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## 3. RESEARCH, INNOVATIONS AND EXTENSIONS

### 3.1. RESEARCH PUBLICATIONS AND AWARDS

3.3.1: Number of research papers published per teacher in the Journals notified on UGC care list in 2019



# Effect of Blend Ratio and Compatibilisation on the Electrical and Dielectric Properties of Nylon Copolymer (6, 66)/EPDM Rubber Blends

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**In this work, morphological, electrical, and dielectric performance of nylon copolymer (PA6, 66)/ethylene propylene diene rubber (EPDM) blends were systematically studied with reference to blend ratio and compatibilisation. As the concentration of PA6, 66 and the percentage of compatibiliser in the blend increases the resistivity values decreases. The existence of two phases, PA6, 66 and EPDM with different conductivity and interfacial polarization are responsible for the increase in the dielectric properties of the blends. Compatibilisation of the blends improved the dielectric constant of the blend system. Addition of 2.5% of compatibiliser gave the highest value of dielectric constant. At a high concentration of EPM-g-MA, the polarity of the compatibilised blends was found to be increased, which resulted in the substantial increase in the value of loss and dissipation factor. The dielectric values of the blends were correlated with blend phase morphology. Finally the experimental data was compared with various theoretical predications. POLYM. ENG. SCI., 00:000–000, 2019. © 2019 Society of Plastics Engineers**

## INTRODUCTION

Polymers are important materials for the development of advanced flexible electronics components. The polymers can be applied as dielectric and insulating materials if they have good dielectric properties in their un-doped state. Dielectric layers require insulating polymers with polarizable functional groups to increase their dielectric parameters [1]. The dielectric layer has to be thin enough to allow for a high capacitance of the device, which yields enough accumulated charge already at the applied voltage and on the other side, the dielectric coating has to be thick enough to avoid an electrical breakdown through the current leakage. Needs for polymer materials have progressively increased with the advancement of technology. Polymer blends are easy to process and have great flexibility. The blending of polymers is an attractive and inexpensive method for getting novel and different structural materials. We can attain a good cost/performance ratio by careful mixing of polymers. Most of the blends are immiscible due to unstable morphologies and have poor interfacial properties.

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Compatibilisation is the key tool for such blends [2]. The compatibiliser added to the blend system diminishes the interfacial tension and suppresses coalescence and thus leads to a finer phase dispersion and better stability against coalescence.

Many of the TPEs are extensively used in dielectric materials. When compared to porcelain glass insulators polymeric materials have got superior service properties particularly in hard and misty conditions [3–5]. Electrical performance of different thermoplastic polymer blends has been explored by several researchers [6–13]. Ghosh and Chakrabarti [6] studied the effect of incorporation of conductive carbon black in EPDM. Faez et al. [11] studied the conductivity of the EPDM and polyaniline blends and effect of different crosslinking methods on the conductivity. Matchawet et al. [14] studied the electrical and dielectric properties and stress relaxation behavior of ENR/COPA-blend composites. Otero-Navas et al. [15] studied the effect of multiwalled carbon nanotube on the dielectric properties of polypropylene/polystyrene blends.

This article studies the effect of blend ratio and critical micelle concentration (CMC) of EPM-g-MA on the dielectric and morphology of PA6, 66/EPDM blends using impedance analyzer. Systematic studies have been performed on the addition of EPM-g-MA as compatibiliser on the electrical and dielectric properties of PA 6, 66/EPDM blends.

## MATERIALS AND EXPERIMENTAL METHODS

### Materials

Nylon Co polymer (TUFNYL 120) with a composition of 60% Nylon 6 & 40% Nylon 6,6 and having a density of 1.12 g/mol, melting point of 148°C, T<sub>g</sub> of 40°C, relative viscosity of 2.4, elongation of 300% and  $\bar{M}_n$  of 38,000 g/mol was purchased from SRF Ltd. Madras India. EPDM (KELTAN 720) with ethylene, propylene, and DCPD content of 58%, 35.5% and 6.5%, respectively, and having a density of 0.86 g/mol,  $\bar{M}_w=310$ kg/mol and  $\bar{M}_n=51$  Kg/mol was purchased from DSM, Netherlands. EPM-g-MA (Royaltuf 465) with an ethylene content of 55%, propylene content of 45%, and 1 wt% of MA and having a density of 0.88 g/mol and molecular weight of 1,40,000 was procured from Uniroyal Chemical Company, Germany. Before melt mixing, nylon was dried out in an oven at 80°C for 24 h.

### Preparation of Composites

All blends composites were produced by melt mixing method using Haake rheomix at 180°C. The rotation speed mixer and period of melt mixing were fixed at 60 rev min<sup>-1</sup> and 8 min,



# Compatibilising action of multiwalled carbon nanotubes in polycarbonate/polypropylene (PC/PP) blends: phase morphology, viscoelastic phase separation, rheology and percolation

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## Abstract

Multiwalled carbon nanotubes were introduced into both dispersed and co-continuous polycarbonate/polypropylene blends through melt compounding in an internal mixer. Both the neat blends and blend nanocomposites showed viscoelastic phase separation process where phase in phase morphologies could be observed due to viscosity disparity and  $T_g$  differences between the component polymers. A strong compatibilising action was noticed up on the addition of a small quantity of MWCNT into both dispersed and co-continuous morphologies. Theoretical predictions based on thermodynamic considerations clearly indicated the preferential localisation of MWCNTs in the PC phase. However, because of the viscosity differences between the two polymers, we also found that some of the MWCNTs being localised at the blend interphase and in PP phase. From linear viscoelastic studies rheological percolation was observed at high concentration of the MWCNTs where carbon nanotubes formed a network-like structure leading to solid state behaviour at low frequencies.

**Keywords** Polycarbonate/polypropylene blends · Co-continuous morphology · Selective localization of MWCNTs

## Introduction

Melt blending of polymers is an immensely attractive and inexpensive method of getting novel and different structural materials [1]. We can attain a good cost/performance ratio by the judicious mixing of low-cost polymers with expensive polymers. They can be

miscible or immiscible. The miscibility of polymer blend depends on the thermodynamics of mixing. Most of the blend systems are immiscible due to unfavorable interactions and very low contribution of entropy [2–4]. A wide range of morphologies (dispersed to co-continuous structures) could be obtained by carefully controlling the composition and viscosity ratio of immiscible polymer blends. In recent years, nanoparticles have attracted a lot of interest due to their important role in immiscible and incompatible polymer blends. The nanoparticles are able to change the interaction coefficient between two polymers and thus improve the compatibility between the polymer pairs [5]. The dispersed phase morphology (particle size less than 1  $\mu\text{m}$ ) improves the impact resistance of polymer systems and the co-continuous polymer blends are suitable for conductive and mechanical applications. In recent years, several researchers reported interesting studies on co-continuous polymer blend systems. Some of the papers describe the viscoelastic properties of co-continuous blends. Galloway et al. studied the co-

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# TRADITIONAL KNOWLEDGE OF MEDICINAL PLANTS USED IN GASTRO-INTESTINAL ETHNIC THERAPEUTICS BY THE *KURUCHIAR* TRIBE OF WAYANAD DISTRICT, KERALA, WESTERN GHATS.

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**Abstract :** This study has been carried out among the ethnic *Kuruchiar* tribal people in the Wayanad district, Kerala, Western Ghats. Traditional knowledge regarding 25 plants used for various gastrointestinal and other ailments were recorded. The plants have been enumerated with species name followed by, family, common name, collection number, disease and method of use.

**IndexTerms -** Traditional knowledge, *Kuruchiar*, gastrointestinal therapeutics, Western Ghats

## I. INTRODUCTION

People around the world possess unique knowledge of the natural resources on which they depend including tremendous botanical expertise. Indigenous people are the faculty keepers of the cumulative knowledge of generations ; the plants they use are the stockroom of potential medicines[1]. Popular knowledge of plants used by humans is based on thousands of years of experience. By “trial and error”, people learnt how to recognize and use plants, including those with a magic-religious function [2]. Less than 1 percentage of indigenous cultures has been surveyed for their knowledge of medicinal plants and other natural products in the world [3]. Identifying the ethno medicinally important plants that warrant chemical analysis and testing for biological activity is one of the main aims of ethno botany [4].

Nestled among the misty mountains of Western Ghats lies Wayanad, the green paradise at a height of 700-2100 m. above sea level on the northern part of the Kerala state. The name, *Wayanad*, is believed to have been derived from the word, *Vayal nadu*, meaning the land of paddy fields which comprises of about 2126 sq.kms. Countless evidences about New Stone Age civilization can be seen on the hills of Wayanad. A large percentage of the population in this region is tribals. The native Adivasis mainly consist of various sects like *Paniyas*, *Kurumas*, *Adiyars*, *Kurichyars*, *Ooralis*, *Kattunaikans*, etc.

The tribal population in Wayanad district is having tremendous knowledge regarding the medicinal use of plants. This study is focused on the traditional knowledge possessed by the *Kuruchiar* tribes in Wayanad district, Kerala regarding gastro intestinal and other ailments.

## II MATERIALS AND METHODS

### 1. Study area

Wayanad lies between North latitude 11° 27' and 15° 58' and East longitude 75° 47' and 70° 27'. It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.



# DOCUMENTATION OF TRADITIONAL KNOWLEDGE REGARDING MEDICINAL PLANT USE FOR VARIOUS AILMENTS INCLUDING VETERINARY PURPOSE BY A LESS DOCUMENTED INDIGENOUS TRIBE – ADIYAN – IN WAYANAD DISTRICT, KERALA, WESTERN GHATS

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**Abstract :** The knowledge on the richness of plant diversity in any area and the intensity of associations and dependence of the indigenous communities on that plant wealth is very vital for better utilisation of biodiversity. The present study was an attempt to record the ethnobotanical data regarding medicinal plant use by a less documented tribe—*Adiyan* of Wayanad District, Kerala, India. A total of 37 user reports regarding 34 species were recorded from two traditional healers. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report.

**IndexTerms –** *Adiyan-traditional knowledge-Kerala-Western Ghats*

## I. INTRODUCTION

Plants are so much a part of our environment and the fabric of our everyday lives that they rarely register in our conscious thought [1]. Alcorn [2,3] has discussed how the human relationships with plant resources, *i.e.*, the human, cultural, and material uses of plants are largely shaped by history, and by physical and social environments. These relationships cover a very wide canvas, from wild foods, medicines, fibers, fodders, dyes, and body ornamentation, *etc.* to still more important, but less understood areas of the social and religious relationships, like beliefs, faith, taboos, worship and even protection and preservation. The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [4]

Nestled among the misty mountains of Western Ghats lies Wayanad, the green paradise at a height of 700-2100 m. above sea level on the northern part of the Kerala state. The name, *Wayanad*, is believed to have been derived from the word, *Vayal nadu*, meaning the land of paddy fields which comprises of about 2126 sq.kms. Countless evidences about New Stone Age civilization can be seen on the hills of Wayanad. A large percentage of the population in this region is tribals. The native *Adivasis* mainly consist of various sects like *Paniyas*, *Kurumas*, *Adiyans*, *Kurichyars*, *Ooralis*, *Kattunaikans*, *etc.*

The tribal population in Wayanad district is having tremendous knowledge regarding the medicinal use of plants. This study is focused on the traditional knowledge possessed by the *Adiyan* tribes in Wayanad district, Kerala regarding various ailments including veterinary uses. As Wayanad is the district with the highest percentage of tribal population in the state, when one considers the fast pace of modernisation and acculturation exposing these traditional communities to modern methods of medicine and lifestyles, this study is the urgent need of the hour to stay ahead of the curve for the search for new bioactive molecules, that could be lead molecules for novel drug discoveries in future.

## II. MATERIAL AND METHODS

### 1. STUDY AREA

Wayanad lies between North latitude 11° 27' and 15° 58' and East longitude 75° 47' and 70° 27'. It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.

# ETHNO BOTANICAL INVENTORYING OF PLANT USE DATA FOR VARIOUS AILMENTS AMONG AN INDIGENOUS TRIBE - KATTUNAIKKAN IN WAYANAD DISTRICT, KERALA, WESTERN GHATS.

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**Abstract :** The present study was an attempt to record the ethnobotanical data regarding medicinal plant use by a less accessible tribe—*kattunaikkan* of Wayanad District, Kerala, India. A total of 36 user reports regarding 33 species were recorded from two traditional healers. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report.

**IndexTerms -** *kattunaikkan* – traditional knowledge-Kerala –Western Ghats.

## I. INTRODUCTION

Plants are so much a part of our environment and the fabric of our everyday lives that they rarely register in our conscious thought [1]. Alcorn [2,3] has discussed how the human relationships with plant resources, *i.e.*, the human, cultural, and material uses of plants are largely shaped by history, and by physical and social environments. These relationships cover a very wide canvas, from wild foods, medicines, fibers, fodders, dyes, and body ornamentation, *etc.* to still more important, but less understood areas of the social and religious relationships, like beliefs, faith, taboos, worship and even protection and preservation. The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [4]. In developing world, more than 4.5 billion people depend on medicinal plants as they are considered a part of their primary healthcare [5]. In recent years, the ethnobotanical studies concerning the usage of medicinal plant has gained considerable attention among the scientific communities [6].

Nestled among the misty mountains of Western Ghats lies Wayanad, the green paradise at a height of 700-2100 m. above sea level on the northern part of the Kerala state. The name, *Wayanad*, is believed to have been derived from the word, *Vayal nadu*, meaning the land of paddy fields which comprises of about 2126 sq.kms. Countless evidences about New Stone Age civilization can be seen on the hills of Wayanad. A large percentage of the population in this region is tribals. The native *Adivasis* mainly consist of various sects like *Paniyas*, *Kurumas*, *Adiyans*, *Kurichyars*, *Ooralis*, *Kattunaikans*, *etc.*

The tribal population in Wayanad district is having tremendous knowledge regarding the medicinal use of plants. This study is focused on the traditional knowledge possessed by the *Kattunaikan* tribes in Wayanad district, Kerala regarding various ailments including veterinary uses. As Wayanad is the district with the highest percentage of tribal population in the state, when one considers the fast pace of modernisation and acculturation exposing these traditional communities to modern methods of medicine and lifestyles, this study is the urgent need of the hour to stay ahead of the curve for the search for new bioactive molecules, that could be lead molecules for novel drug discoveries in future.

## II. MATERIAL AND METHODS

### 1. STUDY AREA

Wayanad lies between North latitude 11° 27' and 15° 58' and East longitude 75° 47' and 70° 27'. It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.

### 2. DATA COLLECTION

Study sites, knowledgeable informants identification, work plan, data collection procedures and literature survey was completed before starting field work. Two traditional healers belonging to *Kattunaikan* tribe who have a track record of more than ten years of treatment and who are actively doing it were selected from the district. The senior most key informant was 76 years old and the younger one was 56 years old. Both of them were males. Rapport was build with the key informants after repeated visits to their dwellings. Field survey stage was done in all seasons from November 2008 to December 2014. Semi structured interviews were done repeatedly with each and every informant several times followed by a transect walk into the forest areas with the permission of the forest officers and plant specimens and habitats were surveyed thoroughly. Local names, methods of identification used by informants, conservation strategies regarding each and every specimen were recorded. Every word from the interviews was recorded using a digital voice recorder and saved into computer. Video documentation of sites, informant's dwellings, and interviews were also made. Original specimens of plants used by these informants were collected and made into herbarium sheets as per international standard procedures and deposited at Sree Narayana Mangalam College Herbarium.

# A Study on the Ethno botanically Important Plants used by the *Mullakuruma* Indigenous Tribe for Various Ailments in Wayanad District, Kerala

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<sup>2</sup>Research Department of Botany, Union Christian College Aluva, Ernakulam, Kerala, India.

**Abstract**— The knowledge on the richness of plant diversity in any area and the intensity of associations and dependence of the indigenous communities on that plant wealth is very vital for better utilisation of biodiversity. The present study was an attempt to record the ethnobotanical data regarding medicinal plant use by a highly represented tribe—Mullakuruman of Wayanad District, Kerala, India. A total of 60 user reports regarding 57 species were recorded from six traditional healers. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report.

**Keywords**- Mullakuruman-Traditional knowledge-Kerala.

## I. INTRODUCTION

People around the world possess unique knowledge of the natural resources on which they depend including tremendous botanical expertise. Indigenous people are the faculty keepers of the cumulative knowledge of generations; the plants they use are the stockroom of potential medicines [1]. Popular knowledge of plants used by humans is based on thousands of years of experience. By “trial and error”, people learnt how to recognize and use plants, including those with a magic-religious function [2]. Less than 1 percentage of indigenous cultures has been surveyed for their knowledge of medicinal plants and other natural products in the world [3]. Identifying the ethno medicinally important plants that warrant chemical analysis and testing for biological activity is one of the main aims of ethno botany [4]. Plants are so much a part of our environment and the fabric of our everyday lives that they rarely register in our conscious thought [5]. Alcorn [6, 7] has discussed how the human relationships with plant resources, *i.e.*, the human, cultural, and material uses of plants are largely shaped by history, and by physical and social environments. These relationships cover a very wide canvas, from wild foods, medicines, fibers, fodders, dyes, and body ornamentation, *etc.* to still more important, but less understood areas of the social and religious relationships, like beliefs, faith, taboos, worship and even protection and preservation. The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [8].

Wayanad, the green paradise, lies nestled among the misty mountains of Western Ghats at a height of 700-2100 m. above sea level on the northern part of the Kerala state. The name, *Wayanad*, is believed to have been derived from the word, *Vayal nadu*, meaning the land of paddy fields which comprises of about 2126 sq.kms. Evidences about New Stone Age civilization are obtained in plenty from the hills of Wayanad. As Wayanad is the district with the highest percentage of tribal population in the state, when one considers the fast pace of modernisation and acculturation exposing these traditional communities to modern methods of medicine and lifestyles, this study is the urgent need of the hour to stay ahead of the curve for the search for new bioactive molecules, that could be lead molecules for novel drug discoveries in future. The native *Adivasis* mainly consist of various sects like *Paniyas*, *Kurumas*, *Adiyans*, *Kurichyars*, *Ooralis*, *Kattunaikans*, *etc.* The tribal population in Wayanad district is having tremendous knowledge regarding the medicinal use of plants. This study is focused on the traditional knowledge possessed by the *Kuruma* /*Mullakuruma* tribe in Wayanad district, Kerala regarding various ailments.

## II. MATERIAL AND METHODS

### A. Study Area

Wayanad lies between North latitude 11° 27' and 15° 58' and East longitude 75° 47 ' and 70° 27'. It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.

### B. Data Collection

Study sites, knowledgeable informants identification, work plan, data collection procedures and literature survey was completed before starting field work. Five traditional healers belonging to *mullakuruman* tribe who have a track record of more than ten years of treatment and who are actively doing it were selected from the district. The senior most key informant was 69 years

# Quantitative Analysis of the Medicinal Plant use Data by Four Indigenous Tribes- *Kattunaikkan, Mullakuruman, Adiyar and Kuruchiyar* - of Wayanad District, Kerala, Western Ghats

Sreejit C.M.<sup>1</sup>, Thomas Mathew P.<sup>2</sup>

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<sup>2</sup>Research Department of Botany, Union Christian College Aluva, Ernakulam, Kerala, India.

**Abstract**—The present study was an attempt to record the quantitative data regarding medicinal plant use by four predominant tribes— *Kattunaikkan, Mullakuruman, Adiyar and Kuruchiyar*- of Wayanad District, Kerala, India. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report. A total of 565 user reports were collected from the fifteen informants belonging to the four socio-cultural groups during the study period. User reports regarding 165 species from 63 different families were recorded. The data regarding the medicinal plant use were analysed with respect to habit, mode of administration and preparation styles among and across different tribes studied.

**Keywords**- - *Ethnobotany-Wayanad- tribals- medicinal plant use –Western Ghats*

## I. INTRODUCTION

Modern people are alienated from environment so that we consider it as a place to visit or hike through, while most indigenous tribes treat environment as a natural extension of themselves [1]. Alcorn [2,3] has discussed how the human relationships with plant resources, *i.e.*, the human, cultural, and material uses of plants are largely shaped by history, and by physical and social environments. These relationships cover a very wide canvas, from wild foods, medicines, fibers, fodders, dyes, and body ornamentation, *etc.* to still more important, but less understood areas of the social and religious relationships, like beliefs, faith, taboos, worship and even protection and preservation. The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [4]. Wayanad is a hilly district within Kerala state towards the southernmost end of India, with the highest percentage of tribal population recorded so far within the state. Documentation of data regarding edible plants [5, 6] used has been done in this area. Mere listing of medicinal plants used by some individual tribes has also been done [7, 8]. Wayanad, the green paradise, lies nestled among the misty mountains of Western Ghats at a height of 700-2100 m. above sea level on the northern part of the Kerala state. The name, *Wayanad*, is believed to have been derived from the word, *Vayal nadu*, meaning the land of paddy fields which comprises of about 2126 sq.kms. Evidences about New Stone Age civilization are obtained in plenty from the hills of Wayanad. The present study was an attempt to record the quantitative data regarding medicinal plant use by four predominant tribes— *Kattunaikkan, Mullakuruman, Adiyar and Kuruchiyar*- of Wayanad District, Kerala. When one considers the fast pace of modernisation and acculturation exposing these traditional communities to modern methods of medicine and lifestyles, this study is the urgent need of the hour.

## II. MATERIAL AND METHODS

### A. Study Area

Wayanad lies between North latitude  $11^{\circ} 27'$  and  $15^{\circ} 58'$  and East longitude  $75^{\circ} 47'$  and  $70^{\circ} 27'$ . It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.





# Comparative Study on the Medicinal Plant Use Data by Four Indigenous Tribes- Kattunaikkan, Mullakuruman, Adiyar and Kuruchiyar - of Wayanad District, Kerala

Sreejit C.M.<sup>1</sup>, Thomas Mathew P.<sup>2</sup>

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<sup>2</sup>Research Department of Botany, Union Christian College Aluva, Ernakulam, Kerala, India.

**Abstract:** The present study was an attempt to record the quantitative data regarding medicinal plant use by four predominant tribes- Kattunaikkan, Mullakuruman, Adiyar and Kuruchiyar- of Wayanad District, Kerala, India. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report. A total of 565 user reports were collected from the fifteen informants belonging to the four socio-cultural groups during the study period. User reports regarding 165 species from 63 different families were recorded. The data regarding the medicinal plant use were analysed.

**Keywords:** Ethnobotany-Wayanad- tribals- medicinal plant use .

## I. INTRODUCTION

Modern people are alienated from environment so that we consider it as a place to visit or hike through, while most indigenous tribes treat environment as a natural extension of themselves [1]. Alcorn [2,3] has discussed how the human relationships with plant resources, i.e., the human, cultural, and material uses of plants are largely shaped by history, and by physical and social environments.

These relationships cover a very wide canvas, from wild foods, medicines, fibers, fodders, dyes, and body ornamentation, etc. to still more important, but less understood areas of the social and religious relationships, like beliefs, faith, taboos, worship and even protection and preservation.

The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [4]. Wayanad is a hilly district within Kerala state towards the southernmost end of India, with the highest percentage of tribal population recorded so far within the state.

Documentation of data regarding edible plants [5, 6] used has been done in this area. Mere listing of medicinal plants used by some individual tribes has also been done [7, 8]. Wayanad, the green paradise, lies nestled among the misty mountains of Western Ghats at a height of 700-2100 m. above sea level on the northern part of the Kerala state. T

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## II. MATERIAL AND METHODS

### A. Study Area

Wayanad lies between North latitude 11° 27' and 15° 58' and East longitude 75° 47' and 70° 27'. It is bounded on the east by Nilgiris and Mysore districts of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram districts and on the west by Kozhikode and Kannur districts of Kerala.

# Bioprospection of some Medicinal Plants used in the Traditional System Ayurveda, for the Wonder Drug-Ecdysterone

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**Abstract:** This work was a bioprospection study to assess the presence of the multipurpose drug Ecdysterone in some plants used in the traditional medicinal system Ayurveda. Fourteen plants namely, *Vernonia cinerea*, *Azadirachta indica*, *Plectranthus amboinicus*, *Cardiospermum helicacabum*, *Ayyappana triplinervis*, *Phyllanthus amarus*, *Terminalia chebula*, *Andrographis paniculata*, *Coscinium fenestratum*, *Samadera indica*, *Justicia adhatoda*, *Centella asiatica*, *Mimusops elanji*, and *Rauvolfia serpentina* were selected for the study and screened for the presence of ecdysterone in their active parts. Presence of ecdysterone was confirmed in the seeds of *Coscinium fenestratum* for the first time ever.

**Keywords:** Ecdysterone- Ayurveda-Medicinal Plants-Kerala.

## I. INTRODUCTION

The study of natural products not only provides novel bioactive compounds, but also helps in the understanding of nature's way of tackling environmental problems. These processes, which may be called as the "Natural Technology", might provide us with totally new means and agents for combating diseases, controlling pests or improving agricultural productivity[1]. Ecdysteroid (EC)s were first recognised as steroidal hormones, controlling the moulting and metamorphosis in insects. Today, it is realised that these steroids are present at all stages of insect development, regulating many biochemical and physiological processes: in newly-laid eggs, during embryonic and postembryonic developments and in adult insects, regulating aspects of development, metamorphosis, reproduction and diapause [2]. ECs are also present in 5–6% of plant species [3], generally at far higher concentrations than those typically found in arthropods. In plants they are regarded as contributing to the deterrence of the invertebrate predators [2].

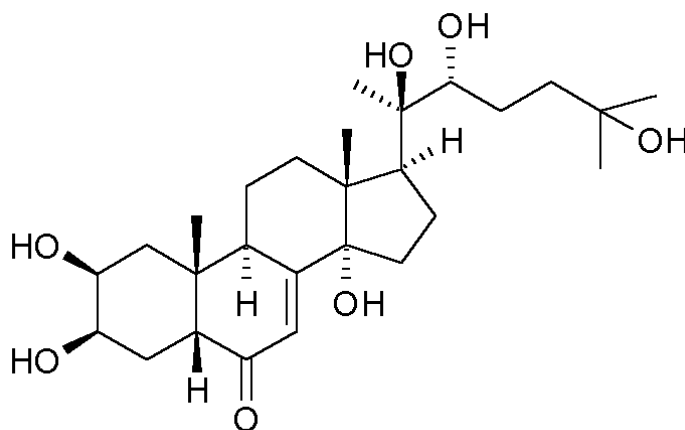


Figure1. Structure of EC.

ECs are apparently non-toxic to mammals and a wide range of beneficial pharmacological (adaptogenic, anabolic, anti-diabetic, hepatoprotective, immunoprotective, wound healing, and perhaps even anti-tumour) activities are claimed for them. In particular, this has led to a large (and unregulated) market for EC-containing preparations for body-builders, sportsmen, and pets, among others. ECs are also being considered as nutraceutical additives to food products. Further, ECs are good candidates as elicitors for gene-switch systems to be used in medical gene therapy and research applications [4]. Indeed the bountiful supply of ECs from plants will greatly stimulate the chemistry and biology of these arthropod hormones.

# QUANTITATIVE INDICES - USE VALUE, FAMILY USE VALUE AND SHANNON WIENNER INDEX - APPLIED ON MEDICINAL PLANT USE DATA COLLECTED FROM FOUR INDIGENOUS TRIBES OF WAYANAD DISTRICT, WESTERN GHATS, INDIA.

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**Abstract :** The present study was an attempt to record the quantitative medicinal plant use data by four indigenous tribes—*Kattunaikkan*, *Mullakuruman*, *Adiyan* and *Kuruchiyar*- of Wayanad District, Kerala, India. Quantitative indices such as Use value (UV), Family use value (FUV), Shannon Wiener index, Simpson index and Berger Parker index were used to understand the preferences and consensus existing among the informants regarding medicinal plant use. A total of 565 user reports were collected from the fifteen informants belonging to the four socio-cultural groups during the study period. Mention of each use of a species with respect to a disease was treated as a separate event and considered as a user report. Among the 63 families from which the informants cited 565 uses, eighteen families which scored a FUV more than 1 and 42 species which recorded a UV more than 0.25 were enumerated in this study. Shannon Wiener index, Simpson index and Berger Parker index were also calculated.

**IndexTerms** -. Quantitative indices- Use value-Family use value- Shannon Wiener index-Kerala- Western Ghats.

## I. INTRODUCTION

The richness of plant diversity in any area is not evaluated by the number of species occurring there, but by the intensity of associations and dependence of the indigenous communities on that plant wealth and, respect for this knowledge helps in conservation [1]. Modern people are alienated from environment so that we consider it as a place to visit or hike through, while most indigenous tribes treat environment as a natural extension of themselves [2]. Wayanad is a hilly district within Kerala state towards the southernmost end of India, with the highest percentage of tribal population recorded so far within the state. Quantitative techniques in ethnobotanical data inventorying has never been attempted in the study area earlier, though documentation of data regarding edible plants [3, 4] used by different tribes and mere listing of medicinal plants used by individual tribes has been done [5, 6]. The present study was an attempt to record the quantitative data regarding medicinal plant use by four predominant tribes— *Kattunaikkan*, *Mullakuruman*, *Adiyan* and *Kuruchiyar*- of Wayanad District, Kerala. Quantitative indices such as Use value (UV), Family use value (FUV), Shannon Wiener index, Simpson index and Berger Parker index were used to understand the preferences and consensus existing among the informants regarding medicinal plant use. When one considers the fast pace of modernisation and acculturation exposing these traditional communities to modern methods of medicine and lifestyles, this study is the urgent need of the hour.

## II. METHODOLOGY

### 1. STUDY AREA

Wayanad is a hilly terrain district in the southernmost state of India, Kerala and lies between North latitude 11° 90' and 11° 49' and East longitude 75° 80' and 76° 35'. It is bounded on the East by Nilgiris and Mysore districts of Tamil Nadu and Karnataka states respectively, on the North by Coorg district of Karnataka state, on the South by Malappuram district and on the West by Kozhikkode and Kannur districts of Kerala state. The altitude of Wayanad varies from 700 to 2,100 metres above mean sea level with 787 hectares under forest cover.



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## Isolation, quantification and chemical characterisation of ecdysterone from medicinal plants of Kerala, Western Ghats

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### Abstract

Ecdysteroids are a group of compounds responsible for molting in insects and is variously expressed in plant kingdom, believed to be a means of deterring insects by influencing the metabolism and metamorphosis in these vectors. Kerala flora has not been screened for the presence of ecdysteroids before. This work is a follow up study based on a preliminary Bio prospection study on fifty medicinally important plants used by indigenous tribes of Kerala for the presence of ecdysterone. Four potential plant species which were found to have adequate amount of compound-*Diploclisia*, *Cyathula*, *Sesuvium* and *Coscinium*-were put to detailed extraction, isolation, quantification and chemical characterisation using HPLC, UV and IR spectroscopy. Literature survey suggested that soil and geographical regime has direct influence on the expression levels of ecdysterone. Some variations were observed in the expression levels of ecdysterone in our study too, in comparison with published literature but potential sources from indigenous plants were identified during this study. Availability in adequate quantity of this wonder molecule will increase its multi-faceted activity related studies in future.

**Keywords:** Ecdysterone-Kerala-medicinal plants- *Diploclisia*-*Cyathula*-*Sesuvium* -*Coscinium*

### Introduction

The study of natural products not only provides novel bioactive compounds, but also helps in the understanding of nature's way of tackling environmental problems. So far, only a small proportion of the known flora has been subjected to chemical or biological investigations [1]. Ecdysteroid (EC) s were first recognised as steroidal hormones, controlling the moulting and metamorphosis in insects. Phytoecdysteroids are analogues of Ecdysteroids, which occur in 5–6 % of plant species [2] in relatively large concentrations and hence being a better source than arthropods. Galbraith *et al.* [3] showed that Ecdysterone derived from plants was identical with the hormone derived from insect sources. ECs are mainly C<sub>27</sub>-C<sub>29</sub> molecules derived from phytosterols, which have been modified to generate an A/B-*cis* ring junction, an  $\alpha,\beta$ -unsaturated ketone in ring- B, and the incorporation of multiple hydroxyl groups, together with other substituent as well.

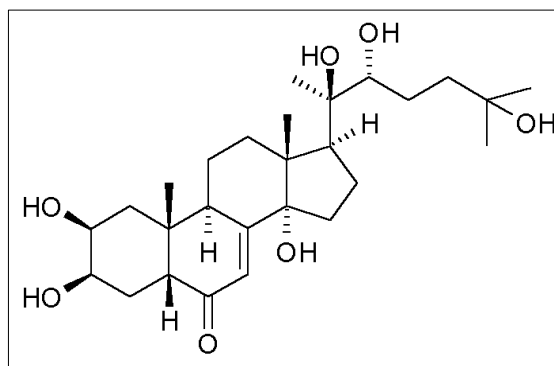


Fig 1: Structure of Ecdysterone

ECs are apparently non-toxic to mammals and a wide range of beneficial pharmacological-adaptogenic, anabolic, anti-diabetic, hepatoprotective, immunoprotective, wound healing, and perhaps even anti-tumour [4] - activities are claimed for them. In particular, this has led to a large and unregulated market for EC-containing nutraceutical preparations for bodybuilders, sportsmen, and pets, among others.

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ARTICLE



## *Hedyotis indirae* (Rubiaceae), a new species from Western Ghats, India

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### ABSTRACT

*Hedyotis indirae*, a new shrubby species of Rubiaceae from Muthikulam forest of Palakkad district, Kerala is described and illustrated here. The species shows similarities with its closely allied taxa *H. hirsutissima* and *H. beddomei*, but differs in many qualitative attributes. Detailed description, phenology and distribution notes are provided along with photographs.

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Elivalmala; Kerala;  
Muthikulam forest; Novelty;  
Palakkad hills

### Introduction

The genus *Hedyotis* Linnaeus (1753) belongs to the family Rubiaceae distributed in tropical, sub-tropical and warm temperate regions of the world but its circumscription and classification is still controversial. Recent molecular studies suggested that the genus *Hedyotis* is polyphyletic and is restricted to Asia and the Pacific with erect and robust species having septicidally dehiscent capsular fruits (Guo et al. 2011; Wikstrom et al. 2013). In a broad sense, *Hedyotis* is a large and heterogeneous genus containing c. 515 species (Terrell and Robinson 2003; Neupane et al. 2015). But, The Plant List (2013) has included only 164 species for the genus *Hedyotis* in the world. In India, the genus is represented by 74 species (Dutta and Deb 2004). Of these 23 are present in Kerala (Sasidharan 2013).

The generic delimitation of *Hedyotis*-*Oldenlandia* complex was in dispute for a long time (Bremer 1996; Andersson and Rova 1999; Hsu and Chen 2017). The generic limits within the complex are also not clear-cut due to overlapping morphology in the characters used for delimiting the genera (Bremer and Manen 2000). Several genera in the complex were found to be non-monophyletic in recent phylogenetic analyses such as *Arcytophyllum* Willd ex Schult. & Schult.f., *Exallage* Bremek., *Hedyotis* L., *Houstonia* L., *Kadua* Cham. & Schltdl., *Kohautia* Cham. & Schltdl., *Neanotis* W.H.Lewis and *Oldenlandia* L. (Groeninckx et al. 2009). Recent phylogenetic analyses suggested that *Hedyotis* s. lat. should be segregated into different genera and *Hedyotis* s. str. only includes Asian and Pacific species with erect, robust herbs or shrubs, entire stipules

with glandular-serrate margins and diplophragmous capsules (Guo et al. 2011; Wikstrom et al. 2013; Neupane et al. 2015).

The recent studies by Neupane et al. (2015) identified 14 distinct clades, namely *Dentella*, *Hedyotis*, *Kadua*, *Kohautia*, *Neanotis*, *Oldenlandia*, *Scleromitron*, *Dimetia*, *Edrastima*, *Exallage*, *Leptopetalum*, *Pentanopsis* and two unnamed clades from the Asia-Pacific region. This result is in agreement with Wikstrom et al. (2013) and aimed to resolve the taxonomic inconsistencies by describing monophyletic genera within this complex, especially in the two unnamed clades (Clades I and II – the members of these clades were historically assigned to either *Hedyotis* or *Oldenlandia*) with more evident data, namely pollen, seed and fruit morphology.

During a floristic exploration in Palakkad district, the authors came across specimens of *Hedyotis* from the high altitude grassland of Muthikulam forest which show resemblance to *H. beddomei* Hook.f. and *H. hirsutissima* Bedd. in some aspects. After a detailed taxonomic study with the perusal of relevant literature (Hooker 1882; Gamble 1915; Sharma et al. 1993; Dutta and Deb 2004; Karuppusamy and Ravichandran 2014; Nayar et al. 2014) and comparison with the specimens of similar species, it became evident that this taxon is hitherto unknown to science and apparently belongs to a new species. It is described and illustrated here as *Hedyotis indirae* sp. nov. The diagnosis and comparison chart has been prepared on the basis of characters observed in the live specimens of its allied taxa (*H. hirsutissima* and *H. beddomei*).

## Indigenous knowledge of coastline sacred groves in Central Kerala, India

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Sacred groves are a patch of forest protected by religious belief in South India, especially in Kerala. It preserves a vast array of plants including critically endangered, endangered and vulnerable medicinal plants and a way to conserve biodiversity. The present study was aimed to document plant diversity and related ethno medicinal significance along the coastline sacred groves of central Kerala. Field visits were conducted for sample collection and semi structured open-ended questionnaire tools have been used to conduct interviews with local peoples herbal healers and herbal dealers. A total of 121 plant species belonging 108 genera under 60 families were recorded from the sacred groves under this study. Indigenous people commonly use around 100 species as herbal medicines and for other uses. Among this, the traditional medicinal usages of critically endangered, endangered, vulnerable plants are described in this paper. The study envisage that indigenous people still relay various plants as herbal remedies to treat various diseases, as source of income, as fuel and during rituals in temple etc.

**Keywords:** Coastline sacred groves, Endangered plants, Indigenous knowledge, Kerala

**IPC Code:** Int. Cl.<sup>19</sup>: A01G 13/00, A61K 36/00

Protection of environment and life supporting system are interwoven with the conservation of biological diversity. Sacred groves represent embracing concept and practice of ancient Indian way of *in situ* conservation of genetic diversity. The practice of assigning a patch of forest as the abode of Gods or Goddesses is not a new. The societies of Greece, Rome, Asia and Africa had long preserved sections of the natural environment as sacred groves to Gods and Goddesses<sup>1-3</sup>.

Sacred groves are small patches of native vegetation types traditionally protected and managed by the local communities. A variety of taboos and prohibitions serve to conserve biodiversity within 'sacred groves'. Many of them are linked to temples premises. These sacred groves (vernacular name: 'kavus') contain the rare and endangered species of medicinal plants. They are thus '*sanctum sanctorum*' having rare, endangered and endemic plant species, many of which have disappeared from the region outside the groves<sup>4</sup>.

Traditional knowledge is an important wealth as far as a nation is concerned. The necessity to document such knowledge and do scientific validation has become the need of the hour. Once such knowledge systems are gone to the oblivion it would be an

irrecoverable loss to the society<sup>5</sup>. The present study was aimed to document sacred grove plants in coastline area of Central Kerala, Southwest India and their ethnomedicinal documentation to preserve the valuable traditional knowledge, which is transmitted orally.

### Materials and methods

#### Study area

A total of 10 sacred groves were studied from the coastline area of Central Kerala starting from the South 10°22'43.02" N and 76°06'30.08" E to North 10°22'43" N and 76°06'30" E. The selected study area includes major area (1.61 hectares) and certain small sacred groves protected by local communities. The major and minor sacred groves are associated with temples.

#### Data collection

The data collection includes plant collection, herbarium preparation and ethnobotanical survey. Plant collection was done by direct visit to sacred groves during January–June (2018) and the specimens were properly tagged and noted important characters in field book. The survey was performed using semi structured open ended questionnaires according to Edwards<sup>6</sup> via a face to face interview. Informants include local people, traditional healers, and herbal

\*Corresponding author



# Inter fjord variations as a key contributor in the meiobenthic faunal distribution in the Arctic Kongsfjord, Svalbard

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## ABSTRACT

The community pattern of meiobenthos in an inner and outer glacial fjord of Kongsfjord was analysed during this study. This study examined the hypothesis that there is a significant difference in the distribution of total meiofauna and the major meiofaunal groups between the inner and outer fjords and it also looked into the effect of environmental variables on their distribution. Meiofaunal abundance and diversity was higher in the inner fjord, indicating that meiofauna can be less sensitive to sediment disturbances caused by glacial activity. Average abundance and biomass of the major meiofaunal groups, namely nematodes (54%) and foraminiferans (37%) were higher in the outer region. 45 species of nematodes representing 20 families were identified during the study, in which *Dorylaimopsis* sp. (39.55%) and *Terschellingia longicaudata* (12.53%) had the highest relative abundance. Out of the 56 foraminiferan species belonging to 5 suborders, *Nonionellina labradorica* (18.30%) and *Cassidulina teretis* (8.85%) had the highest relative abundance. There are clear and significant changes (ANOSIM) in the assemblage of meiofauna with increasing distance from the glacial front which correlates to environmental variables. Species contributing to differences between inner and outer basins (SIMPER) were also determined. Among nematodes, Chromadorids and Araeolaimids had a tendency to distribute in the inner fjord while Enoplids and Monhysterids were more prevalent in the outer fjord. Sediment organic matter, silt content and pH were the best matching variables (BEST) for the distribution of both nematodes and foraminiferans. The Principal Component Analysis (PCA) revealed that environmental variations have significant patterns in the faunal distribution in Kongsfjord. From this study it can be inferred that the inner fjord has the maximum numerical abundance of meiofauna but the foraminiferans and nematodes were numerically abundant in the outer fjord and there is also significant difference in the distribution of species between the two fjords.

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## 1. Introduction

Kongsfjord is an open fjord, without a sill, and is therefore largely influenced by the processes taking place on the adjacent shelf. The fjord is largely influenced by the Transformed Atlantic Water (TAW) from the West-Spitsbergen Current and freshwater from glacial run-off at the inner bay (Pearson, 1980). Due to the interactive effects of rising temperature and enhanced UV-radiation, intense research in the Arctic on organisms and communities is critical to documenting the changes occurring there. Global warming has led to higher temperatures which in

turn have resulted in an increased input of turbid melt waters containing dissolved and particulate organic matter, into Kongsfjord Arctic system (Gabrielsen et al., 2008). These changes can have strong implications on the distribution and succession of benthic organisms between the inner and outer fjords of Kongsfjord. Kongsfjord (located on the north-west coast of Spitsbergen and characterized as a warm fjord) was selected as the site for monitoring the effects of climate change (Warwick et al., 2003), and for studying the bottom fauna.

Meiobenthos are a highly dynamic part of the marine ecosystem and their abundance and diversity exceed that of macrofauna and megafauna (Giere, 2009); meiofauna is less sensitive to sediment instabilities and physical disturbances when compared to macrofauna, but meiobenthic responses have never been studied as extensively as those of the macrobenthic compartment

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JOURNAL  
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## Political Potentials of Body in the Postmodern Context

Ajeesh S

### Abstract

*Postmodernism is overtly preoccupied with the transformation of reality into superficial, fragmentary, and changing images. It attempts to construct the real through language and various forms of representation. On a closer analysis the political potentials and possibilities of postmodernism can be explored. The article analyzes politics of representation of body in the postmodern cultural context. The body has emerged in recent years as a key problematic in the social sciences and cultural studies. In the postmodern context, the body can be theorized as a potentially powerful site of resistance to hegemonic structures and narratives. The materiality of the body is inseparable from the power relations and historical forces and it complicates the relationship between the body and its discursive formations*

[PDF](#)

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Issue





## **Breaking The Cultural Codes: The Bodily Play From The Fringes**

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(M.G.University, Kottayam)

### **Abstract**

The notion of body transcends the fixities of biological entity in the postmodern cultural context. The power discourses defines the bodily subjectivity and the inscription of cultural codes in it makes it politically charged. The social, cultural, historical and political discourses enacts upon the body through multiple narratives. The body of the 'other' breaks the hierarchical cultural discourses inscribed on them by voicing its own extreme materiality. These ideas are exemplified in the context of the marginalized characters of J.M. Coetzee.

**Keywords:** Cultural Studies, Body, Representation.

The body is a key notion in the contemporary cultural studies. Since the post-structural era the notion of body has been extended from the biological sphere to the linguistic and cultural ones. The self- contradictory elements inherent in the cultural manifestations of the body make it one of ambiguous nature. The pre-defined fixities and limits regarding its representative potentials breaks down in the postmodern cultural scenario as the significance of boundaries itself is being questioned. All the experiences related to time and space in our life is determined by the nature of our bodily existence. It extends to the surroundings and employs a pivotal position in the formation of our subjectivity. We perceive the world through our body and in return our body is defined by the discourses of power. The cultural codes inscribed upon the body opens up its multiple political potentials like sexuality, race, nationality, gender, caste and class in the present context.

The political and social meanings are inscribed on to the body through the discursive power practices. In the process of defining things outside it and creating the 'other', the body defines itself and its identity. Even as remaining as a material entity, the body is perceived as a fore grounded space where multiple social, historical and cultural narratives enact. All these diverse discourses may complement or remain antagonistic to one another.

# MARKETING STRATEGIES OF PUBLIC AND PRIVATE ORGANISED RETAILERS IN KERALA - A COMPARATIVE STUDY

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## ABSTRACT

*Retail industry, being the fifth largest in the world, is one of the sunrise sectors with huge growth potential and accounts for 14-16% of GDP. Comprising of organised and unorganised sectors, Indian retail industry is one of the fastest growing industries in India, especially over the last few years. In recent years the Indian retail market has seen considerable growth in the organized segment. For example companies like Reliance, Tata, Adani group have been investing considerably in the booming retail sector of India. Indian retail sector is highly fragmented and the unorganized sector has around 13 billion retail outlets that account for around 95-96% of the total retail sector of India.*

*The growth of the retail trade in Kerala is associated with the growth in Kerala economy. At the beginning stage of organized retailing the government of Kerala as well as traders in the unorganized sector were against their entry in to the market. The Kerala government has introduced a bill namely 'The Kerala state essential commodities act 2007' in the legislature assembly and the act came in to effect. The organized retailers are used various marketing strategies for promote their trade as well as increase the profit. This paper focused on the perception of retailers regarding various marketing strategies.*

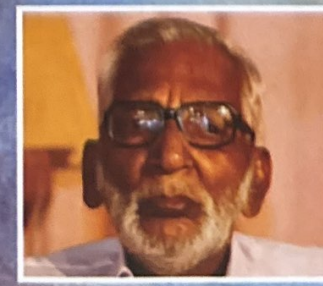
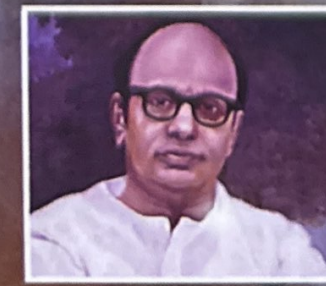
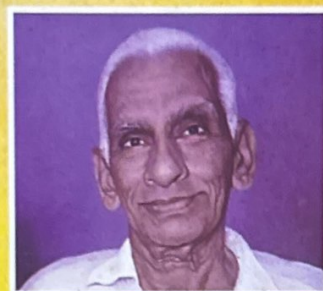
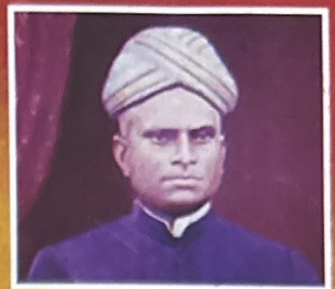
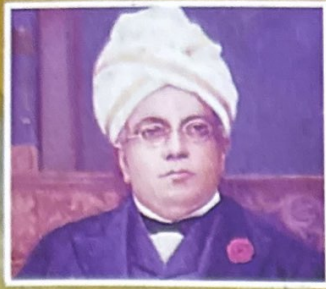
**Keywords:** retail sector, organized retailing, marketing strategies.

## INTRODUCTION

According to Philip Kotler 'retailing includes all the activities involved in selling goods or services directly to the final consumers for personal, non-business use. In India organized sector contributing 3-4% of the total retail sector. The retail sector in India is dominated by mom- pop stores and though organized retail is emerging, but in last 6 years has been seen many Indian companies making an entry into organized retail sector with a few multinational companies tying-up with Indian companies. Both organized retailing and unorganized retailing are existing in Indian retail sector. The sector is dominated by unorganized sector. This sector consist of the traditional formats of retailing such as the local kirana shops, general retail stores, convenience stores, super bazars etc. The organized retail sector consistsof licensed retailers who are registered under sales tax and income tax. The private large retail organizations, retail chain stores and

# കവനകൗമുദി

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# കവന കൗമുദി

ഉള്ളടക്കം

10 ഹിമവത്സംഗത്തിലെ ജാതവേദസ്സ്  
ഡോ.പി.സി. മുരളീമാധവൻ

20 കവിതയിലെ പാരമ്പര്യവും ആധുനിക  
തയും: അച്യുതനുണ്ണിയുടെ കവിതകളെ  
കുറിച്ച്  
എൻ. അജയകുമാർ

28 വല  
പുറമണ്ണൂർ ടി. മുഹമ്മദ്

29 കാളിദാസകൃതികളുടെ ആസാദ്യത  
ധനികാരദൃഷ്ടിയിൽ  
ഡോ.വി.കെ വിജയൻ

36 ഭാര്യ,കാമുകി, അമ്മ, മകൾ  
അഷ്ടമൂർത്തി

40 വധു പറഞ്ഞത്  
ഡോ.കെ.എം. കർത്താ

42 കാൽപനികത മലയാള കവിതയിൽ  
ഡോ.എസ്.കെ. വസന്തൻ

68 അമ്മയുടെ തോൽവി  
കെ.കെ. യതീന്ദ്രൻ

70 പ്രിയ എ.എസ്സിന്റെ കഥകളിലെ  
സ്ത്രീപക്ഷ ഭാഷണങ്ങൾ  
ഡോ.ടി.എച്ച്. ജിത

79 പ്രഭാതം മുതൽ പ്രദോഷം വരെ -  
വി. പത്മാവതി (പുസ്തകപരിചയം)  
ഡോ.നിത്യ പി.വിശ്വം

81 വിനോദ് തോമസ്സ് : കാട്ടുനീതിയും കാടൻ  
ഭാഷയും (പുസ്തകപരിചയം)  
ഡോ.ഉണ്ണി അമപ്പാറയ്ക്കൽ

89 പ്രകൃതിയും കവിതയും  
വള്ളത്തോൾ നാരായണമേനോൻ

93 നാരായണത്തു ഭ്രാന്തൻ  
കുണ്ടൂർ നാരായണമോനോൻ

## പ്രിയ.ഏ.എസിന്റെ കഥകളിലെ സ്ത്രീപക്ഷ ഭാഷണങ്ങൾ

ഡോ.ടി.എച്ച്.ജിത

പ്രമേയങ്ങളുടെ പുതുമയും, വാക്കുകളുടെ വശ്യതയും തികഞ്ഞ മൗലികതയും കൊണ്ട് മനസ്സിനെ ആഴത്തിൽ സ്പർശിക്കുന്നവയാണ് പ്രിയ ഏ.എസിന്റെ കഥകൾ. സാഹിത്യലോകത്തെ ജാടകളേയും ഫെമിനിസത്തിന്റെ പ്രകടനങ്ങളേയും കളിയാക്കുന്ന കഥകളും, 'സ്ത്രൈണം' എന്നു മുദ്രകുത്തപ്പെട്ട വികാരവിഷ്കരണമുള്ള കഥകളും തികഞ്ഞ സ്ത്രീപക്ഷവാദം പ്രകടമാക്കുന്ന കഥകളും- എല്ലാം അക്കൂട്ടത്തിലുണ്ട്. ഇതിൽ നിന്നും വ്യത്യസ്തമായി, പ്രിയയുടെ കഥകളിൽ പ്രധാനപ്പെട്ട ഒരു വിഭാഗമുണ്ട്. അവയെ വേണമെങ്കിൽ 'ആശുപത്രികഥകൾ' എന്നു വിളിക്കാം. ആശുപത്രി, രോഗം, മാനസികവും ശാരീരികവുമായ വേദന-ഇവയാണ് ആശുപത്രികഥകളിലുള്ളത്. കഥാകാരിയുടെ ബാല്യകാലം ഈ ആശുപത്രികഥകളിൽ ഏറെ സ്വാധീനം ചെലുത്തിയിട്ടുള്ളതായി കാണാം. പല കഥകളിലും കുട്ടികളെ പ്രധാന കഥാപാത്രങ്ങളാക്കിയാണ് കഥാവതരണം നടത്തിയിരിക്കുന്നത്. പ്രിയയുടെ വലിയൊരു വിഭാഗം കഥകൾ പ്രണയം വിഷയമാക്കിയവയാണ്. സ്ത്രീപക്ഷവാദത്തിന്റെ മുദ്രകൾ വ്യക്തമായി കാണപ്പെടുന്ന ചിലകഥകളാണ് 'താമരക്കുന്ന്', 'ജാഗരുക', 'നമ്മുടെയൊക്കെ അവസ്ഥകൾ', 'ഒരുമുലച്ചി', 'അതാ നോക്കൂ ഒരു പല്ലി' തുടങ്ങിയവ.

പ്രിയ ഏ.എസ്.രചിച്ച, തികച്ചും ഫെമിനിസ്റ്റ് ചുവയുള്ള ഒരു കഥയാണ് ജാഗരുക എന്ന സമാഹാരത്തിലെ 'താമരക്കുന്ന്'. ജീവിക്കാനും ജീവിതത്തിലെ സുഖസൗകര്യങ്ങൾക്കുവേണ്ടിയും ഭർത്താവിന്റെ അടിമയെപ്പോലെ അഭിമാനം പണയം വെച്ച് ജീവിക്കുന്ന ഭാര്യയാകാൻ ഒട്ടും താൽപര്യമില്ലാത്ത വിദേശ സ്ത്രീകളുടെ പ്രതീകമെന്നോണം ഒരു വാഷിംഗ് മെഷീൻ ഈ കഥയിലുണ്ട്. ഭർത്താവ് ഭാര്യയെ പഞ്ചാരവാക്കുകൾ പറഞ്ഞ്

പറ്റിക്കുന്നതും, താൻ വഞ്ചിക്കപ്പെടുകയാണെന്നറിഞ്ഞിട്ടും ഭാര്യ അയാളോടൊപ്പം താമസിക്കുന്നതും കണ്ട് മനംമടുത്ത് ആ വാഷിംഗ് മെഷീൻ വീടുവിട്ടുപോകുന്നു. സ്വന്തം ഇഷ്ടപ്രകാരം ഇറങ്ങിപ്പോയാൽ സമൂഹം ഒരിക്കലും തനിക്കു പിന്തുണ തരില്ലെന്നും, മറിച്ച് ഭർത്താവിന്റെ പക്ഷത്തു ചേർന്ന് തന്നെ കുറ്റപ്പെടുത്തുമെന്നും അറിയാവുന്ന ഭാര്യ, അയാൾ തന്നെ ഉപേക്ഷിക്കുന്നതിനായി കാത്തിരിക്കുകയാണ്. പൊതുവെ ഭാരതീയ സ്ത്രീകൾ സ്വീകരിക്കുന്ന മനോഭാവത്തിന്റെ വഴിതന്നെയാണ് ഈ കഥയിലെ നായികയും സ്വീകരിക്കുന്നത്. അതായത്, അസ്വാതന്ത്ര്യവും അനീതിയും സഹിക്കേണ്ടിവരുമ്പോഴും അവയ്ക്കെതിരെ പ്രതികരിക്കാനോ പോരാടാനോ തയ്യാറാകുന്നില്ല. പുരുഷനെ ആശ്രയിക്കാതെ, ചെറുതെങ്കിലും സ്വന്തമായി ജോലിചെയ്ത് സാഭിമാനത്തോടെയും സ്വാതന്ത്ര്യത്തോടെയും ജീവിയ്ക്കുകയെന്ന രീതി ഇന്നും ഭാരതീയ വനിതകൾക്ക് അജ്ഞാതമാണ്. ഈ സാമ്പത്തികാടിമത്തം തന്നെയാണ് പ്രധാനമായും സ്ത്രീകളുടെ അസ്വാതന്ത്ര്യത്തിനും കാരണം എന്ന നിരീക്ഷണത്തെ ഈ കഥയിലൂടെ വ്യക്തമായി അവതരിപ്പിയ്ക്കുന്നുണ്ട്. വൈദേശിക ചിന്താരീതികളെ ഉൾക്കൊള്ളാൻ കഴിഞ്ഞതുകൊണ്ടുമാത്രമായില്ല, അതിനെ പ്രാവർത്തികമാക്കാൻ സാധിക്കണം എന്നുള്ള പരിഹാസമാണ് അവസാനമായി വാഷിംഗ് മെഷീൻ കഥാനായികയോട് പറയുന്നത്.

ലൈംഗിക സുഖം നേടാനുള്ള ഒരുപകരണം മാത്രമായി ഭർത്താക്കന്മാർ ഭാര്യമാരെ കാണുന്നതിന്റെ സൂചനയും കഥയിലുണ്ട്. "ഇന്നാളൊരുദിവസം പ്രഷർകുക്കർ അടുപ്പിൽ നിന്നിറക്കുമ്പോൾ അതിന്റെയരികുകൊണ്ട് വാസന്തിയുടെ വയറിൽ കുറുകെ ഒരു പൊള്ളൽപ്പാട് വീണു. അത് ജയരാമൻ കണ്ടതേയില്ല. അരയ്ക്കുതാഴെയാണല്ലോ ജയരാമൻ വാസന്തി, അതും ഇരുട്ടത്ത്".

"12 തല, 15 കാല്, 6 തലച്ചോറ് എന്നിവക്കുടമയായ, അവയെല്ലാം ഒരേസമയം പ്രവർത്തിപ്പിക്കുന്ന, എന്നാൽ പുറമേ

കാണുമ്പോൾ അസാധാരണതമൊന്നുമില്ലാതിരിക്കുന്ന മനുഷ്യജീവി എന്ന് കടങ്കഥയുണ്ടാക്കി, വീട്ടമ്മ എന്നുത്തരം പറഞ്ഞു താനേ പൂർണ്ണ വാസന്തി. വീട്ടമ്മൻ എന്നൊരു വാക്ക് മലയാളത്തിലില്ല, ഇംഗ്ലീഷിലെങ്ങാൻ അതിനു സമാനമായ വാക്കുണ്ടോ എന്ന് വാഷിംഗ് മെഷീനോട് ചോദിക്കണം”- എന്നീ ഭാഗവും ശ്രദ്ധിക്കുക. ഗാർഹിക ജോലികളെന്ന അധികഭാരം സ്ത്രീകളിൽ മാത്രം അടിച്ചേൽപ്പിക്കപ്പെടുന്നതിനോടുള്ള പ്രതിഷേധമാണ് ഈ വരികളിലൂടെ വ്യക്തമാകുന്നത്.

വീട്ടുജോലിക്ക് സഹായകമായ വാഷിംഗ് മെഷീൻ വാസന്തി സ്വന്തമാക്കുന്നത് സ്വന്തം അധ്വാനഫലത്തിലൂടെ-താൻ വരച്ച ചിത്രങ്ങൾ വിറ്റ് ആണ്. കുടുംബിനിയായതോടെ വാസന്തിയുടെ കലാവാസനകൾ മുരടിക്കുന്നതിന്റെ സൂചനകളാണ്, “ദോശമാവിനാൽ അടുപ്പത്തും നനഞ്ഞ തുണിയാൽ പൊടിനിലത്തും വരച്ചുകൂട്ടുന്ന ചിത്രങ്ങൾ ഒന്നിലും വാസന്തി എന്നെഴുതി ഒപ്പടാനൊരു കോണില്ല” എന്ന വരികൾ. സ്ത്രീക്ക് സ്വന്തമായി ഒരു മുറിയില്ല വീട്ടിൽ. വെർജീനിയ വുൾഫിന്റെ, സ്ത്രീ സ്വാതന്ത്ര്യ പ്രഖ്യാപനം എന്നു വിശേഷിപ്പിക്കപ്പെട്ടിട്ടുള്ള ഗ്രന്ഥത്തിന്റെ പേര് അദ്ദേഹം 'ദീപി' എന്നാണ് എന്നോർക്കാം. സ്ത്രീ ചെയ്യുന്ന ഗാർഹിക ജോലികൾ ജോലികളായി/അധ്വാനമായി എണ്ണപ്പെടുന്നില്ല എന്നൊരു സൂചനകൂടി ഈ വരികളിലൂടെ ലഭിക്കുന്നു.

വാസന്തിയുടെ മറ്റൊരു രൂപം തന്നെയാണ് വാഷിംഗ് മെഷീൻ. അതിന്റെ ഇറങ്ങിപ്പോക്ക് ഇബ്സന്റെ പാവവീട്ടിലെ (ഉീഹഹ ടെ ഒീൗലേ) നോറയുടെ ഇറങ്ങിപ്പോക്കുതന്നെയാണ്- വഞ്ചകനായ പുരുഷനിൽനിന്നും, കപട ആദർശവാദിയിൽ നിന്നുമുള്ള മോചനം.

ഇതിലെ നായകന്റെ പേര് ജയരാമനെന്നാണ്-ഏകാധിപതിയായി, ഭാര്യയെ സ്വന്തം ഇഷ്ടാനിഷ്ടങ്ങൾക്കനുസരിച്ച് പ്രവർത്തിക്കാൻ നിർബന്ധിതനാക്കുന്ന, നയതന്ത്രജ്ഞനായ

രാമന്റെ മറ്റൊരു പതിപ്പ്. ഭർത്താവു നിർദ്ദേശിയ്ക്കുന്ന പെരുമാറ്റച്ചട്ടങ്ങൾ, പുറം ലോകവുമായുള്ള ഭാര്യയുടെ ഇടപഴകലുകൾക്ക് പരിധികളേർപ്പെടുത്തുന്നവയാണ്. അവ സ്ത്രീക്കു ചുറ്റും സൂരക്ഷയുടെ മറവിൽ വിലങ്ങുകൾ സൃഷ്ടിക്കുന്നു. എന്നാൽ ഭർത്താവ്/പുരുഷൻ യഥേഷ്ടം ആ സ്വാതന്ത്ര്യത്തെ അനുഭവിക്കുകയും ആസ്വദിക്കുകയും ചെയ്യുന്നു. കെട്ടിച്ചമച്ച പ്രണയ കഥാസൂചനയിലൂടെയും ഭർത്താവില്ലാത്ത സമയത്ത് അയാൾക്കിഷ്ടമില്ലാത്ത വേഷം ധരിച്ചും, അയാളുടെ പരസ്ത്രീബന്ധം അറിഞ്ഞിട്ടും അറിഞ്ഞില്ലെന്ന് അഭിനയിച്ച് പറ്റിച്ചും-ബാലിശമായ പ്രതികരണപടികളാണ് കഥാനായിക നടത്തുന്നത്. ചുരുക്കത്തിൽ, പാരമ്പര്യം അടിച്ചേൽപ്പിക്കുന്ന വിലക്കുകളിൽ നിന്നും മോചനം നേടാനാവതെ ഭീരുത്വം കൊണ്ടു കഴങ്ങുന്ന മദ്ധ്യവർഗ്ഗ സ്ത്രീയുടെ ചിത്രമാണ് ഈ കഥയിലുള്ളത്. അത്തരത്തിലുള്ള സ്ത്രീകൾ നേരിടുന്ന പ്രശ്നങ്ങളെ വാസന്തിയിലൂടെ അവതരിപ്പിക്കുന്ന കഥാകാരി, പ്രശ്ന പരിഹാരത്തെയാണ് വാഷിംഗ് മെഷീനെ കഥപാത്രത്തിന്റെ പ്രതികരണങ്ങളിലൂടെ അറിയിക്കുന്നത് എന്നു പറയാം. എന്നാൽ അത് ഉൾക്കൊള്ളാനുള്ള ചങ്കുറും കഥാനായികക്കൊട്ടില്ലതാനും. അതായത്, കുടുംബം എന്ന സ്ഥാപനത്തെ തകർത്തുകൊണ്ടുള്ള പ്രശ്നപരിഹാരം കഥാകാരിക്ക് സ്വീകാര്യമല്ല എന്നുതന്നെ കഥാന്ത്യം വ്യക്തമാക്കുന്നു.

പ്രിയ ഏ.എസ്. രചിച്ചിട്ടുള്ള ഏറ്റവും നല്ല കഥകളിലൊന്നാണ് ജാഗരുക. കഥാകാരിയിലെ ഫെമിനിസ്റ്റിനെ വെളിപ്പെടുത്തുന്ന ഈ കഥ, പെണ്ണെന്നാൽ പെൺശരീരമാണെന്ന സമൂഹത്തിന്റെ കാഴ്ചപ്പാട് വരുത്തിവയ്ക്കുന്ന പ്രശ്നങ്ങളുടെ മറ്റൊരു മുഖത്തേയും കാണിച്ചുതരുന്നു.

ഒഴിവുകാലത്ത് നഗരത്തിൽ നിന്നും നാട്ടിൽപുറത്തെത്തിയ പന്ത്രണ്ടുകാരി പെൺകുട്ടിയും അവളെ ലോകത്തിന്റെ തിന്മകളിൽ നിന്നും പൊതിഞ്ഞു സൂക്ഷിക്കാൻ പാടുപെടുന്ന വലുത്തമ്മയാണ് ഇതിലെ കേന്ദ്രകഥാപാത്രങ്ങൾ. വലുത്തമ്മയുടെ സംസാരവും പ്രവൃത്തികളും കുട്ടിയിൽ പുതിയൊരു ബോധോ

ദയമുണ്ടാക്കുന്നു. പുരുഷന്മാരെല്ലാം സ്ത്രീകളെ ചൂഷണം ചെയ്യാൻ അവസരം പാർത്തു നടക്കുന്നവരാണെന്നും സ്വന്തം ശരീരം എങ്ങനെയെല്ലാം കാത്തുസൂക്ഷിക്കണമെന്നും ബോധവതിയാകുന്ന അവൾക്ക്, നിഷ്കളങ്കതയോടെ ലോകത്തെ കാണാനുള്ള കഴിവ് നഷ്ടമാകുന്നു, അവൾ ജാഗരുകയാകുന്നു.

പത്രവാർത്തകൾ ഗ്രാമാന്തരീക്ഷത്തിൽപ്പോലും സംശയത്തിന്റെയും കളങ്കത്തിന്റെയും കാറ്റു നിറക്കുന്നതായി ഈ കഥ വെളിപ്പെടുത്തുന്നുണ്ട്. അമിത പ്രാധാന്യത്തോടെ ആവർത്തിച്ച് വാർത്തയക്കപ്പെടുന്ന തെറ്റുകൾ സമൂഹത്തിൽ കൂടുതൽ പ്രചരിക്കുകയും അംഗീകൃതമാവുകയുമാണ് ചെയ്യുന്നത് എന്ന സത്യം ഈ സന്ദർഭത്തിൽ സ്മരണീയമാണ്.

“കഴിഞ്ഞ ഒരാഴ്ചത്തെ പത്രവുമായി ഇരിക്കുമ്പോഴാണ് ഞാനറിയുന്നത് വന്നപ്പോഴത്തെ ശരീരവുമായി എനിക്ക് തിരിച്ചുപോകാൻ കഴിയുന്നത് ഏതോ സൂക്ഷ്മത കൊണ്ടാണെന്ന്. നാലു വയസ്സുകാരിയും, അദ്ധ്യാപികയും, മുത്തശ്ശിയും, നാടോടിസ്ത്രീയും ഭ്രാന്തിയും അതുതന്നെ എന്റെ ഇടം കാതിലും വലം കാതിലും ആവർത്തിച്ച് പറയുന്നു.”

രാത്രി അമ്പലപ്പറമ്പിലുറങ്ങി, വലുപ്പന്റെ തോളത്തുകിടന്നുവന്നതിന് വലുമ്മ കളിയാക്കുമ്പോഴാണ്, “ശരീരം ഒരു നാണക്കേടാണോ”? എന്ന ചിന്ത കൂട്ടിക്കാദ്യമായി ഉണ്ടാകുന്നത്. “ശരീരമാണ് പെണ്ണുങ്ങളെ ചരക്കായും ഉരുപ്പടിയായും മാറ്റുന്നത് എന്നെനിക്ക് പെട്ടെന്ന് വെളിപാട് കിട്ടി” - എന്ന വരികൾ ശ്രദ്ധിയ്ക്കുക ചെറിയ പെൺകുട്ടികൾ മുതൽ വൃദ്ധകൾവരെ ‘സ്ത്രീ ശരീര’മെന്ന പേരിൽ ചൂഷണം ചെയ്യപ്പെടുന്ന ചുറ്റുപാടിൽ വലുമ്മ ചെറുമകളെക്കുറിച്ച് ഉത്കണ്ഠാകുലയാവുകയും തന്നാലാവും വിധം അവൾക്കുവേണ്ട മുൻകരുതലുകൾ സ്വീകരിക്കുകയും ചെയ്യുന്നു, അതിന്റെ ഭാഗമായി അവൾക്ക് ശരീരബോധം പകർന്നു നൽകുന്നു.

അതായത്, പുരുഷ സമൂഹം സ്ത്രീയെ ‘സ്ത്രീശരീരം’

മാത്രമായും ഏതുപ്രായത്തിലുള്ള സ്ത്രീകളെയും ലൈംഗിക ഉപകരണം മാത്രമായും കാണുന്ന ചുറ്റുപാടിൽ, ഉപരോധം സ്വീകരിക്കേണ്ടി വരുന്ന സ്ത്രീ, താൻ സ്വയം ഒരു ‘ശരീര’മാണെന്ന ബോധത്തെ ഏറ്റുവാങ്ങുകയാണ് ചെയ്യുന്നത്. സ്ത്രീ എന്നാൽ സ്ത്രീശരീരമാണെന്ന് അങ്ങനെ കൂടുതൽ ഉറപ്പിക്കപ്പെടുന്നുവെന്നുസാരം.

കഥാന്ത്യത്തിൽ, സ്വന്തം അച്ഛനിൽപ്പോലും കൂട്ടിയ്ക്ക് വിശ്വാസം നഷ്ടപ്പെടുന്നതായി കാണാം. വിശ്വാസം നഷ്ടപ്പെടുന്നതിനുപരി, പുരുഷന്മാരെ ഒന്നടങ്കം ശത്രുപക്ഷത്തേയ്ക്ക് മാറ്റി നിർത്തുന്ന പുരുഷ വിദ്വേഷത്തിന്റെ- റാഡിയ്ക്കൽ ഫെമിനിസത്തിന്റെ തലങ്ങളിലേക്ക് കഥാനായിക ചെന്നെത്തുകയാണ്. കാലമില്ലാത്ത കാലത്തിലേക്കാണ് താൻ യാത്രചെയ്യുന്നതെന്നും (അതിനാൽത്തന്നെ), സ്വയം ജാഗരുകയാണെന്നുമുള്ള പ്രതികരണങ്ങളോടെ കഥ അവസാനിക്കുമ്പോൾ കഥയിൽ ആദ്യത്തം നിറഞ്ഞുനിൽക്കുന്ന സ്ത്രീപക്ഷവാദപരമായ കാഴ്ചപ്പാടുകളുടെ അടിത്തറ പൂർണ്ണമാകുന്നു.

മഞ്ഞമരങ്ങൾ ചുറ്റിലും എന്ന സമാഹാരത്തിലെ ‘നമ്മുടെയൊക്കെ അവസ്ഥകൾ’ എന്ന കഥയിൽ സങ്കീർണ്ണമായ സ്ത്രീമനസ്സിന്റെ ചില ഭാവങ്ങളുടെ ആവിഷ്കരണമാണ് ഉള്ളടക്കമെങ്കിലും പശ്ചാത്തലമായി അവതരിപ്പിച്ചിരിക്കുന്ന സ്ത്രീദിന പരിപാടികളും അവയോട് നായിക പുലർത്തുന്ന പ്രതികരണങ്ങളും -മിക്കവാറും കഥാകാരിയുടെ തന്നെ സ്ത്രീപക്ഷവാദപരമായ നിലപാടുകളെ വ്യക്തമാക്കുന്നവയാണ്. ‘നമ്മുടെയൊക്കെ അവസ്ഥകൾ’ എന്ന കഥാനാമംതന്നെ ശ്രദ്ധേയം. കഥ മുഴുവനും വായിച്ചു കഴിയുമ്പോൾ ‘നമ്മൾ’ എന്നതുകൊണ്ടുദ്ദേശിക്കുന്നത് സ്ത്രീകളെയാണ് എന്ന കാര്യത്തിൽ വായനക്കാരന് സംശയമുണ്ടാകില്ല. കഥാനാമത്തിൽത്തന്നെ വർഷപരമായ ഒന്നുഭാവം വ്യക്തമാണ്.

അടുക്കള എന്ന ‘രസംകൊല്ലിയിടം’ മുലം സ്വന്തം ഇഷ്ടം

നിഷ്ടങ്ങളെ മാറ്റിവക്കേണ്ടിവരുന്ന സ്ത്രീസമൂഹത്തിന്റെ പ്രതിനിധിയായ നായിക, “ആരാണ് ഈ അടുക്കള കണ്ടുപിടിച്ചത്? ആ ആളെ തൂക്കിക്കൊല്ലണം” എന്ന് മനസ്സിൽ വിധിയ്ക്കുന്നു. അതേസമയം വനിതാദിനത്തിൽ മുഖ്യാതിഥി നൽകിയ പ്രസംഗത്തിലെ സ്ത്രീപീഡനക്കണക്കുകൾ കേട്ട്, “ഇത്തരം ശതമാനക്കണക്കുകൾ ഒരു സാധാരണ സ്ത്രീക്ക് എത്ര ശതമാനം ഉണർവ്, ഉദ്ബുദ്ധത, പ്രതികരണശേഷി ഇവ നൽകും” എന്ന് ചിന്തിക്കുന്നുമുണ്ട്. ചൂഷണങ്ങളുടെ കണക്കെടുപ്പും പ്രസംഗങ്ങളുമല്ല, സ്ത്രീകൾക്ക് ഉണർവും പ്രതികരണശേഷിയും ഉദ്ബുദ്ധതയും വർദ്ധിപ്പിക്കാനുതകുന്ന പ്രവർത്തനങ്ങളാണ് ഉണ്ടാകേണ്ടത്, എന്ന സൂചനയാണ് നായികയുടെ ഈ വാക്കുകളിലൂടെ കഥാകാരി നമുക്കു നൽകുന്നത്.

പ്രിയ ഏ.എസ്സിന്റെ കഥകൾ എന്ന സമാഹാരത്തിലെ ‘ഒറ്റമുലച്ചി’ എന്ന കഥയിലെ നായികമാരായ ഗൗരിയും കല്യാണിയും കഥാകാരികളായ പ്രിയയും സൂക്ഷ്മയുമാണ്. ഇ.പി. സൂക്ഷ്മയുമായുള്ള സൗഹൃദത്തെക്കുറിച്ചും ഒറ്റമുലച്ചിയിലെ പേരുകൾവെച്ചു തങ്ങൾ പരസ്പരം കത്തെഴുതാറുണ്ടായിരുന്ന കാര്യവും പ്രിയ തന്നെ പറയുന്നുണ്ട്. അത്യാസന്ന നിലയിൽനിന്നും രക്ഷപ്പെട്ട കല്യാണിയെ ഗൗരി ചെന്നു കാണുന്നതും തുടർന്നും കഥകളെഴുതാൻ പ്രേരിപ്പിക്കുന്നതും അവർ തമ്മിലുള്ള സംഭാഷണവുമാണ് കഥയിലെ ഇതിവൃത്തം. ഈ സംഭാഷണങ്ങളിൽ നിന്നും കഥയെഴുത്തിനെപ്പറ്റിയുള്ള പ്രിയ.ഏ.എസിന്റെ കാഴ്ചപ്പാടുകളും സങ്കല്പങ്ങളും വ്യക്തമാകുന്നുണ്ട്.

“എത്ര സങ്കല്പങ്ങളെ കുട്ടുപിടിയ്ക്കാമോ അത്രയും സങ്കല്പങ്ങളെ നീ കുട്ടുപിടിയ്ക്കണം. കഥയുറിവരിക ഏതു ഭാഗത്തിൽ നിന്ന്, ഏതു സങ്കല്പത്തിൽ നിന്ന്, ഏതു മടിപിടിച്ചിരിപ്പിൽ നിന്ന് എന്നു നമുക്കറിയില്ലല്ലോ”.

“ശൂന്യതയിൽ നിന്നല്ല, സ്വപ്നവും സങ്കല്പവും ജീവിതവും ഇഴചേർന്നുണ്ടായ അനുഭവങ്ങളിൽ നിന്നാണ് കഥയുറി

വരിക എന്ന പാഠം നീ എവിടെ മറന്നു വച്ചുകല്യാണി?”

“കഥ ശരീരത്തിൽ നിന്നാണോ വരുന്നത്? ആത്മാവിൽ നിന്നല്ലേ? ആത്മാവിലെവിടെയാണ് ജീനുകൾ? കഥയെഴുതുന്നവരുടെയെല്ലാം മക്കൾ കഥയെഴുത്തുകാരാകാത്തത് അതുകൊണ്ടല്ലേ പെണ്ണേ?” തുടങ്ങിയ ഭാഗങ്ങൾ ഉദാഹരണമാണ്. എന്നാൽ,

“... ഒറ്റയാൻ എതിർലിംഗമായിട്ടൊരു വാക്കുണ്ടോ പെണ്ണേ ഈ ഭൂമിമലയാളത്തിൽ? അതെങ്ങനെ, പെണ്ണെഴുത്തിന്റെ പരിമിതികളെക്കുറിച്ച് നിനക്കെന്തറിയാം?” എന്ന സംഭാഷണ ഭാഗത്തിൽ പുരുഷനിർമ്മിതഭാഷ എപ്രകാരം സ്ത്രീയെ തളച്ചിടുന്ന ഉപകരണമാവുന്നു എന്നതിന്റെ സൂചനയുണ്ട്.

പെണ്ണെഴുത്തിനെക്കുറിച്ചും കഥാകാരി ഈ കഥയിലൂടെ പ്രതികരിക്കുന്നുണ്ട്:- “ഗൗരി കുലുങ്ങിച്ചിരിച്ചു ചോദിച്ചു-മലയാളം ആണോ പെണ്ണോ കഥ ആണോ പെണ്ണോ? കല്യാണി കപട ഗൗരവത്തിലായി. എന്താ സംശയം? ഒക്കെ പെണ്ണുങ്ങൾ തന്നെ. ശുദ്ധപെണ്ണുങ്ങൾ. മാദകഭംഗിയുള്ള പെണ്ണുങ്ങൾ. എന്നെപ്പോലെ മൊട്ടത്തലച്ചിയല്ല, ഒറ്റമുലച്ചിയല്ല. നീശ്മുടിയിൽ കൈതപ്പൂമണക്കുന്ന, കാലിൽ ചിലങ്കയിടുന്ന മോഹിനികൾ. കഥയെഴുത്തിൽ ആണുങ്ങൾ കുടുതലും പെണ്ണുങ്ങൾ കുറവുമായതിന്റെ പരമരഹസ്യം മനസ്സിലായോ ഇപ്പോഴെങ്കിലും?.....”

ഇതേ കാഴ്ചപ്പാടുതന്നെ ഇതേസമാഹാരത്തിലെ ജോസച്ചായന്റെ കഥ (എന്റെയും) എന്ന കഥയിലുമുണ്ട്. ഇതിലെ നായിക, “ആഫ്റ്റർഷേവ് ലോഷന്റെ ഗന്ധമാണല്ലോ പൊതുവേ സാഹിത്യത്തിന്” എന്ന് പറയുന്നുണ്ട്. ഇത് കഥാകാരിയുടെ തന്നെ അഭിപ്രായമായിരിക്കണം.

പ്രിയയുടെ മലലികവും സവിശേഷവുമായ രചനാശൈലിയ്ക്ക് നല്ല ഒരു ഉദാഹരണമാണ്, പ്രിയ. ഏ. എസിന്റെ കഥകൾ എന്ന സമാഹാരത്തിലെ ‘അതാ നോക്കൂ ഒരു



പല്ലി' എന്ന കഥ. 'മറിയാമ്മ തുണ്ടത്തിൽ' എന്നു പേരായ ഒരു പെൺ പല്ലിയെ കേന്ദ്രമാക്കിക്കൊണ്ട് മനുഷ്യരുടെ ജീവിതരീതികളെ വ്യത്യസ്തമായ കാഴ്ചപ്പാടിലൂടെ നോക്കിക്കാണുകയും അതിലെ അനാവശ്യമായ സദാചാരബോധത്തെയും മറ്റും ചൂണ്ടിക്കാണിച്ചുതരികയും ചെയ്യുന്ന കഥയാണിത്.

“പെണ്ണു പറഞ്ഞതു കേട്ടുപോയാൽ, ആൺപല്ലി പെങ്കോന്തനാവുകയോ പെൺപല്ലി ഫെമിനിസ്റ്റാവുകയോ ചെയ്യുന്ന രീതിയുമില്ല പല്ലിവർഗ്ഗത്തിൽ”. “ഇഷ്ടമുള്ള മനസ്സുകളോടും ശരീരങ്ങളോടും അടുത്തിടപഴകുന്നതിൽ പല്ലിലോകം ലിംഗഭേദം നോക്കാറില്ല. സദാചാരം നിറഞ്ഞുതുളുമ്പുന്ന അടിമർത്തലുകളുടെ കെട്ടിവരിയലില്ലാത്തതുകാരണം കെട്ടുംപൊട്ടിച്ച് തല്ലിപ്പൊളികളാകാറുമില്ല പല്ലികൾ” തുടങ്ങിയ ഭാഗങ്ങൾ ഇതിനെ ഉദാഹരിക്കുന്നു.

സംവേദനാത്മകവും പുതുമയാർന്നതുമായ പ്രയോഗങ്ങളും ശൈലിയുംകൊണ്ട് ഭാഷയെ പുഷ്ടിപ്പെടുത്തുന്ന രചനകളാണ് പ്രിയയുടേത്. പ്രതിഫലിപ്പിയ്ക്കാനുദ്ദേശിക്കുന്ന ആശയത്തിനനുസൃതമായ ഭാഷയും ശൈലിയും സ്വയം സൃഷ്ടിച്ചെടുക്കാൻ ഈ കഥാകാരിയുടെ കഴിവ് അതിശയകരമാണ്. പുരുഷകേന്ദ്രിത സമൂഹം നിർമ്മിച്ചിട്ടുള്ള സദാചാരപരമായ വിലക്കുകൾക്ക് കഥാകാരി തന്റെ രചനകളിൽ പ്രാധാന്യം കല്പിക്കുന്നില്ലെന്നു മാത്രമല്ല, അതിനെ എതിർത്തുകൊണ്ട്, നിഷേധത്തിന്റേതായ മാർഗ്ഗം സ്വീകരിച്ച്, സാധ്യതകളെ ചൂണ്ടിക്കാണിക്കുകയും സാധ്യകരിക്കുകയും ചെയ്യുന്നതായും കാണാം. നായികാ പ്രാധാന്യമുള്ളവയാണ് ഇത്തരത്തിലുള്ള രചനകളെല്ലാം എന്നതും പ്രത്യേകം ശ്രദ്ധേയമാണ്. സ്ത്രീസ്വാതന്ത്ര്യത്തിന്റേതായ നിലപാടുകളാണ് ഈ സന്ദർഭങ്ങളിലെല്ലാം തന്നെ കഥാകാരി സ്വീകരിച്ചിരിക്കുന്നത് എന്നും കാണാം.



# Controlling the zinc oxide unipolarity through dual acceptor doping for spray-cast homojunction diode

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## ABSTRACT

Dual acceptors, Phosphorous and Nitrogen, were simultaneously doped into zinc oxide crystallite structure for achieving stable p-type conductivity through simple spray pyrolysis technique. Doping concentration was varied from 0 to 1.25 at% in steps of 0.25. The structural, morphological, optical and electronic properties were investigated for phosphorous and nitrogen doped ZnO (NPZO) samples. Furthermore, the optimized p-type film was used for fabricating homojunction with aluminium doped n-type layer (AZO) which was also deposited using spray pyrolysis. The IV characteristics shows the diode behavior of the created homojunction from which the ideality factor was calculated to be 3.16.

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## 1. Introduction

The intrinsic n-type characteristics of ZnO can be further enhanced by introducing the donor atoms like Al, B, Ga, In, etc. in the crystal lattice [1]. However, doping ZnO to p-type has been a major bottleneck in realizing homojunctions for application in devices like LEDs, LDs and FET, etc. This asymmetry, often called the unipolarity, owes to the rise in Madelung energy, which is the electrostatic contribution to the binding energy of wurtzite structured crystals, leading to unstable ionic charge distributions during p-type doping [2]. Besides, the self-compensation caused by native donor levels ( $Zn_i$ ,  $V_o$ ), low solubility of dopants and deep acceptor levels are also barriers to achieve p-type conductivity in ZnO [3].

Through this report, we demonstrate the p-type conductivity achieved in ZnO thin films by simultaneously incorporating P and N and the I–V characteristics of good quality n-AZO/p-NPZO homojunction via spray pyrolysis technique in atmospheric conditions. This is the first time report of n-AZO/p-NPZO homojunction wherein both the semiconducting layers were deposited using simple spray pyrolysis method. Our studies and results are greatly encouraging for the realization of spray casted p–n homojunction diodes which can substantially reduce the cost of optoelectronic devices.

## 2. Materials and methods

A 0.1 M precursor solution was formulated from zinc acetate ( $Zn(CH_3COO)_2$ , Merck, 98%) into which di-phosphorous pentoxide ( $P_2O_5$ , Spectrochem, 98%) and ammonium acetate ( $CH_3COONH_4$ , Merck,  $\geq 97\%$ ), the dopant sources of phosphorous and nitrogen respectively, were added in equal concentrations in steps of 0.25 at%. The samples were named as NPZO(0), NPZO(0.25), NPZO(0.50), NPZO(0.75), NPZO(1.00) and NPZO(1.25).

In order to fabricate the p–n homojunction, a 400 nm thick n-type AZO layer [4] and a 700 nm p-type NPZO layer were subsequently grown on ITO coated glass substrate by spray pyrolysis at 450 °C and 425 °C, respectively, using proper masks.

## 3. Results and discussion

Fig. 1(i) shows the X-ray diffraction patterns of the as prepared samples which confirm the hexagonal wurtzite phase of ZnO without any impurity phases (JCPDS File No: 89-0510). Besides, it reveals a preferential growth along the lower surface free energy direction [0 0 2], perpendicular to the substrate surface [5].

From the Scherrer equation [6], average crystallite size was determined for all the samples. The (0 0 2) peak position was observed to be shifting to lower angles when doped with atoms of larger ionic radii, P(2.12 Å) and N(1.46 Å) [7]. The crystallinity of the samples was found to improve upon increasing doping concentration up to 1 at% and further found to deteriorate due to the

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## Organic &amp; Supramolecular Chemistry

## Hierarchical Self-Assembly of Pyrene-Linked Cyclodextrin and Adamantane-Linked Naphthalene Diimide System: A Case of Inclusion-Binding-Assisted Charge-Transfer Interaction

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Mixed stack charge transfer complexation between pyrene donor linked to  $\beta$ -cyclodextrin and naphthalene diimide acceptor linked to adamantane, where the charge transfer interaction is augmented by inclusion binding of the adamantane moiety in  $\beta$ -cyclodextrin, is studied. The association constant for the charge transfer complexation was  $3.64 \times 10^7 \text{ M}^{-1}$ , which is the highest value reported so far for any charge transfer complex. Complex formation was probed using  $^1\text{H NMR}$ , isothermal titration calorimetry, and circular dichroism studies. The results suggested that within the charge transfer

complex the donor and acceptor exist as alternating units at an inter-planar distance of  $3.7 \text{ \AA}$  with a dihedral angle  $> 50^\circ$  between them with each donor-acceptor pair rotated slightly with respect to the preceding and succeeding pairs. The charge transfer complex undergo hierarchical self-assembly to give twisted nanofibers as confirmed by Atomic force microscopic and Transmission electron microscopic studies. The excited state relaxation process in the charge transfer complex was investigated by femtosecond time-resolved pump-probe spectroscopy.

## Introduction

Intermolecular CT interactions between aromatic D and A molecules generally occur with low or moderate association constants which in turn hinders the formation of organized assemblies with long-range order. The association constant can be enhanced several fold if the CT interaction is augmented by other non-covalent forces such as hydrogen bonding,<sup>[1]</sup>  $\pi$ -stacking,<sup>[2]</sup> metal-ligand coordination,<sup>[3]</sup> or hydrophobic interactions.<sup>[4]</sup> In the recent past large numbers of supramolecular architectures such as micelles,<sup>[5]</sup> vesicles,<sup>[6]</sup> gels,<sup>[7]</sup> foldamers,<sup>[8]</sup> nanotubes,<sup>[9]</sup> liquid crystal assemblies,<sup>[10]</sup> rotaxanes,<sup>[11]</sup> molecular necklaces,<sup>[12]</sup> rotaxane dendrimers<sup>[13]</sup> etc. have been realized by employing CT interactions reinforced with other non-covalent interactions. Even after invoking support from additional non-covalent interactions the currently available 'high'  $K_a$  values for CT complexation is only in the  $10^3$ – $10^4 \text{ M}^{-1}$  range. Among the common D–A systems the pyrene (PY)-naphthalene diimide (NDI) complexes are the most well-known.<sup>[14]</sup> Wilson and co-workers have performed a systematic study on co-assembly of homopolymers containing different pendent D and A groups and identified the PY-NDI system as the best D–A system for

CT complexation.<sup>[14e]</sup> Several groups have determined the association constants for the PY-NDI CT complex and the reported values include  $6.0 \times 10^3 \text{ M}^{-1}$  in methylcyclohexane,<sup>[14a]</sup>  $9.0 \times 10^2 \text{ M}^{-1}$  in 2:1 water : methanol,<sup>[14b]</sup> and  $8.9 \times 10^2 \text{ M}^{-1}$  in 99:1 water : DMF.<sup>[14d]</sup> Various research groups have attempted to reinforce the CT interactions in the PY-NDI system with other non-covalent forces.<sup>[15]</sup> For example, Khalily *et al.* reported the construction of supramolecular 1D nanowires of PY-NDI system with a high  $K_a$  value of  $5.18 \times 10^5 \text{ M}^{-1}$  employing a combination of H-bonding, CT, and electrostatic interactions,<sup>[16]</sup> which was the highest  $K_a$  value reported for the PY-NDI system so far.


Recently our group has shown that CT complexation between PY and pyromellitic diimide (PI) in aqueous solution proceeds with very high association constant if the PY is linked to  $\beta$ -cyclodextrin ( $\beta$ -CD) and the PI is linked to adamantane (AD).<sup>[17]</sup> For PY-PI intermolecular systems, CT complexation was observed only at high concentrations for which the association constant  $K_{\text{CT}}$  was estimated as  $< 10^2 \text{ M}^{-1}$ .<sup>[14e]</sup> For several AD derivatives association constants for inclusion binding ( $K_{\text{IN}}$ ) in  $\beta$ -CD are  $\sim 10^4 \text{ M}^{-1}$ .<sup>[18]</sup> For the PIAD/PYCD system we reported, the association constant ( $K_a$ ) determined using isothermal titration calorimetry (ITC) was  $1.82 \times 10^6 \text{ M}^{-1}$ , which is the highest value reported so far for CT complexes.<sup>[17]</sup> The major contribution to the high association constant came from the inclusion binding interaction. This synergistic interaction led to the formation of 2D sheets which underwent twisting to give helical fibers. We also observed that when the AD substituent in PIAD is replaced by alkyl groups such as *t*-butyl or methyl the binding mode with  $\beta$ -CD changed from inclusion binding to rim-binding with the associated decrease in the value of  $K_a$ .<sup>[19]</sup> The PYCD/PI-*t*-Bu system also exhibited high association

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## New host and geographical record of *Eudactylina pusilla* Cressey, 1967 from Indian waters with DNA barcodes

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### Abstract

The present paper reports the first record of the parasite *Eudactylina pusilla* Cressey, 1967 from the gills of the pelagic thresher shark, *Alopias pelagicus* Nakamura, 1935 collected during a multifilament longline operation at a depth of 762 m from Indian EEZ around Andaman Islands. The occurrence of this copepod gill parasite on *A. pelagicus* in the Indian waters constitutes new host record and extends the parasite's known geographical distribution, thus contributing to the knowledge of biodiversity of the parasitic copepods in Indian waters. Molecular marker based taxonomical annotation using Mitochondrial 18S r DNA sequencing also confirmed the identity of the *E. pusilla* specimen.

**Keywords:** First record; *Eudactylina pusilla*; pelagic thresher shark; Siphonostomatoida; gill parasites

## 1 | INTRODUCTION

Andaman and Nicobar Islands is one of the largest oceanic archipelago systems and is located between 6–14° north latitude and 92–94° east longitude in southern reaches of the Indian Ocean. It forms about 28% of the Indian Exclusive Economic Zone (EEZ, 0.6 million km<sup>2</sup>) (Anon 2013). Parasites are usually found in wild as well as cultured marine fishes externally as well as internally (skin, nostrils, fins, gills, flesh, intestinal, rectal etc.) and

the gills are found to be most favourite site for attachment of many parasites (Nowak 2007; Montesa *et al.* 2017). Among marine parasites 25% are crustaceans (Erias *et al.* 2000). These parasites damage the gill by feeding on the delicate tissue of the lamellae or the blood circulating within the lamellae, leading to the loss of respiratory surface area (Pillai 1985; Morales-Serna *et al.* 2014). There are several studies on fish parasites from the coast of mainland India (e.g. Pillai 1985; Ravichandran *et al.* 2009; Helna *et al.* 2012; Aneesh *et al.* 2013; Ramesh Ku-

# First Record of *Gloiopotes watsoni* Kirtisinghe, 1934 parasitic on *Istiophorus platypteurs* (Shaw and Nodder 1792) from Andaman Sea with DNA barcodes

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## Abstract

The knowledge of the parasitic copepods from Andaman and Nicobar archipelago of Indian EEZ is limited. The present study reports the Siphonostomatoid parasite *Gloiopotes watsoni* Kirtisinghe, 1934 from the oceanic Indo-Pacific Sailfish *Istiophorus platypteurs* (Shaw and Nodder 1792) from Indian EEZ of the Andaman Sea. 10 specimens of parasite were collected from the skin of the Indo-Pacific Sailfish during the exploratory longline survey in Andaman and Nicobar waters adds to the range extension of the parasite. Molecular marker based taxonomical annotation using Mitochondrial 18S rDNA sequencing confirmed the identity of the *G. watsoni*.

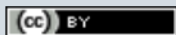
## Introduction

Parasites are ubiquitous, primarily surviving in a dynamic equilibrium with their host(s) and they are often overlooked in health assessments of Fishes. In fishes, parasites can cause mechanical damage (fusion of gill lamellae, tissue replacement), physiological damage (cell proliferation, immunomodulation, detrimental behavioral responses, altered growth) and reproductive damage (Iwanowicz, 2011). Most of the fish parasitic copepods belong to the order Siphonostomatoida Thorell, 1859 (75%) and Poecilostomatoida Thorell, 1859 (20%) (Kabata, 1988, 1992). The order Siphonostomatoida includes 57 recognized families parasitizing a wide range of hosts (WORMS, 2019). Siphonostomatoida is an order of copepods, containing around 75% of all the copepods that parasitise fishes. Their success has been linked to their possession of siphon-like mandibles and of a "frontal filament" to aid attachment to their hosts (Kabata, 1992). The genus *Caligus* Muller, 1785 is among the most successful genera of the marine parasitic copepods, with 423 valid species (Walter & Boxshall, 2019), and they have characteristic lunules on their frontal plates (Kabata, 1988). Hewitt (1964) published an account of *Gloiopotes huttoni* and *G. watsoni* as its synonym and attributed the differences to variation within the species. Later, Cressey (1967) showed

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