 9

$$S_{n} = \frac{(X_{1} + X_{2} + ... + X_{\nu_{n}})}{\sqrt{n}} \text{ is equal to}$$
$$\phi_{n}(t) = \frac{1}{n} \sum_{i=1}^{n} e^{-it^{2}/2n}.$$

Thus, when  $n \to \infty$ , the limiting characteristic function of the sum,  $S_n$  becomes  $\phi(t) = \left(\frac{2}{t^2}\right) \left(1 - e^{-t^2/2}\right)$ , which is not the characteristic function of a normal law.

Therefore, we must study the sum of a random number of random variables. Apart from its interesting theoretical properties, the random summation scheme appears naturally in various fields, such as Physics, Biology, Economics, Reliability and Queuing Theory. The following examples, which have many generalizations, illustrate how random summation can arise in practice:

(i) **Marketing**: When ordering supplies to a store, the owner would like to know the total amount, T, of an article A sold during given period of time. If  $X_k$  is the (random) amount of A sold to the  $k^{th}$  customer, and N is the number of customers buying A during the time period considered, then the total amount of A sold can be written as

$$T = X_1 + X_2 + \dots + X_N.$$

(ii) Insurance Mathematics / Risk Theory : In risk theory, one is interested in the distribution of aggregate claims generated by a portfolio of insurance policies ( collective risk model ). If the individual claims are denoted by  $X_k$ 's

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ISBN: 978 -93 -87709 - 82 - 9

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(assumed to be independent and identically distributed) and the random variable N denotes the number of claims in a given time period, then the aggregate (total) claim S is given by

# $S = X_1 + X_2 + \ldots + X_N$ .

(iii) **Reliability Theory**: Many systems studied in reliability theory can be described by the following scheme and its various generalizations (see, e.g., Gertsbakh (1984) and Pillai and Sandhya (1996)). A system consists of two operating units. The working time (until failure) of each unit has the same distribution F(x). At time 0, the first unit starts working while the second is on stand by. When the operating unit fails, its place is taken by the stand by unit, and the first unit goes to repair. If during that time the second unit fails, the system fails. An important issue in this setting is the nature of the distribution of the time T until failure of the system. Let X denote the length of the cycle, where the cycle starts with putting first unit into operation and ends with completion of its repair (before the second unit fails). Let Y be the length of the incomplete cycle (terminated by the system failure). Clearly  $T = X_1 + X_2 + ... + X_{N-1} + Y$ ,

where N – 1 is the (random) number of cycles prior to the failure, so

that  $P(N=i) = p(1-p)^{i-1}, i \ge 1$ 

and p is the probability that the second unit fails before the first completes its repair. Typically, p is very small, reflecting the fact that the operational (average) time is larger than the repair (renewal) time. One is usually interested in the asymptotic distribution of T when

 $p \rightarrow 0$ .

Another sequence of examples of practical appearance of random sums is connected with the problem of parameter estimation under sampling with a random sample size. Recall that many common estimators (including maximum likelihood estimators, M–estimators and others) are well–approximated by sums of independent random variables (see, Ibragimov and Khasmmskii (1979)). It is expected that for estimation problems with random sample size, such approximation will be provided by sums with random number of terms.

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### EXAMPLE 1.2

Suppose that a statistician observes data transmitted through a device. Assume that the device may fail with probability p in time of transmission of any observation. In such situation, the statistician will have a sample of random volume N, where N has a geometric distribution with parameter and is independent of the values of the transmitted observations.

- •One may come across samples of random volume in reliability theory, for instance when testing operational safety (Gnedenko (1989)). If the test is connected with the life time, then we observe a random number of failures in a given time interval.
- •When we want to find the distribution of the velocities of cars on a highway, and observe the velocities of cars at a given point of the highway during a given time interval, we obtain a sample of random volume.

The number of cases where sums occur is enormous, and it is clear that random summation scheme plays an important role in many applied probability problems. In addition, random sums appear in various branches of Mathematics, including Mathematical Statistics and the Theory of Stochastic Processes (see, e.g., Gnedenko and Korolev (1996), Kalashnikov (1997) and Rahimov (1995)). Klebanov et al. (1984) discussed the properties of distribution of geometric sums of random variables.

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ISBN: 978 -93 -87709 - 82 - 9

# STUDIES ON THE INSECT DIVERSITY OF DIFFERENT REGIONS OF PALAKKAD DISTRICT

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## ABSTRACT

The insect diversity study of different regions of Palakkad district show the abundance of many insect orders with our investigations recording about 556 insects. Kulappully seems to be most insect abundant study site in general but when we calculated insect abundance per square meter Vavanoor seems to be the most insect abundant site. The most abundant insect order is found to be Lepidoptera.

## INTRODUCTION

Insects are the most diverse groups of animals in the planet, including more than a million described species and representing more than half of all known living organisms. The total insect diversity vary from 2.6-7.8 million species with a mean of 5.5 millions. Beetles (Coleopteran) make up 40% of described insect species, Storm et al., have estimated that the number of beetles as 0.9-2.1 million with a mean of 1.5 million. Some Entomologists suggest that Dipterans (flies) and Hymenopterans (wasps, bees and ants) could be more diverse. Five orders of insects stand out in their levels of species richness ie., Hymenoptera, Diptera, Coleoptera, Lepidoptera and Hemiptera.

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### METHODOLOGY

The insect diversity in different regions of Palakkad district like Kulappully (1092.5 Square Meter), Kudallur (1618.4 Square Meter), Vavanoor (1010.3 Square Meter), Mathuppully (728.2 Square Meter) and Thalakkassery (927.4 Square Meter) has been studied during the months of November 2020, December 2020 and January 2021. This study assesses the abundance, diversity and distribution of insects. These sites of the study were selected within the immediate vicinity of the home and the neighbourhood of the group members for convenience and accessibility.

The sites were regularly observed for the different varieties of insects. As the study was carried out with the intention of conservation of biodiversity the insects were neither collected nor preserved for identification. The photographs of the insects were taken for identification. Most of the insects were identified with the help of Dr. Revathy V.S., Assistant Professor, Dept. of Zoology, U.C College, Aluva & Dr. Anju Viswam, State Malaria Officer, Chattisgarh.. Insects which were difficult to identify at the genus level were identified at the order/family level only. Diversity was assessed based on total order richness (the number of insect orders per month) and the relative dominance of each insect order in a site was determined by calculating the dominance index using the following formula: Relative dominance = ni x 100/N . Where ni = no. of insects in the 'i' th order, and N = the total number of insects in all the orders collected during the study

SL. NO	INSECT ORDERS	NOV	DEC	JAN	TOTAL	PERCENTAGE OFINSECT ORDERS
22			NO. OF I	NSECTS	INSECTS	
1.	HYMENOPTERA	6	4	4	14	8.58
2.	DIPTERA	12	9	8	29	17.79
3.	COLEOPTERA	3	3	4	10	6.13
4.	LEPIDOPTERA	11	11	10	32	19.63
5.	ORTHOPTERA	11	11	7	29	17.79
6.	ODONATA	9	12	8	29	17.79
7	THYSANOPTER A	3	1	1	5	3.06
8	HEMIPTERA	4	6	5	15	9.20
2	TOTAL	59	57	47	163	

#### RESULTS

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## SITE 2 - KUDALLUR IN PALAKKAD DISTRICT

SL. NO.	INSECT ORDERS	NOV	DEC	JAN	TOTAL NO. OI INSECTS	PERCENTAGEOF
1	HYMENOPTERA	3	2	3	8	6.95
2	DIPTERA	5	4	3	12	10.43
3	COLEOPTERA	9	6	7	22	19.13
4	LEPIDOPTERA	11	10	10	31	26.95
5	ORTHOPTERA	7	10	7	24	20.86
6	MECOPTERA	3	4	1	8	6.95
7	MANTODEA	1	2	1	4	3.47
8	HEMIPTERA	3	2	1	6	5.21
	TOTAL	42	41	35	115	

	SITE 3 - VA	VANOOR	IN PALAK	KAD DISTRICT	
 INSECT	Charles and a second	and the second s	Same and the second	The same street of the same	and the second second

SL. NO.	INSECT ORDERS	NOVEMBER	DECEMBER	JANUARY	TOTAL NO. OFINSECTS	PERCEN TAGEOF INSECT ORDERS
1,	HYMENOPTERA	2	3	3	8	7.27
2.	DIPTERA	4	8	6	18	16.36
3.	COLEOPTERA	4	2	2	8	7.27
4.	LEPIDOPTERA	8	10	9	27	24.54
5.	ORTHOPTERA	10	10	9	29	26.36
6.	MANTODEA	1			1	0.90
7.	HEMIPTERA	6	7	6	19	17.27
	TOTAL	32	40	31	110	

#### SITE 4 - MATHUPPULLY IN PALAKKAD DISTRICT

SL. NO.	INSECT ORDERS	NOVEMBER	DECEMBER	JANUARY	TOTAL NO. OF INSE CTS	PERCENTAGE OF INSECT ORDERS
1.	HYMENOPTERA	5	3	2	10	15.62
2.	DIPTERA	6	4	3	13	20.31
3.	COLEOPTERA	4	3	1	8	12.5
4.	LEPIDOPTERA	3	4	2	9	14.06
5.	ORTHOPTERA	3	4	4	11	17.18
б.	MANTODEA	2	1	2	5	7.81
7.	HEMIPTERA	3	2	3	8	12.5
	TOTAL	26	21	17	64	574

## SITE 5 - THALAKKASSERY IN PALAKKAD DISTRICT

SL. NO.	ORDERS	NOVEMBER	DECEMBER	JANUARY	TOTAL NO. OF INSECTS	PERCENTAGE OF INSECT ORDERS
1.	HYMENOPTERA	4	5	6	15	14.42
2.	DIPTERA	6	7	5	18	17.307
3.	COLEOPTERA	3	2	3	8	7.69
4.	DERMAPTERA	1	1	0	2	1.92
5.	LEPIDOPTERA	5	4	3	12	11.53
6.	ORTHOPTERA	6	5	8	19	18.26
7.	ODONATA	2	3	5	10	10.4
8.	MANTOIDEA	4	1	2	7	6.73
9.	PHASMATODEA	1	0	0	1	1.04
10.	HEMIPTERA	5	5	2	12	11.53
	TOTAL				104	

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SL. NO	INSECT ORDERS	KULAPPULLY	KUDALLUR	VAVANOOR	MATHUPPULLY	THALAKKASSERY
1.	HYMENOPTERA	14	8	8	10	15
2.	DIPTERA	29	12	18	13	18
3.	COLEOPTERA	10	22	8	8	8
4.	LEPIDOPTERA	32	31	27	9	12
5.	ORTHOPTERA	29	24	29	11	19
6.	ODONATA	29				10
7	THYSANOPTERA	5				
8	HEMIPTERA	15	6	19	8	12
9	MECOPTERA	2	8			
10	MANTODEA		4	1	5	7
11	DERMAPTERA					2
12	PHASMATODEA					1
	TOTAL	163	115	110	64	104

#### COMPARATIVE NUMBER OF INSECT ORDERS IN DIFFERENT STUDY SITES

Total number of Insects found= 556

4

# INSECT ABUNDANCE PER SQUARE METER OFDIFFERENT STUDY SITES

SITES	STUDY AREAIN SQUARE METER	TOTAL NO. OF INSECTSFOUND	INSECT ABUNDANCEPER SQUARE METER
<u>Kulappully</u>	1092.5	163	0.14
Kudallur	1618.4	115	0.07
Vavanoor	1010.3	110	0.17
Mathuppully	728.2	64	0.0 <mark>8</mark>
Thalakkassery	927.4	104	0.11

#### THE RELATIVE DOMINANCE OF INSECTORDERS IN DIFFERENT SITES

(Insect orders not represented in all the sites are omitted)

SL. NO	INSECT ORDERS PER SQUARE METER	KULAPPULLY	KUDALLUR	VAVANOOR	MATHUPPULLY	THALAKKASSERY
1.	HYMENOPTERA		+			++
2.	DIPTERA	++	+			
3.	COLEOPTERA		++	+		
4.	LEPIDOPTERA	++			+	
5.	ORTHOPTERA	++	+			
6	HEMIPTERA		+	++		

++ Highest relative dominance

+ Lowest relative dominance

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#### DISCUSSION

The study show the sites chosen have many insect orders in abundance with our investigations recording about 556 insects. These sites may be important sources of support for insects, Since Kulappully seems to be most insect abundant study site in general followed by Kudallur, Vavanoor, Thalakkassery and Mathuppully when we calculated insect abundance per square meter considering the area of the sites, Vavanoor seems to be the most insect abundant site followed by Kulappully, Thalakkassery , Mathuppullyand Kudallur. Also the most abundant insect orders are found to be Lepidoptera followed by Orthoptera and Diptera when determined based on area. The relative dominance of insect orders were calculated per square meter omitting insect orders not represented in all the sites. The relative dominance of Lepidoptera, Orthoptera and Diptera were highest in Kulappully and lowest in Mathuppully and Kudallur respectively.

The lepidopterans outnumbered other insect orders may be because of their ecological adaptation , speciation and high dispersal ability . Their polyphagous nature helps them to inhabit in all habits. Their dominance is also because of their active flying nature and they can search a large area of resources. The butterfly diversity and abundance is highly correlated with the availability of food plants and assemblage of plant varieties in the habitat (Kunte, 2000). The abundance of butterfly species population depends on the availability of positive tropical climate and topographic features of the regions (Tiple et .al , 2009; Subba et al., 2006 and Hogsden et al., 2004).

Preferences of Orthopteran species for particular habitat may reflect a preference for enemy-free space or optimal microclimate as studied by Quinn & Walgenbach (1990). The Dipteran abundance may be related to warmer climate of Palakkad. As studied by Viesturs et al., (2014) many environmental factors are directly or indirectly involved in fly community changes like climate warming, deposition rates, increase of the level of CO2, and nitrogen pollution. Rising temperature accelerates decomposition of dead organic matter (Conant et al., 2011) and promotes the microbial and soil animal community. Flies, most of which are connected with soil seems to be a good indicator of those ecological processes.

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In all the sites except in Talakkassery, most number of insects were recorded in the months of November and December and less number in January. In Thalakkassery, though there is a slight increase in the number of insects in the month of January it was not recorded at a significant level. As the temperature was not recorded during the study period whether there is a correlation between the differences in atmospheric temperature and the insect abundance is uncertain. The sites have unlimited sunlight during the daytime.

Insect order richness encountered related to plant species richness, size of the site and the percentage of the area under grass cover Madhumitha et al., (2013). In the present study the site with largest area was Kudallur but insect abundance was not high as expected per square meter when compared to other sites. Greater taxonomic resolution is required to provide additional insights, as pointed out by previous studies (Kim and Byrne 2006)

However the present study corroborates other studies in the points that even significant levels of biodiversity support can be provided by small, local-scale patches of green space. Plants of these sites might be providing critical habitat for small-sized taxa, such as insects. Though small, overall, these sites seem to be stable and thus reliable for the existing diversity. The present study also helps to lay the foundation for further investigations into the role of the human factors shaping the distribution of faunal and insect diversity in rural ecosystems.

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ISBN: 978 -93 -87709 - 82 - 9

# AN INTRODUCTION TO GRAPHS AND NETWORK ANANLYSIS

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#### Abstract

The explicit linking of Graph theory and network analysis began in 1953. The language of graphs can be used to model many notions that were discussed long before graph theory was born. As, many previous applicability of Mathematics in real life situations, network analysis shows that Mathematical invention and discovery is sometimes stimulated by social science. Social network analysis has emerged as a key technique in modern sociology and in anthropology, biology, communication studies, geography and information science. The underlying structure of a social network is nothing other than a graph and the properties, terminologies and results in graph theory can be adopted to networks to improve various properties of networks. In this paper, some basics in network analysis and graph theory and their correlations are detailed.

**Keywords:** Graph Theory, Social Network Analysis, Centrality Measures

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ISBN: 978 -93 -87709 - 82 - 9

#### INTRODUCTION

Graph theory is a fast-growing area in Mathematical research. A graph G consists of a finite nonempty set V = V(G) of p vertices together with a prescribed set E(G) of q unordered pairs of distinct vertices of V. Each pair  $e = \{v_i, v_j\}$  of vertices in (G) is an edge of G and e is said to join  $v_i$  and  $v_j$ . Also, we say that  $v_i$  and  $v_j$  are adjacent vertices. A graph with p vertices and q edges is called a (p, q) graph. A path in a graph is a sequence of distinct vertices such that the adjacent vertices in the sequence are adjacent in a graph. The distance between two vertices  $v_i$  and  $v_j$  in G is the length of the  $v_i - v_j$  geodesic, denoted by  $(v_i, v_j)$ where geodesic means the shortest  $v_i - v_j$  path. The degree of a vertex  $v_i$  in a graph G denoted by  $d_i$  or deg  $v_i$  is the number of edges incident with  $v_i$ . The adjacency matrix (G) =  $[a_{ij}]$  of a graph G with p vertices is the p x p matrix in which  $a_{ij} = 1$  if  $v_i$  is adjacent with  $v_j$ and  $a_{ii} = 0$  otherwise.

A social network is social structure made up of individuals called "nodes" which are tied by one or more specific types of interdependencies such as friendship, common interest, financial dependency, relationships of knowledge, prestige or beliefs. Social network analysis views these in terms of network theory. The underlying graph-based structure will be so

complex. The term "Social Network Analysis" was widely used years ago for complex sets of relationships between members of social systems, from interpersonal to international. Now it is now moved from a suggestive metaphor to an analytic approach with its own theoretical statements, methods, software and researchers. They either study whole networks where all of the ties containing specified relations in a defined population (known as complete networks) or personal networks (known as egocentric networks) in which the ties will be have with specified people.

#### CENTRALITY MEASURES IN SOCIAL NETWORK ANALYSIS

- 1. Degree centrality Degree centrality is based on the degrees in the graph. The degree centrality of a vertex is a normalized value representing the number of edges touching a vertex. For a graph G = (V, E) with *n* vertices, the degree centrality  $C_D(v) = \frac{d(v)}{n-1}$ Vertices with low degree centrality will usually be on the periphery of the network or the low flow branches. Let  $v^*$  be the node with highest degree centrality in G. Then  $C(G) = \frac{\sum_{i=1}^{n} [C_D(v^*) - C_D(v_i)]}{\sum_{i=1}^{n} [C_D(v^*) - C_D(v_i)]}$
- 2. Betweenness centrality Betweenness centrality is centrality measure of a vertex within a graph. The vertex that occurs on many shortest paths between other vertices have higher betweenness than those who do not.
  - $C_B(v) = \sum_{s \neq v \neq t \in V} \frac{\sigma_{st}(v)}{\sigma_{st}}$  where  $\sigma_{st}$  is the number of shortest paths from s to t

and  $\sigma_{st}(v)$  is the number of paths from s to t that passes through the vertex March 2022

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ISBN: 978 -93 -87709 - 82 - 9

Betweenness centrality of a vertex is a global topological measure. It quantifies the extent to which a vertex controls communication in a network by estimating how frequently paths through the network include the vertex. Vertices with high betweenness centrality thus represent hubs that many paths pass through, and represent either highways or bottlenecks for the flow in social networks.

3. Closeness centrality – In Graph theory, closeness is a measure of a vertex within a graph. In network theory, it is a sophisticated measure of centrality which is defines as the mean geodesic distance between a vertex v and all X-me de(vt)

other vertices reachable from it.  $C_C(v) = \frac{\sum_{t \in V \setminus v} d_G(v,t)}{n-1}$ 

Closeness centrality helps to find the individuals who are best placed to influence the entire network most quickly. The closeness centrality is tightly related to the notion of distance between vertices. The farness is equal to the sum of the distance from a vertex to all the other vertices. Closeness centrality is actually the reciprocal of the farness. It highlights vertices that may reach any other vertices within a few hops and vertices that may be very distant in the graph.

4. Eigenvector centrality – Eigen vector centrality is a measure of the importance of a vertex in a network. It is defined as the greatest eigenvalue among all the eigenvalues of the Adjacency matrix. Eigen Centrality is a good 'allround' score, handy for understanding human social networks, but also for understanding networks like malware propagation. By calculating the extended connections of a vertex, Eigen Centrality can identify vertices with influence over the whole network, not just those directly connected to it. Eigenvector centrality is a more sophisticated view of centrality: a person with few connections could have a very high eigenvector centrality if those few connections were to very well-connected others. Eigenvector centrality allows for connections to have a variable value, so that connecting to some vertices has more benefit than connecting to others.

# APPLICATIONS

The Google Algorithm PageRank is a variant of Eigen Centrality, designed and made famous by Google founders Larry Page and Sergei Brin. Designed for ranking webpages, PageRank uses links between pages as a

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measure of importance. Each webpage is treated as a node in a network, and is assigned a score based upon its number of in-coming links. These links are also weighted depending on the relative score of its originating node. The result is that nodes with many in-coming links are influential, and nodes to which they are connected share some of that influence. Like Eigen Centrality, PageRank can help uncover influential or important vertices whose reach extends beyond just their direct connections.

The paper titled "A comparative study of reciprocity in two rural social networks in Tamil Nadu, India" S. Arumugam et.al.[5] highlights a real life application of graphs in networks. This paper contributes to our understanding of rural India from the social network perspective by analyzing two unique data sets on three types of social networks (monetary help, advice and companionship) collected from households in two villages of Tamil Nadu in southern India.

#### CONCLUSION

Because of the simplicity of Graph Theory, graphs and products of graph has so many applications in different fields such as energy graphs in Chemistry and neural networks in Biology etc. Social network analysis is a recent area in which real life structures are identified with graph theoretical structures. The capacity and utility of such networks can be improved and modified using pure mathematical theories such as Graph theory and Linear Algebra.

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ISBN: 978 -93 -87709 - 82 - 9

March 2022

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# CURCUMIN- A COMBATANT AGAINST CORONA VIRUS – SOME FINDINGS

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# Abstract

In this present work,tried to find out the combatant action of curcumin on the corona virus.Covid-19 has a very negative impact on the human body, especially the lungs, liver and kidney. Many works of the literature showed that Curcumin, a polyphonic natural molecule, has antioxidant, antibacterial, anti-proliferative, anti-inflammatory, neuroprotective, and cardioprotective effects. Its structural properties and mechanism of action on the corona viruse are described here.

Key Words: COVID-19, Curcumin, Lungs, Liver, Kidney, target cells

# 1. Introduction

In December 2019, a novel coronavirus outbreak was first reported in Wuhan, Hubei Province, China. Coronaviruses are singlestranded positive-sense RNA viruses that spread through the air and are transmitted to people by respiratory droplets[1]. COVID-19 infection symptoms are similar to those of normal cold and include a dry cough, fever, shortness of breath, and breathing difficulties. In more serious situations, pneumonia, severe acute respiratory syndrome, renal failure, and death are all possible outcomes. COVID-19 is spread from person to person through droplets produced by infected people's respiratory systems, most commonly during coughing and sneezing. Clinicians have examined antiviral medicines, antibiotics, and anti-inflammatory medications as part of combination

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ISBN: 978 -93 -87709 - 82 - 9

therapy [2]. Several polyphenolic compounds isolated from natural products have been found as having antiviral mechanisms that target virus host-specific interaction, viral entry, replication, and assembly in the context of preventive and supportive therapy. Curcumin, a polyphonic natural molecule, has antioxidant, antibacterial, anti-pro-liferative, anti-inflammatory, neuroprotective, and cardioprotective effects.

#### 2. Covid – 19 Impact on Human Body

SARS-CoV-2 is a novel beta coronavirus with a glycolipid envelope [3]. It is a positive-strand RNA virus with a glycolipid envelope. To infect host cells, the virus recognises the angiotensin-converting enzyme 2 (ACE-2) receptor. Although inhalation of respiratory microparticles is the most common way for viruses to enter the body, the oral-faeces route cannot be discounted because viral RNA has been identified in faecal samples [4].

## 2.1 Impact on Lungs

COVID-19 can lead to lung issues such as pneumonia and, in the most severe cases, ARDS (acute respiratory distress syndrome). Another possible COVID-19 consequence is sepsis, which can cause long-term damage to the lungs and other organs.

#### 2.1.i.Pneumonia

In pneumonia, the lungs become inflamed and filled with fluid, causing breathing problems. Pneumonia caused by covid-19 tends to spread to both lungs. Shortness of breath, cough and other symptoms result when air sacs in the lungs fill with fluid, reducing their ability to take in oxygen. While most people recover from pneumonia without any long-term effects, pneumonia caused by covid-19 can be rather serious. Even when the sickness is gone, lung injuries can cause breathing problems that take months to resolve[5].

# 2.1.ii .Acute Respiratory Distress Syndrome (ARDS)

As covid-19 pneumonia worsens, more of the air sacs fill with fluid spilling from the lungs' tiny blood veins. Shortness of breath eventually develops, which can lead to acute respiratory distress syndrome, a type of lung failure. Patients with ARDS are frequently unable to breathe on their own and may require ventilator support to help them breathe[5].

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## 2.1.iii . Sepsis

Sepsis is another potential complication of a severe case of covid-19. Sepsis occurs when an infection enters the bloodstream and spreads throughout the body, causing tissue damage. The connection between the organs breaks down in sepsis. Entire organ systems, such as the lungs and heart, might begin to shut down one by one. Even if a patient survives sepsis, the lungs and other organs can be permanently damaged.

# 2.2. Impact on Liver

According to one Chinese study, up to half of those infected with the new coronavirus, nuclear if the cause was the virus SARS-CoV-2, developed liver impairment at some stage during their illness. Increased levels of liver enzymes, such as alanine aminotransferase, have been found in some patients hospitalised with covid-19 (AST). Increased levels of liver enzymes may indicate that a person's liver has been damaged, at least briefly. Some studies have found that patients diagnosed with covid-19 who had pre-existing liver disease (chronic liver disease, cirrhosis, or related comorbidities) have a greater risk of death than people who do not have the pre-existing liver disease [6]. This could be due to the state of direct infection of liver cells getting caught up in the immune war between the body's immune system and the virus with chemicals produced by our body, namely cytokines.

## 2.3. Impact on Kidney

Coronavirus may be able to attack kidney cells. The novel coronavirus has receptors that allow it to connect to kidney cells, infiltrate, and replicate, potentially causing damage to those tissues. The ACE2 receptor, which can also be found in the kidney, is found in our bodies. It makes a strong attachment with the coronavirus's sticky spikes. Blood clotting is caused by the virus, which can obstruct the kidneys. Kidneys function as filters, removing pollutants, excess water, and waste from the body. COVID-19 causes blood clots to develop, which can obstruct the tiniest blood arteries in the kidney, impairing its function. COVID-19 patients frequently have low oxygen levels in their bodies. Kidney failure can occur when there is a lack of oxygen. When the immune system battles an infection, cytokines are tiny proteins that help cells communicate. However, a

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massive inflow of cytokines in a short period might produce acute inflammation. This reaction, in its attempt to eradicate the invading virus, can harm healthy tissue, including kidney tissue [7].

# **3.** Mechanism of Action of Curcumin for the prevention of Coronavirus

Curcumin is a diarylheptanoid that belongs to the curcuminoids family of natural phenols responsible for the yellow colour of turmeric.  $C_{21}H_{20}O_6$  is the chemical formula. Curcumin, dimethoxy curcumin, and bisdemethoxycurcumin curcumin are three notable curcuminoids. Curcumin is the most active and health-promoting of these. Curcumin comes in two forms: keto and enol. The enol form is the most common. Curcumin's action is determined by three reactive functional groups: a di-ketone moiety and two phenolic groups. It is the most important bioactive component with numerous health advantages.

Pneumonia may produce hypoxemia in severe COVID-19 infections, which disrupts cell metabolism, reduces energy availability, and increases anaerobic fermentation. The cell membrane's phospholipid layer is then destroyed by oxygen free radicals, resulting in acidosis [8]. As a result, these patients will benefit from treatment with a medicine that possesses antioxidant characteristics, which curcumin has.

In mice with acute lung injury caused by intestinal ischemiareperfusion, curcumin raised superoxide dismutase (SOD) levels [9]. In ventilator-induced lung damage in rats, curcumin lowered malondialdehyde (MDA) levels and restored xanthine oxidase (XD) and total antioxidative capacity (TAOC) levels [10]. Curcumin also boosted SOD activity and lowered MDA concentration in the lungs in sepsis-induced acute damage.

Recent insilico predictions suggest a stable interaction between curcumin and the SARS-CoV2 enzyme. Curcumin has been shown to hinder replication of the SARS coronavirus as well. The entry of SARS cov2 into host cells is predicted to be hindered by curcumin through direct interaction with viral ligands/target cell receptors [11]. Curcumin has also been shown to block trans-membrane Serine Protease-2(TMPRSS2), a priming enzyme for SARS-Cov-2 cellular entrance [12].

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Angiotensin-converting enzyme 2(ACE 2) is an enzyme present on the surface of our body cells. The viral spike protein is believed to interact with this enzyme which serves as the doorstep for the coronavirus. The spike protein consists of two subunits. The S1 subunit of spike protein through its receptor-binding domain interacts with ACE 2 on target cells. Curcumin has been predicted to interact and block S1 subunit of SARS-Cov-2[13]. Blocking the receptorbinding domain of spike protein will prevent the recognition of viral particles.

TMPRSS-2 is one of the major activating protease of host cells for entry of SARSCov-2. The cleavage of the S2 subunit of spike protein, which is a prerequisite step for the release of viral content in host cells is mediated by TMPRSS-2. Curcumin has been demonstrated to diminish endormal cysteine protease of TMPRSS-2.

Basigin (EMMPRIN- Extracellular Matrix Metallo Protease Enzyme) [14] is another hypothesised pathway for viral entrance. This alternate approach may allow a viral particle to penetrate target cells while ACE2 is blocked[15]. The efficacy of ACE2 blockers will be shattered as a result of this. Curcumin, on the other hand, has been demonstrated to inhibit basigin [16].

Dipeptidyl Peptidase-4(DPP4) is a receptor for internalisation used by a variety of coronaviruses [17]. Because curcumin has a high affinity for Dipeptidyl Peptidase-4, it also blocks this viral receptor. Curcumin can bind directly with aminopeptidase, another receptor for coronavirus entry, in vitro and in vivo, and inhibit it irreversibly [18].

#### Conclusion

In this review, we have attempted an overview of potential antiviral effects of curcumin that can be helpful for researchers to further investigate the potency of curcumin against newly emerging SARS-Cov-2 infection. The advantage of curcumin over other important natural agents with reported antiinflammatory activities such as zerumbone, thymoquinone[19], honokiol, escin, pinitol and tocotrinols is that it has additional antiviral, antifatigue and bronchodilator effects. Also, it has significant protective effects in ARDS model in animal studies. These mentioned effects help us to conclude that curcumin has the potential to be effective against COVID-19 infection.

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# FORAGING BEHAVIOUR OF FISHES UNDER PREDATION STRESS

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# ABSTRACT

Predator-prey interactions are critical in ecological communities, but it is increasingly clear that a predator's effect goes beyond eating prey. Fear of predators may also alter the behaviour, physiology, and morphology of prey as they try to reduce risk. It also has important demographic effects on prey populations. Here, the article review the studies on fish behaviour under predatory stress and summarise what is currently known about 'non-consumptive effects' (NCEs) in fish assemblages, including effects on individuals and populations and variations in space and time caused by predator and prey traits and environmental factors, and the evidence for NCEs driving trophic cascades. Critically, throughout we also draw on a wider literature to highlight hypotheses and theories emerging in other ecosystems that can inform further work on this field.

Key words: Predator, fish behaviour, non-consumptive effects, trophic cascade

# INTRODUCTION

Foraging for food is a crucial behavior for animals. Like all behavior, it requires the interaction of many components including environmental factors, structure of habitat, presence of predators, and energy associated with a given food type or item etc. Natural selection favours efficient foraging, and most animals are extremely adept at searching for, and harvesting food. Foraging efficiency is usually a matter of *trade-off* between competing priorities. These may include energy gained versus energy spent; energy gained versus risk

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ISBN: 978 -93 -87709 - 82 - 9

of predation; energy gained versus losses to rivals, etc. Such tradeoffs apply not only to energy produced by foraging, but also to that usurped.

Feeding behavior in fish has been extensively studied from both ecological and behavioral viewpoints (Marcotte and Browman, 1986; Volkoff and Peter, 2006). Finding food in the most economic way and to avoid the risk of being preyed upon are two important factors in maximizing the fitness of an individual. Predators of many taxa are specialized piscivores and they mainly focus on small teleost fish. An animal may reduce activity in response to stress related to increased predation risk (Watson et al., 2004). All at once, growing fast provides the fish an increased reproductive success as well as a better opportunity to escape from the prey spectrum of many predatory stress – the animal become more conspicuous by its inevitable movements during foraging, it has to concentrate on finding food at the expense of vigilance for predators and the food can be plentiful in places of high risk of predation (Millinsky, 1996).

Predation pressure is known to have significant impacts on the evolutionary ecology of different populations and can affect life-history traits, behaviour, and morphology. It is demonstrated that fish from areas of low-predation pressure had shorter foraging latencies, than fish from high-predation sites. Predation stress is known to affect energetic processes in many fishes (Magnhagen, 1993). For example, the presence of the largemouth bass, *Micropterus salmoides*, causes small bluegill sunfish, Lepomis macrochirus, to spend longer periods in dense cover where fewer planktonic prey, leading to slower growth rates (Werner et al., 1983). In freshwater guppies, intimidation by predators reduces the growth of adults and causes a 50% reduction in egg production (Fraser and Gilliam, 1992). Further, stress has inhibitory effects on all stages in the reproductive process, including gamete quality and progeny (Schreck, et al., 2001), egg and larval development and survival (Campbell et al., 1994). Holbrook and Schmitt (1988) experimentally varied predation pressure on juvenile black surfperch Embiotoca jacksoni and showed that they are more closely associated with shelter and feed on less preferred algae at high predation pressure. Therefore, there is a trade-off between

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ISBN: 978 -93 -87709 - 82 - 9

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energetic returns from foraging and the risk of predation accepted by the animal.

# BALANCING THE STRESS OF PREDATION AND FEEDING

MacArthur and Pianka (1966) developed a theoretical and empirical construct, the optimal foraging theory (OFT), which led to a better understanding of foraging behavior. Optimal foraging theory is an idea in ecology based on the study of foraging behaviour and states that organisms forage in such a way as to maximize their net energy intake per unit time. In other words, they behave in such a way as to find, capture and consume food containing the most calories while expending the least amount of time possible in doing so. The understanding of many ecological concepts such as adaptation, energy flow and competition hinges on the ability to comprehend what food items animals select, and why. Foraging theory considers the foraging behavior of animals in reference to the payoff that an animal obtains from different foraging options. Foraging theory predicts that the foraging options that deliver the highest payoff should be favoured by foraging animals because it will have the highest fitness payoff, specifically the highest ratio of energetic gain to cost while foraging.

# RELEVANCES OF FORAGING BEHAVIOURAL STUDIES IN FISHERY MANAGEMENT

If we are able to understand how factors such as food and environment can influence growth and the population dynamics of fish, then ethological studies allied to ecological principles will be of great benefit. Care should be exercised to ensure that such information is not used to further increase pressure on already over fished stock, but should be applied constructively. Many studies have pointed out predation avoidance as an important component in the evolution of sociality in organisms. However, it is most probably not acting alone but rather in conjunction with other benefits such as increased foraging efficiency (Hughes et al., 1992,). Foraging efficiency can be improved by learning, as fishes adjust their behaviour to changing circumstances. Learning and memory are in turn closely linked with the ontogeny and life history of a species. The basic repertoire of predator avoidance thus can be reinforced by providing the fish better opportunities to learn the environment and improving the shoal-

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ISBN: 978 -93 -87709 - 82 - 9

ing responses by a frequent exposure to predators from the larval stages onwards. Rearing in such a competing environment can increase the efficiency of a laboratory bred fish when exposed to a natural environment. Providing an environment in which the fish experience a low predation stress even in the presence of a predator can enhance the performance level of the fish in its later life. **SUMMARY** 

Unlike artificial habitats of culture ponds, natural aquatic habitats provide atmosphere conducive for the fish to feed and breed. However, foraging in natural aquatic habitats is highly risky because of the presence of umpteen numbers of predators. Understanding predator-prey dynamics requires an understanding of how prey assesses and avoid the predation risk. Fishes tackle prime needs of feeding and breeding by efficiently avoiding the risk of predation. The problem is that these activities are not always compatible. Compromises must be achieved between courting a potential mate and looking out for enemies. Trade-offs must be accommodated between the necessity to search for food and the desire to avoid detection by a predator. From early life onwards, fishes learn predator avoidance paradigms while maximizing their food intake. This type of learning is absent in fishes artificially bred and reared in hatcheries. As a consequence, mortality is very high when hatchery reared fingerlings are released into their natural habitats. The rate of survival of fishes can be augmented, if we are able to manipulate early rearing conditions in the hatcheries in the light of the dynamics of predator – prey relationship in natural aquatic systems.

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ISBN: 978 -93 -87709 - 82 - 9

# ANOTHER SEMIGROUP CONSTRUCTED FROM A FUNCTION

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Key words: Directed graphs, functions, and semigroups.

# Abstract

A semigroup is a well-studied structure so is a function. This paper describes a way in generating a semigroup from a function on a finite set, using its directed graph studies the proper- ties of the semigroup generated like its greens relations, regularity, etc.

# INTRODUCTION

Let  $\dot{a}$  be a function on a set X. Recent studies have shown when a function forms an inner translation (also known called Cayley functions) of a semigroup. In 1972 Zupnik characterised all Cayley functions algebraically(in powers of  $\hat{a}$ ) [6]. In 2016, Araoujo et all characterised the Cayley functions using functional digraphs[1]. He also described a process(a problem half solved) on generating a semigroup from Cayley functions by constructing a graph with Cayley functions as the vertices and identifying the maximal cliques of the common semi- group graph  $G_{s}$  (two Cayley functions are edge connected if appear on the same semigroup). There are many ways to construct a semigroup from graphs, for example Endomorphism semigroup, graph semigroup, commutative graph semigroup, inverse graph semigroup, path semi- group, etc. This paper describes a way to construct a semigroup from a function on a finite set using directed graphs, studies the properties of the semigroup generated. A similar construction is discussed in a previous paper [7]. Also for all the basic definitions used here can be referred from [7] and [8]

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ISBN: 978 -93 -87709 - 82 - 9

In the sequel  $\dot{a}$  will denote a function mapping a non-empty finite set *X* onto itself. For any positive integer *n*,  $\dot{a}^n$  denotes the *n*<sup>th</sup> iterate

of  $\dot{a}$ . By  $\dot{a}^0$  we mean the identity function on *S*, so  $\dot{a}^0$ 

(x) = x. Let X be a finite set, then T (X) denotes the set of all transformations (functions) from X to X.

#### 2. GENERATING SEMIGROUP FROM ANY FUNCTION

In this section we construct a semigroup from a function. There are two subsections in one we use a total order to define a binary operation and in the other a total order is not required.

Let X be a finite set. Now consider a function  $a \in T(X)$ , let  $A_1$ ,  $A_t$ be the connected components in the directed graph of a,  $D_a$ . Now for each connected component  $A_i$ , let  $s_i$  be the length of the longest branch in  $A_i$ , fix a vertex  $a_i \notin A_i$  such that  $a_i$  is the initial vertex of the longest branch of the cycle (if the cycle has no branches then choose any one vertex in the cycle ), if there two or more branches of the same length choose any one.

For  $x, y \in X$  define  $N(x, y) = \{(r, q) : \alpha^r(x) = \alpha^q(y)\}$ . If N(x, y) is empty then x, y are in different connected components. If N(x, y) is non-empty then x, y are in same connected component and in this case we define

(1) 
$$\delta_{xy} = \psi_{xy} - \tau_x$$

where

(2) 
$$\tau_{xy} = \min\{q : (r, q) \mathbb{D} N(x, y)\}$$

and

(3) 
$$\psi_{xy} = \min\{r : \alpha^r(x) = \alpha^{\tau xy}(y)\}$$

If you take two vertices x, y in a connected component of the directed graph  $D_{\alpha}$ , then  $\tau_{xy}$  is the minimum distance from y to the path travelled by x in the directed graph  $D_{\alpha} \alpha$  is composed again and again,  $\tau_{xy}$  is zero if y is on the path, that is if there is an integer n such that  $\alpha^n(x) = y$ , again if  $y^{\parallel} = \alpha^{\tau x \cdot y}(y)$  then  $\psi_{xy}$  is the minimum distance from x to  $y^{\parallel}$ . Hence when the initial vertex of longest branch is chosen as x,

$$0 \le \delta_{x,y} \le (s+k-1)$$
$$0 \le \tau_{x,y} \le (s+k-1)0$$
$$\le \psi_{x,y} \le (s+k-1)$$

where s is the length of the longest branch in the component and k is the length of the cycle in that component.

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**Definition 1.** Let n, m and s be positive integers, for any positive integer n we define

$$n \mod s(m) = (k \mod (m)) + s$$

**Lemma 1.** Let X be a finite set and  $\alpha \in T(X)$  be a function. Let A be a connected component in the directed graph  $D_{\alpha}$ , x the initial vertex

the longest branch in A, s the length of the longest branch, k the length of the cycle in A. If  $\delta_{xy}$  is defined as in equation 1, then

> (4) 
$$\begin{split} \delta_{x\alpha} \mathcal{I}(s) &= \begin{pmatrix} \delta_{xy} + l & \text{if } (\delta_{xy} + l) \leq (s+k_1) \\ y \end{pmatrix} & \text{if } (\delta_{xy} + l) = (s+k-1) \\ \text{Now for two elements } x, y \in X, \ \alpha \in T(X) \text{ and a fixed } a \in X \end{split}$$

define(5)

 $\mathbf{x} * \mathbf{y} = \begin{cases} \partial a_i \mathbf{x}^{i+1}(\mathbf{y}) & \text{if } \mathbf{x} \text{ and } \mathbf{y} \text{ are in the same connected component } A_i. \\ a_i A_i & \text{if } \mathbf{x} \text{ and } \mathbf{y} \text{ are in the different connected component } A_i. \end{cases}$ 

where  $A_i$  is a connected component of the directed graph  $D_a$ . Let  $s_i$ ,  $k_i$  respectively be the length of the longest branch, the length of the cycle in the connected component Ai.

 $(X, \mathbb{D})$  forms a semigroup as  $\mathbb{D}$  is a associative operation on X, and so  $(X, \mathbb{D})$  is a semigroup, and this summaries to the following theorem,

**Theorem 1.** Let X be a finite set and  $\alpha \in T(X)$  then there exist a semigroup operation on X derived from the function a.

Let X be a non-empty set,  $\alpha$  a function on X. Let  $A_i$  be a connected component of directed graph of  $D_i$ , let  $Z_{j} = \in x$  }  $X_x$   $A_i$ , then  $\alpha_{/Z}$  is a function on Z. We now describe the greens relation of the

semigroup  $S_{a_{/Z}}$  generated from the function  $a_{/Z}$ , so in effect the greens relation of a connected component. After which the details of  $S_{\alpha}$  as a whole is describe.

**Lemma 2.** Let X be a non-empty set,  $\alpha$  a function on X. Let  $A_i$  be a connected component of directed graph of  $D_{ab}$  let  $Z \neq x \in X | x \in A_i$ then for  $a_i$  the initial branch of the longest branch Let  $a, \bar{b} \in S_{\alpha_{/2}}$  the semigroup generated from  $\alpha_{/Z}$  using equation 4 then

- (1) a R b if and only if they are vertices in the cycle of  $D_{a/Z}$ .
- (2) a L b if and only if they are vertices in the cycle of  $D_{a/Z}$ .
- (3) the D-class are H-class are identical.

If the directed graph  $D_a$  has at-most one branch in each connected component then the semigroup generated from  $\alpha$  is commutative. Moreover if  $\alpha$  is a permutation then the semigroup generated is a union of groups. Further for a function  $\alpha$ , if  $D_{\alpha}$  has t connected components then  $S_a$  has t maximal-subgroups. Precisely the vertices of a cycle in  $D_a$  form a group.

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ISBN: 978 -93 -87709 - 82 - 9

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Some Properties of  $S_{\alpha}$ 

- (1) The vertices of a cycle in  $D_{\alpha}$  form a subgroup
- (2) for  $a_i$  an initial vertex of a branch in a connected component  $A_i$ ,  $a_i$  generates a commutative semigroup
- (3)  $S_{\alpha}$  is not regular semigroup, hence not inverse
- (4) If every connected component has only one branch then  $S_{\alpha}$  is commutativ
  - (5)  $S_{\alpha}$  is a union of groups, if alpha is a permutation
  - (6) the fixed point *a* is an idempotent or 0 or 1 if and only if  $E(S_{\alpha})$  forms a sub-semigroup of  $S_{\alpha}(i. e, S_{\alpha}$  is an orthodox semigroup.)

So now one can construct a semigroup from any function  $\alpha$  on a finite set. Let  $S_{\alpha}$  be the semigroup constructed from a function in the above manner.  $S_{\alpha}$  changes with a change in the choice of the fixed points  $a_i$  if there exists more than one, though there is a similarity in them being that the sub-semigroups generated by  $a_i$  and  $b_i$  are isomorphic, which is proved in the following theorem.

**Theorem 2.** Let X be a finite set and  $a \in T(X)$ , Suppose that a hast connected components and a connected component (say  $A_k$ ) such that the length of the longest branch is s and there is at-least two branches of length s, let the initial vertices of these branches be  $a_k$ ,  $b_k$ , ... Let  $S^1_{\alpha}$  be two semigroups constructed from a one with fixed initial vertices  $a_1$ , ... $a_k$ , ...,  $a_t$  and the other with fixed initial vertices  $a_1$ , ... $b_k$ , ...,  $a_t$  with two different choice of fixed points then a principal subsemigroup gen-

semigroup generated by  $a_k S^1_{\alpha}$  is isomorphic to a principal sub-semigroup generated by  $b_k$  of  $S^2_{\alpha}$ .

Now comparing the number of semigroup on a finite set and the number of function on a finite set one can see that [3] one can conclude that most of the semigroups constructed from a function in a manner described above must be isomorphic.

**Theorem 3.** Let X be a finite set and  $\alpha$  and  $\beta$  two functions on X, then for any  $S_{\alpha}$  there is directed graph  $D_{\beta}$  and a choice of vertices  $b_i$  such that  $S_{\alpha}$  and  $S_{\beta}$  are isomorphic if and only if the directed graphs  $D_{\alpha}$ and  $D_{\beta}$  are digraph isomorphic.

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ISBN: 978 -93 -87709 - 82 - 9

# BREATHING BEYOND BODYMIND CON-FLICTS IN WOMEN CANCER NARRATIVES

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# Key words: Medical Humanities, Gender Studies, Body Image Abstract :

Female body has been interpreted in innumerable ways throughout the various genres of literary texts. As in Shakespeare's plays, the wisest women are portrayed most elegantly, in poetries of classic writers, women and beauty of the body is presented incomparably. The perception about women and women body has a predestined image engraved in the minds of people though rituals, culture, social and demographic perceptions.

Beautifying women body is seen different in each community and in each religious background, related to the climatic conditions and of very rare and peculiar beliefs. But in reality is this the same that happens in the life of women and to their body is what has been interrogated in this discussion. Through the various illness narratives specifically related to the life threatening disease cancer a new reading of reality about women and body is attempted in order to realise and understand the distorted forms of female body as deformed, leaky, medicalised, amputated, prosthetic, scarred and dying through surgery, treatment, struggle, survival and death.

Creating a new form of body appearance and accepting the scarred

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ISBN: 978 -93 -87709 - 82 - 9

body though alienated in the social milieu, the survival narratives bring a decoding to the ideal illusions of beauty and body image which is attempted to be observed through this study.

Introduction

Female body has been interpreted in innumerable ways throughout in various genres of literary texts. In poetries of classic writers, women and beauty of the body is presented incomparably. The perception about women and body has a predestined image engraved in the minds of people through rituals, culture, social and demographic perceptions. Beautifying women's body is seen differently in each community and in each religious background, related to the climatic conditions and of very rare and peculiar beliefs.

But in reality it is not the same that happens in the lives of women and to their body. Body image includes the known and unknown aspects of one's own body. It discusses about the notions created about the personal feelings about body size, sex, and the functions of the body. Body has been placed to have a vital role in feminist theories and also in disciplines of Philosophy, Sociology and Cultural Studies. Embellishing and transforming the body with clothes, cosmetics and jewellery is meant to be associated with femininity, even though it is well documented that men were also regularly occupied in such practices.

Male involvement in elating manifestation of beautification decreased during the 18th century, due to the increase of acknowledgment of homosexuality that occurred during that period. Sexual stereotyping in dress, creating a prominent distinction between the sexes and exaggerating the physical differences between male and female became prominent during the eighteenth century.

According to Elizabeth Wilson fashion is 'obsessed' with gender, and serves to define and redefine the gender boundary (Wilson 1985 p.117). During the Victorian era, women were specifically creating a difference of appearance to create the concept of otherness by drawing attention to the body parts like breasts, waist, buttocks and the hip that were embellished with corsets, bustles and bras. But later in the 19<sup>th</sup> century it was realised that such clothes triggered illness and discomfort leading to breathing difficulties and internal organ disorder. This brings into notice the analogy of Foucault's writing on tor-

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ture, as he says "mark the victim: it is intended, either by the scar it leaves on the body" (Foucault 1977, p.34).

Even in this current scenario women are advised to avoid exposure to elements like wind, water and the UV rays of the sun in order to prevent the skin from damage and to look good, charming and to retain youthfulness. It is observed that only those youthful bodies that appear as youth are considered as beautiful and are valued in our society. EfratTseëlon points out: "While both sexes dread ageing, it is the woman who is expected to prevent it." (Tseëlon op. cit., p.82).

De Beauvoir argued that free movement of women were restricted with the styles and costumes introduced in the society, like "Chinese women with bound feet could scarcely walk, the polished fingernails of the Hollywood star deprive her of her hands; high heels, corsets, panniers, farthingales, crinolines were intended less to accentuate the curves of the feminine body than to augment its incapacity". Paralysed by either too little or too much weight, by inconvenient attire or the 'rules of propriety', woman's body could then "present the inert and passive qualities of an object" and "[seem] to man to be his property, his thing." (de Beauvoir op. cit., p.189-90).

It is analysed that in the late capitalistic era, where body image dominates the visual media-magazines, televisions, internet, social network etc interests increase in understanding how the ideal, unnatural, fantasy body affect the real, physical bodies.

Women having the hegemonically defined "beautiful" body are seemed to have greater level of confidence and sexual conviction. The beautiful white body considered as healthy, lean, svelte, fit bodies. In order to achieve success and to remain healthy women are seemed turning not only towards healthier food, natural skin care products and cosmetic surgery, but also to more intense bodily activities and rigorous fitness regimes.

Body image and the interrogations about body and its importance has been increased due to the population growth, reproductive technics, cloning, delayed old age etc., creating interests in finding out how science can affect the physical bodies.

Yet along with the innovative scientific progress, the fragility and imperfection of human body has emerged as something to be stud-

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ied, especially when human beings are affected by various unpredictable illness and epidemics.

Women and body are two independent but interrelated focal points that needa detailed observation and analysis. Speculations of the attack of cancer on the body of the diseased are to be interrogated leading to interpretations and decisions about how the diseased tackle through the crucial situation and how the struggle has paved way to a new consciousness of living.

As Thoreau wrote in 1852, "Death and disease are often beautiful", so is the bond between body and mind. As Susan Sontag in *Illness as Metaphor* states that, "the body's treachery is thought to have its own inner logic." The concept of perfect body and the ideal notion of beauty of the physical self are placed on a platform of discussion with a comparison to the infected body.

As per the words of Audre Lorde," My breasts have always been so very precious to me..." The image of a perfect body is questioned as Lorde decides that " now I really see it as a choice between my breast and my life, and in that view there cannot be any question. "

The pain of losing the breast is being personified as "my beloved breast has suddenly departed from the rules we had agreed upon to function by all these years."The pain of loss is secretly shared by Lorde from the words, "from time to time I would put my hand upon the flattish mound of bandages on the right side of my chest and say to myself-my right breast is gone ,and I would shed a few tears if I was alone."Lorde expresses her wrath of discomfort in the absence of her breast to woman from Reach for Recovery while explained about the benefit of prosthesis, that she would never know the difference, Lorde assures that she knew of sure that she would know the difference. "My right breast represented such an area of feeling and pleasure for me, how could I bear never to feel that again?,reflects the significance of the inevitable part of the body being amputated.

The importance of the breasts in a woman's body and the doubtful feeling of the consequences of the absence of itin a relationship is expressed from the words," What is it like to be making love to a woman and have only one breast brushing against her", and then she consoles by responding as "I wonder if our love-making had anything to do with it?"

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The thought of acceptance grew in the mind of Lorde and a new body image was visualised withthe presence of the vacuum created through the absence of the breast. Form her words, " ... I would love my body one-breasted now or remain forever alien to myself.", we realise the pain of accepting the new body is not an easy task but remains a struggle. On the contrary, the image of an ideal body is customised as per visualised by the society when in an article appearing in " Early Breast Cancer, Detection and Treatment" edited by Stephen Gallegher,M.D, declares that, " What we are aiming for is to allow women to look decent in clothes...The aim is for the patient to look normal and natural when she has clothes on her body", which is ironically portrayed by Lorde in *The Cancer Journal*.

Creating a new form of body appearance and accepting the scarred body though alienated in the social milieu, the survival narratives bring a decoding to the ideal illusions of beauty and body image which is reflected in the writings like ofEisenetein and Susan Miller. "I built a new chest and rejected implants. My path was to build my own muscle and create sexual/sensual pleasure on this new terrain" (Eisenetein 67), "I cherish this scar"(Susan Miller 236).

Even in this supposedly equal, liberated and progressive society femaleness is still disturbing enough to require supervision and containment by forms of discipline that men are not subjected to. The story of women's emancipation and increasing self-determination is clouded by the continuing presence of restrictive ideals of womanhood that Myra Macdonald claims 'defensively reinvent'. (MacDonald 1995, p.220).

As Foucault claimed, resistance exists wherever there is normalisation and domination. Power is not always stable, if it is exerted on 'micro levels' it can be contested on micro levels; there is "no single locus of great Refusal" but a "plurality of resistances" (Foucault 1998, p.95-6). Therefore assuring a new reading of female body is what the disease culture had developed in the present era of medicalisation and therapies. Acceptance of the scarred body and redefining the ideology of perfect body could become the rejuvenation of the mind and soul for a holistically content living.

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ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

# SOCIO –CULTURAL CHANGES THROUGH WOMEN EMPOWERMENT AN OVERVIEW

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## ABSTRACT

Women empowerment does not denote exclusivity. It is more inclusive in practice, it acknowledges women and ensures her women empowerment is not wanting to treat women differently and encouraging equality. The concept of women empowerment is not discrimination through various gender stereotyping like looking reverential, protective etc. Women empowerment promotes equal opportunities for women to go to school, to get adequate nutrition, to get a job with a fair salary and have equal access to resources that enable her to achieve what she sets out to do. If her being a woman has denied her this equality, we need to restore that right. The problem today is that these rights of a woman are not seen as naturally hers but as something society with allow or permit her. A widespread and willing acceptance of this secondary status as less than equal, leads to systematic loss of voice in the running of a household, a business or even the country. It on is a liability as a cultural monument that affects the future generation of women.

# **KEYWORDS**

Women, Empowerment, Financial Security, Rural Employment, Indian Women, UN Goals.

Socio-cultural changes through women empowerment is a topic that has fascinated me as a literature student, later as a faculty member. Empowerment is an inalienable right that is embedded in human existence. Empowerment doesnot stop at just being educated and enjoying financial security. It should extend to sharing spaces irrespective of gender and the most crucial dimension, of being aware of their inalienable right. The cognition of this powerful tool is being

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ISBN: 978 -93 -87709 - 82 - 9

suppressed by various competing forces within an individual. The social cultural milieu does act as a catalyst or as a retardant depending on the current psycho social attitude of the society. Women have been in the centre stage of action for all these earth shattering changes to engulf anation. The history of India is replete with innumerable instances where womenthoughs hack led by tradition have raised themselves to the pinnacles of success in all spheres of human activities. Hats off to thosebrave hearts.

My article is to focus on the rural Kerala that is definitely notlike an average rural village of India. But have the winds of change of women empowerment blown over this country side? What are the gains and what have been the losses during this churning with inthe nation? These queries needed some broad outlook to envisage a solution in women dynamics in empowerment. The nation building process of India began in the 50's after our precious freedom from colonialism. Women were notcentraltoplanning in the initial stage of the fledgling nation. The focus was on Nationhoods trengthen, economicsustainabilityandguardingtheborders from external threats. The rich cultural heritage did not translatein to a social democracy as fast as our political democracy. Naturally priorities tended to be lopsided while ensuring growth to emerge as astrong nation. Empowerment of women in India was the key to successthat we reaped during our scintillating freedom movement. As a nationwe moved forward on equal footing, but Nation's cause overtook thedomesticissueandbalancedperspectiveforwomen'sroleinthesociety.

Recent decade has witnessed a critical emphasis on increasing therole of women to pitch fork the socio economic development of thecountry. There is no disputing of the fact that women empowerment is the corner stone for emancipation of humansin general. Emanicipationis a term used over the years to denote the abrogation of the rights of slaves. But the modern context has connotation on the freedom allowed to the excercised by man in a society irrespective of the gender.

Freedomhas to be sustained at all costs for properoiling of the ruled and the ruler. Democracyhas been over shadowed to suit the needs offew though not with standing the liberality of the term.Thesocio-cultural milieuofasociety is governed by the above

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ISBN: 978 -93 -87709 - 82 - 9

broad spectrum of enhancing ideas. The practical version of this is a crude shrinkage of opportunities especially to the softer gender. Their opportunities are trimmed to fit the bill of poverty, gender, caste, class and religion. The gender difference has been brought out into the open and the society has a woken to this disparity. New strategies, legislations and other equitable access opportunities have been rolled out for women empowerment.

Women empowerment has been the slogan for change in the statusof the softer gender. Gender disparity in the access to almost all basicamentities and rights has always been in the spotlight.India along witha host of countrieshave initiated a slew if scheme and programmes under the auspices of the UnitedNations that had rolled out the Millennium Development Goal, 8 in number to be achievedby 2015,forecasting a response to the worlds main development challenges. The Millennium Development Goals are drawnfrom the actions and targetscontained in theMillenniumDeclaration, that was adopted by 189 nations and signedby 147 headsof state and governments during the UN Millennium summitin September 2000.The eightgoalsbreak down into 21quantifiable targetsthat aremeasured by 60 indicators.

The MDGs focus a lot on the status of women who are intrinsically the indicator of the progress or the development all evels achieved by the society. The rights and health of women is a prognosis for the hugeleap for well- rounded citizens of the future. The challenges faced by women today is not confined to her gender alone it is more about the potential of strength that may upset balance that show titled in favour ofmen. The economic freedom and educational strength has made women walk the extramileto empower themselves. This has raked in animmense asset of women power to solve the problems faced by thenationtoday.

Especially the women empowerment of the rural areas in India that constitute 48% of the population. India is a welfare state ever since its independence and the country'ss trengthis derived from the achievement of planning. The policies and programmes havebeen designed with the aim of alleviation of rural poverty which been one of the primary objectives of planned development in India.

Empowerment by itself is a multifaceted and multi-

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ISBN: 978 -93 -87709 - 82 - 9

dimensionalconcept. It is a process in which women gain greater share of control over resources, material, human and intellectual like knowledge, information, ideas and financial resources like money and access tomoney and control over decision making athome, communityetc.The Global Gender Gapreport (2008) by theWorld Economic Forum assessed the extend of the gender gap experienced by women in 58countries and have achieved equality with men in five critical areas :economic participation, economic opportunity, political empowerment, educational attainment health and wellbeing.TheNordiccountries have nearly achieved gender equality while other countries are waybehind in scaling the targets to be met by nations.

The article attempts to point out that the countries that do not capitalize on the full potential of one half of their societies are misallocating their human resource and undermining their competitive potential. Genderequality refers to that stage of human social development at which the rights responsibilities and opportunities of individuals will not be determined by the fact of being born maleor female.

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# SYNCHRONIC AND DIACHRONIC STUDY OF FASHION AS A MODE FOR RESISTANCE

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#### Abstract

Fashion is an art and a form of expression, expressing all that literatue or any other form of art would express. The paper studies the subtle changes in fashion down the centuries and in contemporary times and the mute rebellion it has been waging, thus bringing positive changes in the constraints of gender, class, ethnicity and other social identities.

Key Words: Resistance, Fashion, Gender, Practice

Fashion is a strong norm about appropriate appearance at a particular point in time. Fashion performs a major role in the social construction of identity. It is the most visible markers of social status and gender and therefore useful in maintaining and subverting symbolic boundaries. Fashion, particularly clothing is an indication of how people in different eras have perceived their positions in social structures and negotiated status boundaries. In previous centuries, in India as well as abroad clothing was the principle means for identifying oneself in public space .Clothes as an artifact 'create' behavior through their capacity to impose social identities and empower people to assert latent social identities. Fashion is an effective means of non verbal communication that manifests cultural values and exercises social control through a projection of identity ().The act of wearing clothes is an intersectional social process. Additionally the in which sartorial choices project caste, class, gender, race and reli-

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ISBN: 978 -93 -87709 - 82 - 9

gious affiliations simultaneously. And this is exactly the reason why Fashion has become a subtle mode of resistance throughout the ages and across nations.

Resistance is an inbuilt ability within all creatures. To resist usually means to prevent something from happening, to avoid or to oppose. It is a natural behavior exhibited by rational and irrational beings . Only difference being in the case of rational being, due to the additional quality of rationalization resistance is brought out for varied reasons in varied ways and many a time it acts upon situations involuntary or voluntarily. Psychologically, resistance means a process b which the ego opposes the conscious recalling of painful experiences. For this reason rational beings can take up any modeforeresistance.

As the globe is fragmented b the longitudes and latitudes on it ,people all over the world are categorized b invisible lines of caste, colour, race, class, and gender which has its own visible manifestations. These classifications might have begun from the initial stages of civilization and this might have very well coincided with man's invention of donning himself with something. Clothes are expressions and extensions of the wearer. The proximity to the body gives clothing a special potential for such elaboration (Tarlo 16).Clothing represents the intersection of multiple social identities enacted b and constituting individuals in their daily life practices.Clothing regulations particularly for women are often tied to patriarchal religious moves to control women's sexuality. (Arthur 13).

On observing the clothing habits in Colonial Kerala it could be noted that, 'Each group had specific codes of conduct, systems of alliances and regulations for everyday life. Eating, dressing talkingjust about everything signified one's position in the social hierarch, and one's difference from the other '(Devika 2). In Kerala Muslims wore a dark blue *mundu*, a long cloth covering the legs, warped and tucked at the waist. Women wore long blouse and a black scarf to cover and 5-8 gold earrings in helix of ear(Kurian 77) Wh dress was a mandate for Brahmins of Kerala. According to dictates written in Shankara's 64 *anacharams* (Menachery197)Nambodiri Brahmins traditionally wore white /creamcoloured garments.*mundu rouka* for women – a cloth tied below the arm and the breasts. Gold ornaments were

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ISBN: 978 -93 -87709 - 82 - 9

permitted only for the upper class. Umbrellas were also part of the dress code reserved for namboodiriand Brahmins. Syrian Christian women used the white mundu or thuni similar to the nair but it was tied differently than the Nayar with a fanned tail.( )The wore a jacket known as the Kuppayam this latter on paved way to the Chatta -a stitched V necked shirt. Kavani was the breast cloth. Elongated lobes and piercing the top of the ear for large gold hooped earings called Kunnika worn after marriage. White garment became an embodiment of social purit ,Low castes including Ezhavas ,Pulayas and parayastraditionally wore the callumalla or stone necklace to denote subservience and eventually became a symbol of slaver.(Gangadaran 293). The were required to wear only soiled clothing and were prohibited from washing their clothes(Kurien 13)White and gold jewllery signifying purity and civilization while dirt clothes and stones symbolize pollution and closeness to the earth. Thus the dress code was an indicator of were a person belonged socially. This trend was prevalent upto the middle of the 19<sup>th</sup>century the visible distinction created b the dress code and the injustice of not allowing proper outfit for the lower classes gathered momentum and caused an explicit rebellion -the breast cloth rebellion. The only movement of resistance that might done on clothing issues in India.Through this resistance belonging to both upper and lower classes received a better status.Not only women but men also got the right to cover the upper part of the bod in public space if the chose.et the rule on the material, colour of clothing and jeweler remained.

On close observation on the trends that were prevalent during the time of independenceupto some decade after it another kind of resistance can be noted reflecting the spirit of unit and integrity gathered b the nations new phase ,people in newIndia unconsciously adopted a more secular dress code . Women of all castes and religions gradually changed from their distinctive Communal dresses to the sari.Similarly men into pant and shirt or mundu and shirt. B this through out India people homogenized their religious /cast identifiers into one identity alone their gender identity.The currency that sari received is invariably related to the man movements at the time to abolish racism and upliftment of lower classes combined with the mission of empowering women.The coming of the sari can be seen

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ISBN: 978 -93 -87709 - 82 - 9

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as an implicit resistance of the society against communalism and religion .With the switch over to the sari class differences between women and gender differences between men and women seemed to be the most pronounced form of difference at work.

A similar kind of resistance against dress code that distinguish class race occupation etc. in the western countries could be seen almost around the same time as when it took place in India.Since men represented their families in public space men's hats were used to indicate the status of family(wilcox1945).Different kinds of hats like top hat ,bouler,straw hat boater,peaked cap etc. indicated people from different occupation.Until the 1960's a man's hat, as the most immediately visible part of his costume was a major signal of social identity and social classes .specificstyles of hats were associated with a different class strata.But in the later half of the 20<sup>th</sup>century hats almost disappeared .this is because of the rising standard of living combined with rising expectations and greater to information,led working class to participate more actively in public spheres and spaces .a person has unparalleled freedom to construct new identities outside the economic and political sphere. Amidst the process of the creation of new identity the disappearance of hats which were codes indicating class can be read as a resistance against class barriers.

Fashion in the earl 21st century can be read as a resistance against the gender bias created byclothing. Androgynous fashion is a slowly becoming style that breaks the rules of common gender trends (Gould 7). Clothing styles that used to be for a particular gender have now become overlapping trends within men and women's fashions. Therefore, our perception of gender identity has a strong influence on fashion and plays a large role in the trends that one follows.Society is split in half by a battle of the sexes within male and female genders. Even in department stores, you will find products divided in order to appeal to males and females (Crane 12). Certain styles of clothing are sported by specific genders as a form of self-expression. Presently, we are moving at such a fast pace that we do not take the time to fully meet one another. Fashion serves as a way to introduce us to the public by observation. Clothing is therefore worn by each gender to assign their identity and to allow society to be able to recognize this. The bridge between society and gender inequality has

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ISBN: 978 -93 -87709 - 82 - 9

recently started to stabilize. Within the past few years, homosexual individuals have faced less prejudice from others. This movement has thus caused modern fashions to convert to more gender-neutral clothing styles (Crane 21). Earlier fashions embellished the physique of a woman by showing off the bust or adding ornate jewels to a certain piece of clothing (Shapiro 3). Current fashions offer a more balanced look where the garment could very well belong to a man or a woman. Fashion does not only reflect gender, but it reflects sexuality as well. Because sex sells, it is used as a powerful marketing ploy to attract the public to certain products (Gould 15). However, our sexuality no longer determines what fashion one wears. Wearing jeans and a t-shirt may have been the dominant style of clothing for men in the past, but newly acquired modern ideologies have accepted women sporting this fashion as well (Shapiro 3).Modern ideals have given society room to express our identified gender throughfashion. The ongoing lack of physical male and female characteristics that are stressed by specific styles of clothing make up androgynous fashion (Gould 2). Busty curves and a masculine physique are no longer "in style" and instead, modern fashion has developed an image of being skinny for both male and female genders (McRobbie 1). publications are also noticing this trend in androgynous clothing. Wearing this loose-fitted and unbiased clothing allows for a more genderneutral look. This is because the curvy build of a woman is thus lost within clothing that does not extenuate distinctive parts of a woman's body (McRobbie 1). Modern styles of clothing refrain from accentuating physical appearances that are unique to each gender (McRobbie 2). Not only women, but men have also undergone a modification in fashion throughout the years. Men in the fashion world are no longer emphasizing a strong masculine image, but instead sporting a smaller overall body type (Crane 11). Much like women's fashion progressing into loose-fitting clothing, men's fashion has decreased its use of clothing to show off masculine features.

Resistance against the norms on symmetry, colourcombination ,colour code and set standards are themark of fashion of the present da.Contemporary fashion is more ambiguous and multifaceted, in keeping with the highly fragmented nature of contemporary post industrial societies.Clothes for both men and women that do not fol-

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ISBN: 978 -93 -87709 - 82 - 9

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low an smetrr for instance frocks ,churidar tops ,skirts with oneside long and the other short ,Vnecked shirts with the curve either to the left or to the right.Clothing posing a resistanceagainst proportion for instance baggy tops and tight bottoms, or clothing too big or very small for the wearer has been in fashion. Dresses which give an impression of an in-ware peeping out has also come as fashion posing a resistance to the standards of decency. Similarly certain things that were considerd not so respectable are carried on now as designs. For instance foot prints ,shoes with lace,chappals,etc appear as designs on t-shirts ,bagsetc. The are also found as rings ear rings or pendants.

Up to the 1990's white was considered as the official colour for almost all games. As break and as a resistance to the existent conservative and formal trend, coloured and much informal uniforms for games especially cricket was introduced unconsciously. It was around this time when multi coloured toothpaste and soaps were introduced into the daily life of people around the globe. Similarlyumbrellas also changed colour from standard black to an colour and also with design. An unconscious resistance against a set norm can be read in these changes.

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ISBN: 978 -93 -87709 - 82 - 9

# മരണത്തെ ഓർമ്മിപ്പിക്കുന്ന അടയാളക്കല്ലുകൾ

#### ഡോ. ഷൈജി സി മുരിങ്ങാത്തേരി

അസിസ്റ്റന്റ് പ്രൊഫസർ, മലയാള വിഭാഗം, എൽ. എഫ്. കോളേജ്

അവിചാരിതമായ മരണങ്ങളിലൂടെയാണ് സ്മാരകശിലകൾ എന്ന നോവൽ ആരംഭിക്കുന്നതും അവസാനിക്കുന്നതും മരണത്തിന്റെ നിസം ഗത ഈ നോവലിൽ ഉടനീളം വായനക്കാരെ പിൻതുടരുന്നതായി കാണാം.

പാലപ്പുരയിലെ മമ്മത് ഹാജിയുടെ മരണത്തിലാരംഭിച്ച് അറയ്ക്കൽ കുഞ്ഞിബീയുടെ മരണത്തിലാണ് നോവൽ അവസാനിക്കുന്നത്. നാടു വാഴിത്തം അസ്തമിക്കുന്ന കാലഘട്ടത്തെയും ആധുനികതയുടെ കട ന്നുവരവിനെയുമാണ് ഈ നോവൽ അടയാളപ്പെടുത്തുന്നത്. മുന്നൂറു ഉറുപ്പിക കട്ടതിന് മരുമകനെ വീട്ടിൽ നിന്നും പുറത്താക്കിയ, അമ്പ ത്തിയാറാം വയസ്സിൽ പതിനാറ് വയസ്സുള്ള ബിയ്യാത്തുവിനെ വിവാഹം കഴിച്ച വിശാലമായി പരന്ന്കിടക്കുന്ന വയലിനുടമയായ മമ്മത് ഹാജി. മമ്മത് ഹാജിയുടെ മരണത്തിൽ നിന്നാണ് നോവൽ ആരംഭിക്കുന്നത്.

"പള്ളിക്ക് ചുറ്റുമുള്ള പറമ്പുനിറയെ ഖബറിടങ്ങൾ അതിനുള്ളിൽ ഓരോരോ കഥകളുടെ പരിസമാപ്തികുടികൊള്ളുന്നു. ജീവിതകാലത്ത് ആടിത്തീർത്ത വേഷങ്ങൾ അഴിച്ചു വെച്ച് നിതൃ വിശ്രമത്തിനു കടന്നുപോയ കഥാപാത്രങ്ങൾ അവരുടെ സ്മാരകശിലകളിൽനിന്ന് ഒരു പുരാവൃത്തം വായിച്ചെടുക്കാൻ ശ്രമിക്കുകയാണ് കുഞ്ഞബ്ദുള്ള സ്മാരകശിലകൾ എന്ന പ്രശസ്ത നോവലിൽ"

കാരക്കാടിന്റെ ദേശചരിത്രമാണ് നോവലിൽ നിഴലിക്കുന്നത്. പള്ളി പ്പറമ്പിനോട് ചേർന്നുതന്നെയാണ് അറയ്ക്കൽ തറവാട്. ഒരു മതിലു കൊണ്ടാണ് രണ്ടിനെയും വേർതിരിക്കുന്നത്. മതിലിന്റെ ഒരു ഭാഗത്ത്

March 2022

ISBN: 978 -93 -87709 - 82 - 9

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മരണവും മറ്റേ ഭാഗത്ത് ജീവിതവും അങ്ങനെ നോവൽ മരണത്തെയും ജീവിതത്തെയും അടയാളപ്പെടുത്തുന്നു.

നോവലിലെ രണ്ടാമത്തെ മരണം നീലിയുടേതാണ്. നീലിയെ ബോധമറ്റ നിലയിലാണ് തങ്ങളും കൂട്ടരും കണ്ടെത്തുന്നത്. അവളെ തന്റെ വീട്ടിൽ കൊണ്ട് ചെല്ലുകയും മോളെപ്പോലെ പരിപാലിക്കുകയും ചെയ്യുന്നുണ്ട്. പ്രസവത്തോടെ അവൾ മരിക്കുന്നു. കുഞ്ഞാലി പിന്നെ അറയ്ക്കൽ തറവാട്ടിലാണ് വളരുന്നത്.

ഞാറയ്ക്കൽ തറവാട്ടിൽ പിറന്ന പെൺകുട്ടിയാണ് പൂക്കുഞ്ഞിബീ. തങ്ങൾ പറഞ്ഞ്കൊടുത്ത കഥകേട്ടാണ് പൂക്കുഞ്ഞിബീ വളർന്നത്. അതേ ദിവസം തൊടിയിൽ നീലി പ്രസവിച്ചു കുഞ്ഞാലിയെയും തങ്ങൾ പൂക്കുഞ്ഞിമ്പിക്കൊപ്പം ഒരു ക്ഷയരോഗിയെ വിവാഹം കഴി ക്കേണ്ടിവന്നു. അവളുടെ മൃതശരീരം ഗോസായിക്കുന്നിന്റെ താഴ് വര യിൽ കടപ്പുറത്തെ വിജനതയിൽ ഒരു സ്ഥർണ്ണമത്സ്യംപോലെ കിടന്നു.

നാട്ടിൽ പടർന്നു പിടിച്ച കോളയിൽ ആദ്യം മരണപ്പെട്ടത് പൊക്കി യാണ്. പൊക്കിയുടെ മരണത്തോടെ ബാപ്പുക്കണാരൻ ആത്മഹത്യ ചെയ്യുന്നു. തുടർന്ന് ഒഞ്ചിയത്ത് പോലീസിന്റെ വെടിയേറ്റ് മരിച്ച സഖാ ക്കളെ നോവൽ ഓർത്തെടുക്കുന്നുണ്ട്.

റെയിൽവേ സ്റ്റേഷനിൽ ഒന്നിച്ച് വന്നിറങ്ങിയ കഥാപാത്രങ്ങളാണ് സ്വാമിയും ഖലീഫയും സ്വാമി ചെറുപ്പക്കാർക്കൊപ്പം ഫുട്ബോൾ കളി ക്കാൻ ഇറങ്ങുന്നുണ്ട്. എതിർടീമിന്റെ ഗോൾപോസ്റ്റിലേക്ക് ഗോളടി ക്കാതെ സ്വന്തം ഗോൾ പോസ്റ്റിനെ ലക്ഷ്യമാക്കി സ്വാമി ചീറിപ്പാ ഞ്ഞെത്തി ഗോളടിക്കുന്നുണ്ട്. അമ്പരന്ന് നിൽക്കുന്ന കാണികളെയും കളിക്കാരെയും നോക്കി സ്വാമി ഒരു വിഡ്ഢിച്ചിരി ചിരിക്കുന്നു. നിയ മങ്ങളെ കാറ്റിൽപ്പറത്തികൊണ്ടുള്ള സ്വമിയുടെ മുന്നേറ്റം സ്മാരകശി ലകളിലെ മിക്ക കഥാപാത്രങ്ങളിലും കണ്ടത്താം. ആകസ്മികമായി മരണം കടന്നു വരുന്നതിന്റെ പ്രതീകമാണ് ആ നിയമലംഘനം. ജീവി തത്തിൽ മനുഷ്യൻ സ്വന്തം വേഷങ്ങൾ ആടിത്തീർത്ത് അവസാനം പള്ളിപ്പറമ്പിലെ ആറടി മണ്ണിലേക്ക് ചേക്കേറുന്നു.

"സ്പപ്ന സദൃശ്യമായ ഒരു കഥാപ്രപഞ്ചത്തിന്റെ മനോഹരിതയിൽ സഹൃദയരെ വ്യാമുഗ്ദ്ധരാക്കുന്ന നോവലാണ് സ്മാരകശിലകൾ"² കട ന്നുപോകുന്ന ഓരോ വഴികളിലും അടയാളങ്ങൾ അവശേഷിപ്പിക്കാൻ ശ്രമിക്കുന്ന മനുഷ്യൻ ഒടുവിൽ പള്ളിപ്പറമ്പിലെ സ്മാരകശിലകളിൽ അഭയം പ്രാപിക്കുന്നു.

ജീവിതയാത്രയിൽ നിനച്ചിരിക്കാതെ മരണം കടന്നുവരുന്നതും അവിടെ നിസ്സഹായയായി നോക്കി നിൽക്കുന്ന മനുഷ്യനെയും സ്മാര

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കശിലകളിൽ കണ്ടെത്താം. മരണത്തെ ഓർമ്മിപ്പിക്കുന്ന അടയാളക്ക ല്ലുകളായി നോവൽ മാറുന്നു. സാമാരകശിലകൾ എന്ന നോലലിൽ സ്മാരകങ്ങൾ കണ്ടെത്താൻ കഴിയില്ല. തങ്ങളുടെ വേഷങ്ങൾ ആടി ത്തീർക്കുന്ന കഥാപാത്രങ്ങളാണുള്ളത്. അവർ അവരുടെ ഭാഗം ഭംഗി യായി ആടിത്തീർത്ത് ആറടിയിലേക്ക് മടങ്ങുന്നു. ധാരാളം മനുഷ്യർ ഈ നോവലിൽ കയറിഇറങ്ങിപ്പോകുന്നുണ്ട്. വലിയവരും ചെറിയവരും ഉണ്ട്. നോവലിന് ഉൾക്കൊള്ളാൻ കഴിയാത്ത അത്രയും ജനങ്ങൽ കഥാ പാത്രങ്ങൾ നോവലിലുണ്ട്. അവരിൽ പേരറിയാവുന്നവരും അറിയാ ത്തവരും ഉണ്ട്. പള്ളിയിൽ കൂട്ടത്തോടെ നിസ്ക്കരിക്കാനെത്തുന്നവ രുണ്ട്. അറയ്ക്കൽ തറവാട്ടിൽ അങ്ങനെ വലിയൊരു ജനസഞ്ചയം ഈ നോവലിന് കെട്ടുറപ്പ് നൽകുന്നു.

#### സഹായകഗ്രന്ഥങ്ങൾ

1. ജോർജ്ജ് കെ.എം (എഡി)

ആധുനിക മലയാള സാഹിത്യചരിത്രം, ഡി.സി ബുക്സ് കോട്ടയം 2. ബഞ്ചമിൻ ഡി. നോവൽസാഹിത്യ പഠനങ്ങൾ, കേരളസാഹിത്യ അക്കാ ദമി, തൃശ്ശൂർ.

 പരമേശ്വൻ പിള്ള എരുമേലി, മലയാള സാഹിത്യം കാലഘട്ടങ്ങളി ലൂടെ, കറന്റ് ബുക്സ് കോട്ടയം.

#### കുറിപ്പുകൾ

1. ജോർജ്ജ് കെ.എം എഡിറ്റർ ആധുനിക മലയാള സാഹിത്യ ചരിത്രം പുറം 236

2. ടി.പു 237

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ISBN: 978 -93 -87709 - 82 - 9

# 'നെറ്റി നെറ്റി'യിലെ നാടോടി ഗോത്രചിഹ്നങ്ങൾ

ഡോ. അന്നം സിനി എ.പി.

അസിസ്റ്റന്റ് പ്രൊഫസർ, മലയാള വിഭാഗം, എൽ. എഫ്. കോളേജ് പ്രബന്ധ സംഗ്രഹം

ആധുനിക കേരളീയ ചിത്ര-കലകളുടെ രൂപീകരണഘടകങ്ങളെ പരി ശോധിക്കുമ്പോൾ ഗോത്ര നാടോടി സംസ്കൃതിയുടെ അടയാളപ്പെടുത്ത ലുകൾ ഒളിഞ്ഞും തെളിഞ്ഞും സൂക്ഷ്മസ്ഥൂലഭേദങ്ങളിൽ എല്ലാ ചിത്രങ്ങ-ളിലൂം നിറയുന്നുണ്ട്. ഇന്നിന്റെ സൗന്ദര്യസങ്കല്പങ്ങളെയും രാഷ്ട്രീയ സാമൂഹ്യ സാംസ്കാരിക സാമ്പത്തിക ജാതിമത പ്രതിരോധ ങ്ങളെയും അയൊളപ്പെടുത്താൻ ചിത്രകലകൾ നാടോടി ഗോത്രസംസ ്കൃതിയുടെ ചിഹ്നത്തെ ഉപയോഗിച്ചുവെന്നതിൽ തർക്കമില്ല. ചിത്രകല വിപണനോദ്ദേശ്യത്തോടെയുള്ള അലങ്കാരകലയായി കാണുന്നു. ചിത്ര കലയെ ചിഹ്നസംസ്കൃതിയുടെ അടയാളങ്ങളായി കണ്ട് ആധുനിക കാലത്ത് ഇവ നിർമ്മിക്കുന്നഅനുകുല ഗോത്ര നാടോടിസംസ ്കൃതിയുടെപൊളിച്ചെഴുത്തും അതിനാസ്പദമായ കാരണങ്ങളും സുരേന്ദ്രൻ നായരുടെ 'നെറ്റി നെറ്റി' എന്ന ചിത്രത്തെ ആധാരമാക്കിഅപ ഗ്രഥിക്കുകയാണ് ഈ പ്രബന്ധത്തിൽ ചെയ്യുന്നത്.-സുരേന്ദ്രൻ നായരുടെ ചിത്രങ്ങൾക്ക് രാഷ്ട്രീയവും സാമൂഹൃവുമായ പ്രതിരോധമുണ്ട്. പ്രതിരോ ധത്തിനും കലഹത്തിനും വെല്ലുവിളിക്കുമാണ് അദ്ദേഹം ഗോത്രനാടോടി സംസ്കൃതിയെ ഉപയോഗപ്പെടുത്തിയിരിക്കുന്നത്. ചരിത്രവും ചരിത്രത്തിന്റെ പുനർനിർമ്മിതിയുംചരിത്രത്തിലെ വായിക്കാത്ത ഏടുകളെ വായിക്കാനുള്ള ശ്രമവും കൂടിയാണ് അദ്ദേഹത്തിന്റെ ചിത്രം. ജനതയുടെ ബുദ്ധികേന്ദ്രവും വിചാരകേന്ദ്രവും നാടോടിഗോത്രസംസ്കൃതിയിലാ ണെന്ന പാഠം ചിത്രം പ്രദാനം ചെയ്യുന്നു.

*താക്കോൽ വാക്കുകൾ :* ആധുനിക ചിത്രകല, ഇംപ്രഷനിസം, ഫോക് ,ഗോത്രസംസ്കൃതി

പ്രാചീനവും പാരമ്പര്യവുമായ കലകളിൽ നിന്ന് സംസ്കൃതിയുടെ കൂടിച്ചേരലുകളും നൂതന സത്താബോധവും പുതിയ ലാവണ്യസങ്കല്പ ങ്ങൾ രൂപപ്പെടുത്തി പ്പോൾ പാരമ്പര്യകലകളെ നിഷേധിച്ചു കൊണ്ട്റൊമാന്റിക് സങ്കല്പങ്ങളും തുടർന്ന് റിയലിസ്റ്റ് സങ്കല്പങ്ങളും കേരളീയചിത്രകലകയിൽ കടന്നുവരുന്നു. റൊമാന്റിക്കുകളുടെ അമിത കാല്പനികതയും റിയലിസ്റ്റുകളുടെ ശക്തമായ സാമൂഹ്യ വീക്ഷണവും പരസ്പരം പൊരുത്തപ്പെടാതെ ഇരുധാരയായി നീങ്ങുമ്പോൾ ഇവയിൽ നിന്ന് നിർദ്ധാരണം ചെയ്തെടുത്ത കലാസങ്കല്പങ്ങളും പാരമ്പര്യകലാ ശക്തി സൗന്ദര്യങ്ങളും ചേർത്തെടുത്ത ഒരു കലാനിർമ്മിതി 1970 കൾക്ക് ശേഷം കേരളത്തിൽ രൂപപ്പെട്ടു. റിയലിസ്റ്റുകളുടെ വീക്ഷണത്തിൽ തന്നെ

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

പാരമ്പര്യവും കീഴാളവുമായ സങ്കല്പങ്ങളുടെ കലർപ്പുകളുണ്ടായിരുന്നു. ചുരുക്കത്തിൽ റൊമാന്റിക് റിയലിസ്റ്റിക് സങ്കല്പങ്ങളുടെ സവിശേഷ ചേരുവകളും പാരമ്പര്യ കലാബോധവും വർണ്ണസങ്കല്പവും ചേർത്ത ഒരു ഇംപ്രഷനിസ കലയാണ് 1970 കൾക്ക് ശേഷമുള്ളചിത്രകലയിൽ ഉള്ളത്. ഇംപ്രഷനിസ്റ്റുകൾക്ക് മാധ്യമത്തോടും ദൃശ്യഭാഷയോടുമായിരുന്നു പ്രതി സമൂഹത്തെ സാന്ത്വനപ്പെടുത്തുകയല്ല ചൊടിപ്പിക്കുകയാണ് ബദ്ധത. കലാകാരന്റെ ധർമ്മം എന്ന പാപബോധം ഇംപ്രഷനിസ്റ്റുകളെ ഭരിച്ചു. ഒഴുക്കിനൊത്ത് നീന്താതെ ഒഴുക്കിനെതിരെ നീന്താൻ ഇംപ്രഷനിസ്റ്റുകൾ ശ്രമിച്ചു. കലയെ ഒരു പൊളിച്ചെഴുത്തിന് വിധേയമാക്കാനുള്ള ശ്രമം, മാധ്യമത്തെയും അതിലൂടെ സൃഷ്ടിക്കപ്പെടുന്ന ചിഹ്നവ്യവസ്ഥയെയും വരെ അതുവരെ മാറ്റിക്കൊണ്ട്നിലനിന്നിരുന്ന കലാസംസ്കൃതിയെ പൊളി ച്ചെഴുതി. "ചിത്രപ്രതലം, നിഴൽ / വെളിച്ചം, വെളിച്ചമെന്ന തനതു പ്രതി ഭാസം, പശ്ചാത്തലം/മധ്യസ്ഥലം/മുൻസ്ഥലം എന്ന സ്ഥലവിഭജനത്തിന് നൽകിയ പുതിയ മാനം, വർണത്തിന്റെ നവീനദൃശ്യദർശന സിദ്ധാന്തങ്ങൾ"1 എന്നിവയുടെ പുതുമാനം എന്നിവയെല്ലാം ആധുനിക ചിത്രകലയുടെ ലാവണ്യദർശനങ്ങളെ വൃക്തമാക്കുന്നു.

കേരളത്തിലെ നവീന ചിത്രകലയിൽ സുരേന്ദ്രൻ നായരുടെ'നെറ്റി നെറ്റി' എന്ന ചിത്രത്തെമുൻനിർത്തിയാണ് പ്രബന്ധം തയ്യാറാക്കിയിരി ക്കുന്നത്. ഈചിത്രത്തിലൂടെ ആധുനികകലയിലെ ഗോത്രനാടോടി ചിഹ്ന സമൂഹത്തെ സൂക്ഷ്മമായി വീക്ഷിച്ച് ഇന്നിന്റെ ജ്ഞാനമണ്ഡലത്തെ അടിസ്ഥാനപ്പെടുത്തി അപഗ്രഥിക്കുകയുമാണ് ചെയ്യുന്നത്.

"എടക്കൽ പാറപ്പിളർപ്പിലെ കൊത്തുചിത്രങ്ങളും കളമെഴുത്തുകാരുടെ ദ്രുതവടിവുകളും പല്ലവചുമർചിത്ര മാതൃകകളും ആണ് കേരളീയർ ചിത്ര കലാരീതിക്ക് മാതൃകകളാക്കേണ്ട"തെന്ന് വാദിച്ച കേസരി ആധുനിക ചിത്രകലയ്ക്ക് പുതിയൊരു കുഴി വെട്ടുകയായിരുന്നു. രവിവർമ്മ ചിത്ര ങ്ങളെ അനുകരിക്കരുതെന്ന് പറഞ്ഞ് നാട്ടുസംസ്കൃതിയെ പോഷിപ്പി ക്കാനും അതാണ് കേരളീയ ചിത്രകാരന്റെ സ്വത്വനിർമ്മിതിയെന്നും ഉള്ള ഇദ്ദേഹത്തിന്റെ ആശയത്തെ ചിത്രകാരാർ സ്വീകരിച്ചു. ഓരോ ആഖ്യാ നവും ഓരോ സാധ്യതയെ നിർമ്മിക്കുന്നു. ചിലപ്പോൾ പല സാധ്യത കളെ നിർമ്മിക്കുന്നു. വ്യാഖ്യാനമാണ് പല സാധ്യതകൾക്ക് നിയാമകമാ കുന്നത്.

സുരേന്ദ്രൻ നായർ – 'നെറ്റി നെറ്റി'

'നെറ്റി നെറ്റി' എന്ന ചിത്രം വെളിപ്പെടുത്തുന്ന സാധ്യതകൾ പലതാ ണ്. ഈ ചിത്രം ഒറ്റ നോട്ടത്തിൽ നാട്ടുസംസ്കൃതിയുടെ ചിഹ്നവ്യവസ്ഥ യാണ്. എന്നാൽ അടിസ്ഥാനപരമായി ചരിത്രവും ഇതിഹാസവും പ്രാദേ ശികസ്വത്വബോധവും ഇഴപിരിഞ്ഞു കിടക്കുന്ന ഇതിൽ വർണ്ണ പ്രയോഗ ത്തിൽ തന്നെ പ്രാദേശികതയും പാരമ്പര്യവും സ്വത്വബോധവും അദ്ദേ ഹം ക്രമപ്പെടുത്തിയിരിക്കുന്നു.

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

March 2022

കഥാപാത്രത്തിന്റെ ആത്മഗതം മുദ്രകളിലൂടെയും സംഭാഷണങ്ങൾ

ചിഹ്നങ്ങളിലൂടെ വെളിപ്പെടുത്തുന്നു. ഇവ രണ്ടും നാട്ടു സംസ്കാരമുദ്ര യായ ഭയാനകമായ സർപ്പവും പച്ചയുടെ ഹരിതാഭമായ ചെടിയും ആണ്. തിറയാട്ടത്തിലെ മുദ്രകളെ കൈകളിമേൽ അദ്ദേഹം സന്നിവേശിപ്പിച്ചിരി ക്കുന്നു. മുഖത്തെഴുത്ത് പൂർണ്ണമായും നാട്ടുസംസ്കൃതിയുടെ ഭാഗമാ ണെങ്കിലും ചിത്രം കഥകളിയിലെ പച്ചയെ അനുസ്മരിപ്പിക്കുന്നു. വെളു പ്പിന്റെയും ചുവപ്പിന്റെയും കറുപ്പിന്റെയും വർണ്ണയോഗമായ വസ്ത്രം നാട്ടു സംസ്കാരമുദ്രയാണ് അതിലേറെ ഗോത്രസംസ്കാരമാണ്. വർണ്ണം ദ്രാവി ഡീയമാണ്. വില്ലും പന്തവും സിംഹവുമെല്ലാം ഗോത്രസംസ്കൃതിയെ ഓർമ്മിപ്പിക്കുന്നു.

അദ്ദേഹത്തിന്റെ ഈ ചിത്രം ഒരു ഭൂതകാല ജ്ഞാനവൃവസ്ഥയെ അനു

സ്മരിപ്പിക്കുന്നുണ്ട്. ജാതിവ്യവസ്ഥ യുടെ പരുക്കൻ യാഥാർത്ഥ്യങ്ങളെ വിളിച്ചോതുന്നുണ്ട്. അതോടൊപ്പം തന്നെ ഇന്നിന്റെ രാഷ്ട്രീയ അർത്ഥങ്ങ ളെയും വായിക്കാൻ പ്രേരിപ്പിക്കു ന്നുണ്ട്. കേരളീയ ഗോത്രനാടോടി സംസ്കൃതിയുടെ പുരാവൃത്തങ്ങളും ഈ ചിത്രത്തിന് ഊടും പാവുമായി ത്തീർന്നിട്ടുണ്ട്. അങ്ങനെ ഈ ചിത്രം ആഖ്യാനങ്ങളുടെ ബാഹ്യാർത്ഥതല ങ്ങൾ സൃഷ്പിച്ചു വളരുകയാണ്.

ചിത്രത്തിലെ വർണ്ണങ്ങൾ കേര ളീയ നാടോടി ഗോത്രമനുഷ്യന്റേ താണ്. രവിവർമ്മ ചിത്രങ്ങളിൽ

കാണുന്ന വെളുപ്പെന്ന വർണ്ണത്തിൽ നിന്ന് ശരീരത്തിന് ഇരുൺ നിറം നൽകുന്നത് തന്നെ കീഴാളസംസ്കൃതിയെ പുന:സൃഷ്ടിക്കാനാണ്. അതോടൊപ്പം ശരീരവർണ്ണവ്യവസ്ഥയുടെയും സൗന്ദര്യസങ്കല്പങ്ങളു ടെയും ധാരണകളെ തന്നെ മാറ്റി മറിക്കുന്നുൺ അത്. പ്രസ്തുത വർണ്ണ ത്തിലൂടെ ജാതീയ അസമത്വങ്ങളിൽ ഇന്നും നിലനിൽക്കുന്ന വർണ്ണത്തെ അദ്ദേഹം ശക്തമായ പ്രതിരോധമാക്കി നിലനിർത്തിയിരിക്കുന്നു. കറുത്ത പ്രതലത്തിൽ കറുത്ത തറയിൽ നിഴലില്ലാത്ത ചിത്രത്തിന് ഇരുൺ ശരീരം നൽകുമ്പോൾ രാത്രിയുടെ ഇരുളിമയിൽ പന്തത്തിന്റെ വെളിച്ചത്തിൽ തെളി യുന്ന നാടോടികലകളെ അദ്ദേഹം ഓർമ്മിപ്പിക്കുന്നു. വില്ലാണ് അതിജീ വനത്തിന്റെ ആധാരം. ഇരുളിമ ദൈന്യതയുടെയും ആഘോഷത്തിന്റെയും അനുഷ്ഠാനത്തിന്റെയും ആധാരമാണ്. അത് രാത്രിയുടെ പ്രതീകമാ ണ്. ഇരുളിൽ രൂപപ്പെട്ട മനുഷ്യന്റെ അടിസ്ഥാനം ഇരുളിലാണ് എന്നു തന്നെ നായർ വരച്ചിട്ടിരിക്കുന്നു. മനുഷ്യനും പ്രകൃതിയും ഒന്നായി ERUDITION ISBN: 978 -93 -87709 - 82 - 9 March 2022



കഴിഞ്ഞ ഗോത്രകലത്തെ അനുസ്മരിപ്പിക്കുമ്പോഴും അവനുള്ളിൽ നിറ യുന്നത് സർപ്പീകൃതമായ ചിന്തകളും ഭയനാകമായ മനസ്സുമാണ്. ശ്വാസം വരെ ഇത്തരമൊരു ചിന്തനിയന്ത്രിക്കുന്നുണ്ട്. ചിന്താഭാരത്താൽ വ്യഥി തനായ ആധുനിക മനുഷ്യനെയും ഈ ചിത്രം അനുസ്മരിപ്പിക്കുന്നു.

നിശ്ചിതമായ സാമൂഹികസാംസ്കാരിക രാഷ്ട്രീയപരിപ്രേക്ഷ്യം ചിത്ര ത്തിനുണ്ട് . ചരിത്രപരമായ ജാതിവ്യവസ്ഥയെയും വർണ്ണവ്യവസ്ഥയെയും ഈ കാലഘട്ടത്തിൽ പ്രതിരോധമാർഗ്ഗമാക്കാൻ നായർ ശ്രമിക്കുന്നു. എന്നാൽ ചിന്തയിലെ സർപ്പീകൃതസ്വഭാവം ഗോത്രപ്രതിനിധാനമായി നിൽക്കുമ്പോൾ വിവേകത്തിന്റെ നാൾ വഴികളാണവർ പിന്നിട്ടതെന്ന് അദ്ദേഹം പറഞ്ഞുപോകുന്നു. സർപ്പം ഭയം ജനിപ്പിക്കുന്ന പ്രതീകമാ ണ്. സർപ്പമെന്ന ബിംബത്തിലൂടെ ചുരുൾ വിടർത്തപ്പെടുന്ന നവയുഗ ത്തെ അദ്ദേഹം രഹസ്യാത്മകമാക്കിയിരിക്കുന്നു. മാറി വരുന്ന കാലഘ ട്ടത്തിൽ ഗോത്രവും ആര്യവുമായ സംസ്കൃതിയുടെ സങ്കലനം സർപ്പ ചുരുളഴിച്ച് വിഭ്രമാത്മകവും ഭയാനകവുമായ ശക്തിയായി രാഷ്ട്രീയ നാട കമാടുന്ന പുതിയ സാമൂഹ്യചിത്രം അദ്ദേഹം വരച്ചിട്ടിരിക്കുന്നു.

സാംസ്കാരിക ബിംബങ്ങളിലൂടെ അദ്ദേഹം കലയുടെ പുതിയ പ്രയോ ജനത്തെ ഉപയോഗപ്പെടുത്തുക കൂടി ചെയ്യുന്നു. ഗോത്ര സംസ്കൃതി യുടെ കാലത്ത് കലകൾ ജീവിതത്തിന്റെ ഭാഗമായിരുന്നു. പുതിയ ചിഹ്ന ങ്ങൾ ഉൾച്ചേർത്തുകൊണ്ട്വിപണിയിൽ പുതിയതും വൃതിരിക്തവുമായ ഉല്പന്നത്തെ സൃഷ്ടിക്കുക എന്ന നയവും ഇതിനുപുറകിലുണ്ട്എല്ലാ കാലത്തും മുഖ്യധാരാ കലയ്ക്ക് വാണിജ്യപരത പ്രധാനമായിരുന്നു. ചിത്ര ത്തിന് കിട്ടുന്ന ചന്താമൂല്യം പ്രധാനമായിരുന്നു. ഉപജീവനത്തിന്റെ മാർഗ്ഗ മായി കലയെ കരുതുന്നസംസ്കൃതിയ്ക്ക് ഇന്നും മാറ്റമില്ല. "മൂല്യത്തിനു (Value) പകരം വില (Price) എന്ന ഘടനാക്രമീകരണം എല്ലാ മേഖലയി ലുമെന്നപോലെ കലാമേഖലയിലും വന്നുചേർന്നപ്പോൾ കലാരൂപം എന്നത് ധനനിക്ഷേപത്തിനുള്ള മറ്റൊരിനമായി."3 ഗോത്രനാടോടി കല കൾക്ക് വിപണിയെന്നത് അജ്ഞാതമാണ്. ജീവിതത്തിന്റെയും അനു ഷ്ഠാനത്തിന്റെയും ഭാഗമാണ്. എന്നാൽ "ഗോത്ര ആദിവാസി ആവാസ വ്യവസ്ഥകളുടെ നാശത്തോടൊപ്പം തന്നെ ഗോത്രവർഗ്ഗങ്ങളേയും ആദി വാസികളെയും വൃവസായവൽക്കരണത്തിന്റേയും അതോടൊപ്പംമുഖ്യ ധാരയിലേക്ക് കൊൺണ്ടുവരുന്നതിനുള്ള ഒരു വികസനപ്രയോജനവാ ദവും വളർന്നുവന്നു."4 ഈ വാദമുഖങ്ങളുന്നയിച്ച് ആദിവാസികൾ നാടോടി സംസ്കാരങ്ങളെ വിപണിയിലെ കരുക്കളാക്കി മാറ്റുന്ന പുതി യൊരുതന്ത്രവും നിലനിൽക്കുന്നുണ്ട്. എന്നാൽ സുരേന്ദ്രൻ നായരുടെ ചിത്രങ്ങൾക്ക് വിപണി സാധ്യതയേക്കാളേറെ രാഷ്ട്രീയവും സാമൂഹ്യവു മായ പ്രതിരോധമുണ്ട്. പ്രതിരോധത്തിനും കലഹത്തിനും വെല്ലുവിളിക്കു മാണ് അദ്ദേഹം ഗോത്രനാടോടി സംസ്കൃതിയെ ഉപയോഗപ്പെടുത്തിയി

March 2022

ISBN: 978 -93 -87709 - 82 - 9

ERUDITION

രിക്കുന്നത്. ഒരു കലാകാരനും ചരിത്രത്തെ വിസ്മരിക്കാനാവില്ല. ചരി ത്രത്തിലെ വായിക്കാത്ത ഏടുകളെ വായിക്കാനുള്ള ശ്രമം കൂടിയാണ് അദ്ദേഹത്തിന്റെ ചിത്രം. ജനതയുടെ ബുദ്ധികേന്ദ്രവും വിചാരകേന്ദ്രവും നാടോടിഗോത്രസംസ്കൃതിയിലാണെന്ന പാഠം വരെ സുരേന്ദ്രൻനായരുടെ ചിത്രം പ്രദാനം ചെയ്യുന്നു.

ആധുനിക ചിത്രകലയെ നിലനിറുത്തുന്നതു തന്നെ ഗോത്ര നാടോടി മുദ്രകളാണ്. ഒളിഞ്ഞും തെളിഞ്ഞും വരയിലും വർണ്ണത്തിലും അടയാള ത്തിലുമെല്ലാം സ്വീകരിക്കുന്ന പാരമ്പര്യഘടകങ്ങൾ പുതിയ ട്രെന്റ് ആണ്. പുതിയ രീതിയെന്തിനാണെന്ന അന്വേഷണം കലയുടെ വിപണിസാധ്യ തകൾ കൂടി കലാമൂല്യത്തോടൊപ്പം വ്യക്തമാക്കുന്നു.

എല്ലാ കലകളിലും ഈ പ്രതീതി സന്ദർഭത്തിന് പ്രസക്തിയുണ്ട്. എന്നാൽ പ്രതീതി സന്ദർഭത്തിൽ നിന്നുകൊൺണ്ട് കലയുടെ നിർമ്മിത സന്ദർഭത്തെയും പാരമ്പര്യസന്ദർഭത്തെയും അന്വേഷിക്കുമ്പോൾ ആണ്അവ പരിണാമനിർമ്മിതമായതിന്റെ സൂക്ഷ്മരാഷ്ട്രീയം വെളിപ്പെടു ന്നത്. ഓരോ നാടോടി ഗോത്രഘടകവും കാലഘട്ടങ്ങളെ അതിജീവിച്ച് നവകാലത്ത് നിലനില്ക്കുകയോ പുനർവിന്യസിക്കുകയോ ചെയ്യുന്നുൺ ങ്കിൽ അവയ്ക്ക് നിശ്ചിതമായ ഒരു ലക്ഷ്യമുണ്ട്. ഈ കാലഘട്ടത്തിന്റെ ആവശ്യങ്ങൾക്കനുസരിച്ച് അധികാരവർഗ്ഗം നിർമ്മിച്ചിരിക്കുന്ന ഒരു ലക്ഷ്യം. ഓരോ കാലത്തും നിർമ്മിക്കപ്പെടുന്ന ഇത്തരത്തിലും പുന:സൃഷ്ടികൾക്ക് ചില തിരസ്ക്കാരലക്ഷ്യങ്ങളുൺമുണ്ട്. അങ്ങനെ രൂപപ്പെട്ട് വരുന്ന സൗന്ദ ര്യബോധത്തെ ദേശി സൗന്ദര്യബോധം എന്ന് ഇന്ന് വിവക്ഷിക്കുന്നു. ഫോക് സമൃദ്ധിയുടെ വിളവെടുപ്പ് നടന്നത് ജനപ്രിയസംസ്കാരത്തിലാ ണ്. അത് ഒരു ജനപ്രിയതയെ വളർത്തി നവമാധ്യമങ്ങളിലേക്ക് പകർന്നു അങ്ങനെ ഇന്നത്തെ സംസ്കാരത്തെ നിർണ്ണയിക്കുന്ന, കൊടുത്തു. ഇന്നത്തെ കലയെ രൂപപ്പെടുത്തുന്ന, ആധുനിക ജീവിതത്തെ വ്യവസ്ഥ പ്പെടുത്തുന്ന പുതിയ ചിന്തയെ രൂപീകരിക്കുന്ന, നവീന ആശയത്തെ നിർമ്മിക്കുന്ന നവഭാവുകത്വത്തെ അടയാളപ്പെടുത്തുന്ന വീരോചിതവും നിർണ്ണായകവുമായ സ്വാധീനശക്തിയായി നാടോടിഗോത്രസംസ്കാരം 'നെറ്റി നെറ്റി' യിൽമാറിയിരിക്കുന്നു.

#### കുറിപ്പുകൾ

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ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

## मेल्पत्तूर् नारायणभट्टपादस्य

## व्याकरणशास्ताधारितानां ग्रन्थानां समाक्षात्मकमध्ययनम्

DR. JUSTIN P G.

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#### आमुखम्

नारायणभट्टपादः केरलीयः सन्नपि कैरल्यां भाषायां नैकमपि ग्रन्थम् अलिखत्। संस्कृतभाषायाम् अतिगौरवज्ञानम् अतिलाघवं प्रयोगसामर्थ्यं च भट्टपादस्य आसीत् इत्यतः तेन विरचिताः सर्वे ग्रन्थाः संस्कृतपराः एव। अनेन बहवः ग्रन्थाः लिखिताः। तेषु केचन प्रकाशिताः केचन अप्रकाशिताः केचन प्रकाशनाय शिष्यन्ते च। ई. ईश्वरन् नम्बूतिरिमहोदयेन SANSKRIT LITERATURE OF KERALA इत्यस्मिन् ग्रन्थे भट्टपादेन विरचितानाम् ४३ रचनानां विवरणं कृतम्।' प्रायेण एतेषां ग्रन्थानां प्रकाशितवर्षस्थानादिकम् तत्र निर्दिष्टं वर्तते। भट्टपादस्य रचनया लब्धभाग्याः ग्रन्थाः शास्त्रपराः काव्यपराः च सन्ति । प्रायेण सर्वेषु शास्त्रेषु कृतभूरिपरिश्रमः नारायणभट्टः व्याकरणे, मीमांसायाम् आगमे, ज्योतिषे च विविधान् ग्रन्थान् विलिख्य अस्मान् अनुग्रहीतवान् इति वक्तव्यमेव।

शास्तेषु सर्वेष्वपि तस्य अधिकं वैदुष्यम् आसीत्। विशिष्य शब्दशास्ते अतिनिपुणोऽयं काव्येष्वपि तस्य प्रयोगमकरोत्। वैय्याकरणनिपुणैः एव प्रयोक्तुं साध्यं पदवैशिष्ट्यम् भट्टपादस्य कृतिषु यथेच्छं द्रष्टुं शक्यते। प्रकृतानुगुणं पाणिनीयसूत्राणि तेषां विधयः च काव्ये योजयितुं भट्टपादेन साध्यम् अभवत्। तादृशाः प्रयोगाः तेन आयासं विना प्रयुक्ताः इत्येतत् तस्य वैशिष्ट्यं द्विगुणीकरोति। काव्यानुशीलने वैचित्र्यपददर्शने भट्टपादः शब्दशास्त्रपारङ्गतः इति अवश्यम् अवगन्तुं शक्यते। एवं सर्वगुणसम्पन्नस्य शास्त्रपारङ्गतस्य काव्यानुशालिनः च भट्टपादस्य कृतीनां विवेचनं यथाक्रमं क्रियते।

## व्याकरणशास्त्राधारितग्रन्थाः

संस्कृतसाहित्ये शास्त्रेषु च कृतभूरिपरिश्रमः पण्डितोत्तमः श्रीकृष्णभक्तावतंसः नारायणीयादिस्तोत्रकाव्यानां रचयिता, प्रक्रियासर्वस्वादीनां शास्त्रग्रन्थानां प्रणेता मेल्पत्तूर् नारायणभट्टः महावैयाकरण इत्यत्र नास्ति संशयलेशः। अनेन विरचितौ प्रसिद्धौ व्याकरणशास्त्रग्रन्थौ भवतः प्रक्रियासर्वस्वम् अपाणिनीयप्रामाण्यसाधनम् च।

## प्रक्रियासर्वस्वम् ।

अम्बलपुष्नाराजस्य आज्ञानुसारेण षष्ठिदिवसैः निर्मितः अष्टाध्यायीं समाश्रित्य रचितः महान् ग्रन्थः भवति प्रक्रियासर्वस्वम्। पाणिनीयसूत्राणाम् व्याख्यानेन सह प्रणीतेऽस्मिन् प्रक्रियासर्वस्वे तस्मिन् काले

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#### ISBN: 978 -93 -87709 - 82 - 9

<sup>&</sup>lt;sup>1</sup> Sanskrit Literature of Kerala P. No.??

उपलब्धनाम् समेषां संस्कृतव्याकरणग्रन्थानां सारं निहितं वर्तते। अतः ग्रन्थस्यास्य गौरवं महत् भवति। अस्मिन् प्रक्रियासर्वस्वे संज्ञा-परिभाषा-सन्धि-कृत्-तद्धित-सामास-स्त्रीप्रत्यय-सुबर्थाः, सुपां विधिः, आत्मनेपदविभागे तिङ् लकारदिविशेषा इत्यादिविंशतिखण्डाः प्रतिपादिताः। तत्र उच्यते -

इह संज्ञा परिभाषा सन्धिः कृत्तद्धितासमासाश्च।

स्तीप्रत्ययाः सुबर्थाः सुपां विधिश्चात्मनेपदविभागः॥

तिङ्पि च लार्थविशेषाः सनन्तयड्यङ्लुकश्च सुब्धातुः।

न्यायो धातुरुणादिश्छान्दसमिति सन्तु विंशतिः खण्डाः।।

सूत्रम्, वृत्तिः, उदाहरणम्, पद्यविवरणमित्यादिचतुर्भिः अंशैः प्रक्रियासर्वस्वम् सम्पन्नम् भवति। शब्दशास्त्रबालानां अनायासेन अवगन्तुं स्मर्तुम् च योग्याः कारिकाः ग्रन्थेऽस्मिन् आमूलाग्रं अलंकृताः सन्ति। पाणिनीयसूत्राणि सर्वाण्यपि प्रक्रियासर्वस्वे व्याख्यातानि। तथापि ग्रन्थस्य अतिविस्तरदोषोऽपि न विद्यते। प्रतिपादनशैल्यां संग्रहसूक्ष्मता रक्षिता दृश्यते। तथापि ग्रन्थस्य अतिलाघवदोषोऽपि न विद्यते। वृत्तेः सारं कचित् पद्यरूपेण संगृह्य प्रतिपादितम्। श्रीकृष्णपराणि ललितानि पद्यानि एव उदाहरणत्वेन प्रदत्तानि। एतानि शास्त्रसहजानि, कार्कश्यरहितानि, प्रसन्नानि, मनोहराणि च वर्तन्ते। उदाहरणत्वेन एकं प्रसूच्यते।

रासविलासविलोलं स्मरत मुरारेर्मनोरमं रूपम्।

प्रकृतिषु यत् प्रत्ययवत् प्रत्येकं गोपिकासु सम्मिलितम्।।\*

इदं पद्यं प्रक्रियासर्वस्वस्य मङ्गलपद्यं वर्तते। प्रसिद्धानां वैय्याकरणमतानां खण्डनं मण्डनं तत्र उचितरीत्या विधातुं भट्टपादेन न विस्मृतम्। महाकवीनां प्रयोगेषु विप्रतिपत्तिप्रकाशनेऽपि भट्टपादः अतिललितां शैलीं अवलम्बितवान्। यथा

वर्धमानाख्य आचार्यो वौश्रमेर्वेत्यसूत्रयत् ।

विश्रमेर्वेति भोजोऽपि तेन विश्रामविश्रमौ॥

विश्रम्य मि च मां वेत्ति कौमुदी च जगाद सा।

अम आमश्च मश्चामो ण्युलादौ चैवमूह्यताम्।।

<sup>2</sup> प्र.स/ श्लो.६/ पृ.सं१

3 प्र.स/ श्लो.७ /पृ.सं २

4 प्र.स./ श्लो.१/ पृ.सं१

ें प्र.स./श्लो.१४६/ पृ.सं१०७

<sup>6</sup> प्र.स./श्लो.१४७/ पृ.सं१०७

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ISBN: 978 -93 -87709 - 82 - 9

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तथा च

विश्रामस्यापशब्दत्वं वृत्त्युक्तं नाद्रियामहे ।

मुरारिभवभूत्यादीनप्रमाणीकरोति कः॥"

विश्रामशाखिनं वाचां विश्रामो हृदयस्य च

विश्रामहेतोरित्याति महान्तस्ते प्रयुज्यते।।\*

एवं शब्दशास्त्राणां सारभूतत्वेन प्रणीतोऽयं ग्रन्थः सर्वैः अङ्गीकृतः, संस्कृत्य संशोध्य प्रकाशनमुखम् अवलम्बितः, आधिकारिकश्च अयं व्याकरणशास्त्रग्रन्थ इत्यनेन वैय्याकरणपण्डितानां समस्याकुलसमाधानकग्रन्थः प्रक्रियासर्वस्वम् अखिललोकप्रशस्तभाजनं वर्ततेति सन्देहलेशं विना वक्तुं शक्यते।

## अपाणिनीयप्रमाण्यसाधनम् ।

व्याकरणशास्त्रे न केवलं मुनित्रयस्य प्रधान्यम् अपि तु पूर्वाचार्याणामपि प्राधान्यं वर्तते इति प्रक्रियासर्वस्वे भट्टपादेन विवक्षितम्। मतमिदम् चोलदेशवासिना वैनतेयाख्येन पण्डितेन विमृष्टम्। वैनतेयोक्तिं खण्डितवान् च सुदर्शनाख्यो शब्दशास्त्रज्ञः। चोलदेशस्य वैयाकरणपण्डितानां सोमशेखरदीक्षित यज्ञनारायणदीक्षितादीनां माध्यस्थे विषयोऽयं चर्चितः। अपाणिनीयप्रयोगाणां साधुत्वं कल्पयन् नारायणभट्टपादः क्रोडपत्रमेकं प्रणिनाय। इदं क्रोडपत्रं समेषां भट्टपादविमतानां वादमुखं अबध्रात्। पश्चात् पत्रमिदम् अपाणिनीयप्रामाण्यसाधनमिति नाम्ना प्रसिद्धिं प्राप। <sup>10</sup> इदं परपक्षखण्डनम् इति नाम्ना च अभिधीयते। नारायणभट्टपादस्य शब्दशास्त्रसामर्थ्यं स्वमतप्रस्तावपटुत्वं च अनेन ग्रन्थेन ज्ञातुं शक्यते। कोलम्बाब्दगणनानुसारेण अष्टमशतकात् परमेव अस्य अपाणिनीयप्रमाण्यसाधनम् नामकस्य क्रोडपत्रस्य सृष्टिरजायत इति निरूपकाणाम् अभिमतम्।''

चन्द्र-इन्द्र-काशकृत्स्र-अपिशलि-शाकटायादीनाम् पूर्वाचार्याणां व्याकरणनिबन्धानाम् अप्रमाण्यं तस्मिन् काले कैश्चित् शब्दशास्त्वपण्डितैः कल्प्यते स्म। एतैः विभागीयैः केवलं पश्चाद्वर्तिनः पाणिनेः व्याकरणानुसारमेव शब्दानाम् साधुत्वं कल्पितम् तथा प्रचारितम् च। पूर्वाचार्याणां शास्त्रानुसारं साधुत्वं प्राप्तानि पदानि एतैः निषिद्धानि च। किन्तु नारायणभट्टपादः अमुं वादं निशितं खण्डितवान्। पाणिनीयव्याकरणविलक्षणत्वेन शब्दानाम् निषिद्धता न सम्भवतीति भट्टपादेन पूर्वाचार्याणां शास्त्रसम्मतत्वेन

<sup>9</sup>.Ed. E V Raman Naputhiri, Trivandrum, 1942; E R Sree Krishna Sarma , Oriental Research Institute, Thirupati, 1968

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ISBN: 978 -93 -87709 - 82 - 9

<sup>&</sup>quot; प्र.स./श्लो.१४८/ पृ.सं१०७

<sup>&</sup>lt;sup>8</sup> प्र.स./श्लो.१४९/ पृ.सं१०७

<sup>10</sup> करि जि./भ 🕄 /पू.सं. ४२९

<sup>&</sup>lt;sup>11</sup> न रि.वि.व्य यिआ.६४

प्रतिपादितम्। अयमेव विषयः अपाणिनीयप्रमाण्यसाधनाख्ये ग्रन्थे प्रतिपाद्यत्वेन स्वीकृतः। अत एव ग्रन्थस्य नाम सार्थकं च। अयं ग्रन्थः प्रक्रियासर्वस्वाख्यस्य ग्रन्थस्य अनुबन्धत्त्वेन प्रकाशितः", यः ग्रन्थः गुरुवायूर् देवस्वंद्वारा प्रकाशितः। ग्रन्थेऽस्मिन् भट्टपादः प्रतिपक्षमतं तथा स्वपक्षमतं च एवं प्रतिपादयति।

पाणिन्युक्तं प्रमाणं न तु पुनरपरं चन्द्रभोजादिशास्त्रं

केऽप्याहुस्तल्लघिष्ठं न खलु बहुविदामस्ति निर्मूलवाक्यम्।

बह्वङगीकारभेदो भवति गुणवशात् पाणिनेः प्राक् कथं वा

पूर्वोक्तं पाणिनिश्चाप्यनुवदति विरोधेऽपि कल्पो विकल्पः।।'\*

भट्टपादः युक्तिप्रमाणम् अनुभवांश्च आधारीकृत्य सर्वाकर्षणयोग्यैः स्वमधुरवचोभिः विमतमथनमकरोत्। «अत्र तावदिन्द्रचन्द्रकाशकृरूयापिशलिशाकटायनादिपुरातनाचार्य विरचितानां व्याकरणानाम् अप्रमाणत्वमेवास्ति मुनित्रयोक्तस्यैव तु प्रामाण्यमिति केचित् पण्डितम्मन्याः विचारयन्ति। तदपहसनीयमेव चन्द्रादिवचसामनाप्ताप्रणीतत्वभावेन पुरुषवचसामप्रमाण्य...... कौमुद्याश्च सर्वदेशपरिगृहीतत्वात् पाणिनीयोल्पत्तेः प्राग्भवैश्च वैदिकैर्व्याकरणन्तराणामेवाङ्गीकृतत्वात् पाणिनीय- व्यतिरिक्त-च्छान्दसलक्षणानां प्रतिशाख्यानां युष्माभिरप्यङ्गीकृतत्वं स्पष्टतरमेव"।"एवं रीत्या परमतखण्डनम् विधाय भट्टपादः स्वमतं प्रात्तौत्। अन्तिमे स्वसिद्धान्तः अनेन एवं स्थाप्यते।

पूर्वव्याकराणादिमूलरहितं युक्त्यैव यत्साध्यते

कैश्चित्तत्र मुनित्रयप्रतिहते हेयत्वमुद्घोष्यते।

अन्येभ्यो गुणवत्तया च बहुभिर्यद् गृह्यते खल्विदम्

तस्मात् खल्वयमन्यशास्त्रमखिलं मिथ्येति विभ्राम्यति।।"इति।

प्रतिपक्षिणं खण्डयितुं तथा तोषयितुं च मध्ये मध्ये दुर्युक्तयः हास्योक्तयः च नारायणेन विहिताः। अपाणिनीयप्रामाण्यसाधनस्य आरम्भे वैनतेयाख्यं पण्डितं विरोधित्वेन कल्प्यते। किन्तु ग्रन्थस्यान्ते स एव वैनतेयः बन्धुत्वेन कल्पितः च। ग्रन्थारम्भे यथा -

सुदर्शनसमालम्बी सोऽहं नारायणोऽधुना

वैनतेयभवत्पक्षमाक्रम्य स्थातुमारभे॥\*\*

<sup>12</sup> प्र.स./अनु.पृ.सं. ९

<sup>13</sup> अप]िर्मि] श्लो.२./ पृ.सं. १

<sup>14</sup> अप**प्रि**सि/िपृ.सं.१

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ISBN: 978 -93 -87709 - 82 - 9

ग्रन्थस्यान्ते तु

ततोऽन्यग्रन्थसन्देहैः मदुक्तान्येव साधयन्।

वैनतेयो ममात्यन्तम् बन्धुरेवातिशोभनम्।।"

एवं विरोधिनमपि अस्मदीयम् आकलय्य भट्टपादः सहृदयानां समक्षं सर्वसम्मतः शब्दशास्त्रप्रवीणः समजायत।

सहायकग्रन्थसूची

1. अपाणिनीयप्रामाण्यसाधनम् – नारायणभट्टतिरि –सम्पा- इ वि रामन् नम्पूतिरि तिरुवनन्तपुरम्1942

जनामा मन्त्रामान्यराज स्त्रामान्यराज स्त्रामान्यराज्य राजा २ वि सेत् र मिर्द्रातार सर्वव राज्य
 नारायणीयम् – नारायणभट्टतिरि – वनमालाव्याख्यानम्- गुरुवायूर् देवस्वम्
 प्रक्रियासर्वस्वम् - नारायणभट्टतिरि –सम्पा – नारायणपिषारोटिः गुरुवायूर् देवस्वम् 1998

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<sup>16</sup> अपजिमिणिपृ.सं. १

<sup>17</sup> अप प्रिसि िपृ.सं.८

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

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## इक्कीसवीं सदी की हिन्दी कहानियों में

अस्रक्षित स्त्री जीवन का चित्रण

#### Dr. ANUROJ T. J.

Assistant Professor & HOD, Department of Hindi, L.F. College.

इक्कीसवीं सदी के वर्तमान सामाजिक वातावरण में महिलाओं का जीवन अस्रक्षित बनता जा रहा है। उनके साथ छेड़ - छाड़, बलात्कार, हिंसा आदि वारदात दिन-ब-दिन सुनाई दे रहे है। स्त्री जीवन गर्भ के भ्रूण से लेकर उसकी मृत्यु तक सुरक्षित नहीं है। इस संबंध में ँ वीरेन्द्र सिंह यादव का मत है- " आज दिन दहाड़े उनकी इज्जत लूटी जा रही है, उन्हें मौत के घाट उतारा जा रहा है। हम अपने क्षणिक स्वार्थ और भोग लिप्सा की खातिर घृणित कार्यों को अंजाम देने लग गए हैं। यह विकृत मानसिकता की बात ही कही जायगी। आज देश के अंदर ही नर पिशाचों ने ेषा एल रखा है और हम उससे बेबस और लाचा र बने हुए हैं।"1 स्त्री समुदाय घर के अन्दर और बाहर सुरक्षित नहीं है। भ्रूण हत्या, कन्या- हत्या, दहेज प्रथा, योन उत्पीड़न आदि हिंसात्मक प्रवृत्तियों की वजह से स्त्री जीवन अस्रक्षित होकर नरक तूल्य बनते जा रहे हैं। कभी-कभी सड़कों में स्त्रियों के साथ पुरुष द्वारा छेड़ छाड़ होती है। इस संबंध में रमा शर्मा और एम. के मिश्रा के कथन है "महाविद्यालयों के परिसर में रेलों एवं बसों में बाजारों में मनचले एवं उद्धण्य किस्म के लड़कों द्वारा लड़कियों को भद्दे और गन्द इशारे किए जाते है उन पर फब्तियाँ कसी जाती हैं उन्हें अपशब्द कहे जाते हैं, उनके साथ गाली गलौज की जाती है उनको छूने का प्रयत्न किया जाता है, उन्हें नाँचने या उनके चिकुटी काटने, नाखुन चुभोने जैसे गन्दी हरकतें की जाती हैं।"2 आज इक्कीसवीं सदी के कहानीकारों ने असुरक्षित स्त्री जीवन के मुद्दे को लेकर कहानियों लिखी हैं।

राजेन्द्र मिश्रा की कहानी 'दुष्कर्म' में विदेशी लड़की जो पढ़ने के लिए भारत आयी थी, उसके साथ दिल्ली के नामी गुण्ग प्रताप छेड़ - छाड़ करता है। एक बार उसके साथ बलात्कार करने

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

की कोशिश भी करता है। कहानी में रोज़ी और राधा की बातों में अपने असुरक्षित होने का भाव यो झलकते है कि " पता नहीं कहीं प्रताप कोई प्लानिंग न कर रहा हो । उसके साथ गुंगे का बड़ा ग्रूप रहता है। पहले वह लड़कियों को ग्रिप में लेता है, फिर रेप कर मंग्र कर देता है। बाँगे का कहीं पता ही नहीं लगता। पुलीस का मानना है कि एक साल में वह कम से कम तीन घटनाओं को अंजाम दे चुका है। उसने एक ब्रिटीश टूरिस्ट का भी रेप किया है, पर वह किसी तरह बच गई।"3 इस प्रकार आज के ज़माने में लड़कियाँ बाहर निकालने से प्रती हैं। राजेन्द्र मिश्रा की कहानी 'प्रतिरोध' की नायिका एक कंपनी में 'रिसप्पनिस्ट' है। जब वह ऑफिस से घर जाने के लिए निकलती है तो गुँग- मव्वाले लड़के अश्लील टिप्पणियाँ करते हैं। नमिता कहती है " ऑफिस के बाहर कुछ लोग खडे रहते हैं। मेरे वहाँ से गुजरने पर अश्लील ठिप्पणियों करते हैं। मैं सलवार कुर्ती में आती हूँ। स्कार्फ भी रहता है, फिर भी मेरी ड्रेस को लेकर भी कमेंट होती है। क्या करूं समझ नहीं आता में किसी को नहीं जानती। मुझे लगता है, रिपोर्ट करने पर कार्यवाई तो कुछ नहीं होगी, उल्टे उन लोगों से सीधे दुश्मनी हो जाएगी।"4 पुलीस भी स्त्री विषयक मामलों में कभी - कभी चुप रहते हैं, यही सच्चाई पहले

इसी तरह राजेन्द्र मिश्रा की ही कहानी'जॉब', 'बेघर', 'वेशबंध' आदि कहानियाँ भी असुरक्षित स्त्री जीवन के विविध पहलुओं का उद्घाटन करती हैं।

औरत अपने घर और बाहर यौन उत्पीड़न के शिकार बनती हैं। दिन दहाड़े औरतों का अपहरण किये जाते हैं। आवारा, निकम्मे पुरुष लड़कियों के साथ छेड़ - छाड़ करते हैं। घर में हो तो पति और ससुरालवालों द्वारा अत्याचार, कभी दहेज की माँग हेतु तो कभी देखें पुरुषीयत मानसिकता की वजह से इसप्रकार देखा जाए तो औरत की स्थिति वर्तमान सामाजिक परिदृश्य में अस्रक्षित है।

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

March 2022

स्त्री पर होने वाले बलात्कार एवं उत्पीड़न आये दिन बढ़ते जा रहे हैं। बलात्कार केवल सुन्दर स्त्रियों के साथ ही नहीं होते, यह तो अबोध बच्ची से लेकर नब्बे साल की बुढ़िया के साथ भी हो जाते हैं। बलात्कार और स्त्री शोषण के घटनाओं को देखने पर ऐसा प्रतीत होता है कि बच्चों से लेकर बूढ़ों तक हमारे समाज में सुरक्षित नहीं है। बलात्कार के संबंध में रमा शर्मा, एस. के. मिश्रा की राय हैं- " भारतीय दण्य संहिता की धारा ३७६ के अनुसार बलात्कार एक दण्मीय अपराध का आजीवन कारावास हो सकता है। इस धारा के अनुसार जब पुरुष किसी स्त्री से उसकी इच्छा के विरुद्ध या सम्मति के बिना या मृत्यु का भय दिखाकर संभोग करता है तो वह बलात्कारी कहलाता है।"5 कई रूपों में स्त्रियाँ यौन उत्पीड़न का शिकार बनती हैं। जो स्त्रियाँ शरणार्थियों है, दलित है, आर्थिक रूप से अक्षम है वे बलात्कार का अधिक शिकार बनते हैं। इसी प्रकार गरीब महिलाएँ, जेल में कैद महिलाएँ, पागल, गूँगी, बहरी, अपंग एवं भिखारिन महिलाओं के साथ भी बलात्कार एवं शोषण हो जाते हैं। मृणाल पांं⊔के मत में-"स्त्रियों के ख़िलाफ़ अपराध वैसे तो दुनिया भर में बढ़ते जा रहे हैं, लेकिन शरणार्थी स्त्रियाँ चूँकि पारम्परिक, सामाजिक और आर्थिक सुरक्षा से अपेक्षा अधिक वंचित होती है, अतः वे इन अपराधों की और भी ज्यादा शिकार बनती है, और उनकी कमज़ोर स्थिति के कारण उनकी सुनवाई भी नहीं होती।"6 इक्कीसवीं सदी के कहानीकारों ने स्त्री शोषण एवं बलात्कार को प्रमुख मुद्दा बनाकर कई कहानियाँ लिखी हैं।

रंजना जायसवाल की कहानी 'अथमेलाघुमनी कथा' जो अपने ही पति के कारण उनके ठाकुर द्वारा बलात्कार भुगतने वाली स्त्री की कथा है। कहानी में इस घटना का चित्रण इस प्रकार है- "एक दिन उसने मेलाघुमनी को अपने मालिक के साथ कमरे में बन्द कर दिया और खुद बाहर चौकीदारी करता रहा। मेलाघुमनी चीखी- चिल्लाई, रोई पर उसका वश न चला। वह लूट ली गई। उस दिन के बाद उसके लिए पति और कुत्ते में कोई फ़र्क नहीं रहा। दस महीने बाद उसको एक पुत्र पैदा हुई।"7 बलात्कारित स्त्री अपने समाज और परिजन की दृष्टि में हेय

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मानी जाती है। उसके साथ, वह बेकसूर होने के बावजूद भी समाज के लोग होन व्यवहार करते हैं और वह मानसिक रूप से कमज़ोर पड़ जाती है।

इसी तरह राजेन्द्र मिश्रा की कहानी 'वेशबंध', 'अपने से अलग', जया जादवानी की 'क़यामत का दिन उर्फ़ क़ब्र से बाहर' जैसे कहानियाँ स्त्रियों की प्रति होनेवाली हिंसा, शोषण, बलात्कार वो भी गेंगरेप आदि अहम मुद्दों को लेकर लिखी गई है। स्त्री शरीर पर होनेवाले यह घृणित वहशीपन भारतीय सामाजिक व्यवस्था पर गहरी चोट पैदा करता है। दिल्ली के बस में हुए निर्भया हत्या काँ।, केरल के 'पेरुम्बावूर' में नियम विद्यार्थी 'जिषा' के साथ हुए बलात्कार आदि को प्रमुख रूप से देखे जा सकते हैं। इनके अलावा कितनी स्त्रियाँ दिन प्रति दिन बलात्कृत हो जाती हैं और मार दी जाती हैं। सब की जानकारी हमें नहीं मिलती हैं।

1.1 चौरेन्द्र सिंह यादव ,२१ सदी का महिला सशक्तीकरण मिथक एवं यथार्थ पृ. २६७-२६८

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3. राजेन्द्र मिश्रा, दुष्कर्म, विस्थापन का दर्द, पृ.१३८

4. राजेन्द्र मिश्रा, दुष्कर्म, विस्थापन का दर्द, पृ.१३८

+

5 रमा शर्मा, एम. के. मिश्राः भारतीय समाज में नारी का अवधारणात्मक स्वरूप, पृ.१७२

6 'मृणाल पाणे।, परिधि पर स्त्री, पृ. ७२

7.रजना जायसवाल, अथमेला घुमनी कथा, युद्धरत आम आदमी विशेष २०१२, ६.०५

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# CUSTOMERS' ATTITUDE TOWARDS ONLINE SHOPPING IN INDIA: WITH SPECIAL REFERENCE TO KERALA

## Dr Neethu S.Arrakal

Asst Professor in Economics

## Abstract

The growing no. of internet users in India provides a bright prospect for online shopping. This researcher paper highlights factors which online Indian customers keep in mind while shopping. Companies use the Internet to convey, communicate and disseminate information to sell the product, to take feedback and also to conduct satisfaction surveys with customers. Customers use the Internet not only to purchase the product online, but also to compare prices, product features and after sale service facilities they will receive if the purchase the product from a particular store. Many experts are optimistic about the prospects of online business.

**Keywords:** Changing trends of using internet, online trends in India and Use of Online shopping impact in Kerala.

## INTRODUCTION

Online shopping is defined as purchasing items from internet retailers as opposed to a shop or store or the act of purchasing products or services over the Internet.Earlier food, cloth and shelter were called as primary need but today one more need is added in that is "internet". Due to revolution in telecommunication sector internet has changed the way consumers shop and buy goods and services. Both domestic companies as well as MNC's have started using the Internet with an objective of cutting marketing costs and thereby reducing the price of their products in order to stay ahead in heavy competition. In addition to the tremendous potential of the E-business market, the Internet provides a unique opportunity for companies to more efficiently reach existing and potential customers.

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ISBN: 978 -93 -87709 - 82 - 9

## **REVIEW OF LITERATURE**

**Prof. Ashish Bhatt (2014)** in article entitled "Consumer Attitude towards Online Shopping in Selected Regions of Gujarat" published in Journal of Marketing Management stated that online shopping is gaining popularity among people specially the younger generation but in today scenario to become equally popular among all age groups e-marketing will have to cover a longer distance. As per study mode of payment is depended upon income of the respondents. People from different age groups are doing online shopping regularly. The attitude of consumers is changing with the time.

Upasana Kanchan, Naveen Kumar and Abhishek Gupta(2015) in their article "A Study of Online purchase behaviour of Customers in India" Published in ICTACT Journal on Management Studies stated that online shopping is gaining popularity among people of young generation. Higher income groups and educated people are purchasing more via e-retailing websites. People have hesitations in doing online shopping due to security concerns. At the same time people are resistant to change because of technological complexity in making online purchase.

Objectives of the Study

1. Analyse the customer attitude towards online shopping in Kerala

2. Study the impact of customer attitude on sales in India Database & Methodology

The work is based on the primary and secondary data. The researcher selected 60 samples from Adat Panchayat of Thrissur district of Kerala state by employing the purposive random sampling. The data was collected with the help of a well structured questionnaire. For secondary data the researcher used various books, journals and reports over various years as a part of the study.

1. Customer Attitude towards Online Shopping in Kerala

Kerala holds nineth position in terms of e-commerce transactions in the country. Nearly fifty per cent of the consumers from the state buy technology-based products through ecommerce. Kochi, Thiruvananthapuram, Thrissur, Kozhikode and Paravoor are the ecommerce hubs of the state, as revealed by a recent census conducted by ebay.in, an online shopping website. In this context the

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

researcher have made an attempt to examine the influence of online shopping on consumer behavior with special reference to Adat Grama panchayat of Thrissur district in Kerala. To get a clear idea about the online shopping pattern of the sample respondents, a primary survey including 60 sample households from Adat Grama Panchayat of Thrissur district of Kerala was carried out. This paper discusses the trends of online shopping and consumption pattern of the respondents of the concerned area.

·Category¤	No. of Respondents	Percentage of Respondents:
Online Shopping¤	47¤	78.4%¤
Do·not·follow·online·shopping¤	13¤	21.6%¤

Source: Primary Data

#### Table 1.3 Distribution of the respondents on the basis of problems faced

Number of Respondents	Percentage of Respondents
19	40.4%
11	23.4%
9	19.2%
8	17%
47	100%
	Number of Respondents 19 11 9 8 47

Source: Primary Data

# Table 1.4 Distribution of the respondents on the basis of factorswhich influence product selection

Nature of Product	Number of Respondents	Percentage of Respondents
Price only	8	17 %
Price & Quality	25	53.2%
Company & Brand	8	17%
Time saving	5	10.64 %
Others	1	2.13%
Total	47	100%

Source: Primary Data

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ISBN: 978 -93 -87709 - 82 - 9

 
 Table 1.5 Distribution of the respondents on the basis of main reason behind online shopping

Reason	Number of Respondents	Percentage of Respondents
Low Price	23	49%
Brand	18	38.2%
Quality	6	12.8%
Total	47	100%

Source: Primary Data

#### Impact of Customer attitude on online shopping in India

The popular online retailing companies in India are Myntra, Flipkart Snap deal, Amazon.com and e-Bay etc. The five dominant factors which influence consumer perceptions for online shopping are information, easy to use, satisfaction, security, proper utilization of available information to compare the different products

## Trends of Internet users and E-Business in India

In 2015, India had 408.4 million internet users. This figure is projected to grow to 635.8 million internet users in 2021. Despite the untapped potential, India already is the second-largest online market worldwide next to China.

Year	Number of Internet Users (in millions)	
2015	259.88	
2016	295.39	
2017	437.4	
2018	483	
2019*	525.3	
2020*	564.5	
2021*	601	
2022*	634.9	
2023*	666.4	

Table	2.1	Statistics	on	Internet	Users
rapie	2.1	Statistics	on	Internet	User

India is one of the fastest-growing e-commerce markets			
worldwide.As of 2016, 26 percent of the local population			
was using the internet; almost ten times the audience size			
from a decade prior. According to recent market research,			
mobile phone internet user penetration in India is projected			
to reach 37.36 percent of the population in 2021,			
representing a huge potential in terms of digital and mobile			
buyer audience. Increased availability of bandwidth, cheap			
data plans and increased awareness driven by government			
programmes seem to have rapidly bridged the digital gap			
between urban and rural India. Consequently, the			
penetration in rural India has increased from 9 per cent in			
2015 to 25 percent in 2018. Bihar registered the highest			

ERUDITION

ISBN: 978 -93 -87709 - 82 - 9

March 2022

growth in internet users across both urban and rural areas, registering a growth of 35 percent over last year. The report also noted that the internet usage is more gender balanced than ever before with women comprising 42 percent of total internet users.

As of 2015, the majority of online users in India were male, and the same held true for online shoppers. In India, men accounted for almost two thirds of online shopping audiences. Despite this imbalance in online presence and digital spending, female online shoppers are estimated to account for 42 percent of all Indian e-retail spending in 2020, up from only 20 percent of total retail e-commerce expenditure in 2015. Average annual e-commerce sales per digital buyer in India were 247 U.S. dollars in 2014 and are projected to reach 424 U.S. dollars in 2020.

Table 2.2 Sales from Online Shopping

Year	Sales(in dollars)	billion	
2015	13.31		
2016	18.39		
2017	20.5		
2018	25.3		

The table presents the e-commerce market revenue in India in 2017. E-commerce revenue in India is expected to grow to 62.3 billion U.S. dollars in 2023. Through the online shopping the revenue of almost all companies has increased. This is a sure sign of positive impact of customer attitude towards online shopping.

Source: www.statista.com

## Findings

From the study, it clearly indicate that online shopping has become a normal part of our lives, mainly because it is so convenient. Every day, millions of people go online to do research about goods and make purchase from thousands of different online merchants. The web allows customers to comparison the shop for the best deals and set product that might otherwise be difficult to find. But while online shopping provides with a high level of handiness, online shopping can be easy and enjoyable with some protection. India's online market is at an early stage but, is predictable to see huge growth over the next four to five years.

#### **Suggestions & Conclusion**

Companies should improve customer's value perception about the products and reduce consumers perceived risk in the online shop-

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ping environment by providing quality products, timely delivery and fulfill their expectations. Also the companies should make their website easy in use and risk reduction activities should be taken care. Perceived privacy of customer information can be enhanced by ensuring that at no point of time the customer is asked for unrelated personal information. People are averse to online shopping because there is a difficulty in returning the defective products. Hence the companies should make the agreement so that try and buy facility is available at the customer doorstep and one can return if the product is faulty. Another problem is that the price sensitive consumers do not take much interest in online shopping. So the companies should allow sizeable bargain for the customers. The trend of the time is phygital commerce which aims at opening offline and online shops to increase customers' trust.

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ISBN: 978 -93 -87709 - 82 - 9