# ETHNOMEDICINAL SURVEY OF PATUR FOREST IN AKOLA DISTRICT

**THESIS**

**Submitted to**
**Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola**
**in partial fulfilment of the requirements**
**for the Degree of**

## MASTER OF SCIENCE
## IN
## FORESTRY
## (FOREST PRODUCTS AND UTILISATION)
**(MEDICINAL AND AROMATIC PLANTS)**

**By**
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**Enrollment Number – OO-1227** **2023**

## DECLARATION OF STUDENT

I hereby declare that the experimental work and its interpretation of the thesis entitled **“ETHNOMEDICINAL SURVEY OF PATUR FOREST IN AKOLA DISTRICT”** or part thereof has neither been submitted for any other degree or diploma of any University, nor the data have been derived from any thesis / publication of any University or scientific organization. The source of materials used and all assistance received during the course of investigation have been duly acknowledged.

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**Place**: Akola **(Telang Rushikesh Gopal)**

**Date**: / / 2024 Enrolment No. OO-1227

# CERTIFICATE

This is to certify that the thesis entitled **"ETHNOMEDICINAL SURVEY OF PATUR FOREST IN AKOLA DISTRICT"** submitted in partial fulfillment of the requirements for the degree of **"Master of Science in Forestry (Forest Products and Utilization)"** of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola is a record of bonafide research work carried out by **TELANG RUSHIKESH GOPAL** under my guidance and supervision.

The subject of this thesis has been apporved by the Student's Advisory Committee.

Place: Akola
Date: / / 2024

**Shri S. M. Khachane**
Chairman,
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**Countersigned**

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THESIS APPROVED BY THE STUDENT'S ADVISORY COMMITTEE INCLUDING EXTERNAL EXAMINER (AFTER VIVA-VOCE)

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# ACKNOWLEDGEMENT

Acknowledgement, a page that is always at the beginning of a scientific document, prepared at the end, and barely ever seen by the reader, yet is specifically intended to express opinions about those who are connected to the conduct and support of the scientific studies, either directly or indirectly.

It is a pleasant moment for me as I am expressing my hearty thanks to all those people for whom I could able to complete this endeavour of my life. I am deeply indebted to all of them for their indispensable assistance and encouragement for timely completion of my thesis work.

With an overwhelming sense of legitimate pride and genuine obligation, I reiterate my deep and sincere gratitude to the Chairman Shri S. M. Khachane Associate Professor and my Advisory Committee, for his enthusiastic interest, constant encouragement, incessant guidance, paternal love, prompt help during the entire course of investigations. It gives me great pleasure in expressing my severe admiration, debt of sincerity, and appreciation to him for merely suggesting this research project. I am extremely indebted to him constant inspiration, valuable advice, constructive criticism and moral support during this programme. I really appreciate his faith and confidence in my abilities and wholehearted support. His invaluable, gifted leadership, which included in a keen interest in the studies and offering insightful criticism and academic guidance all the way through to the thesis manuscript's final shaping.

With a profound personal regard, I take this opportunity to express my deep sense of heartfelt gratitude to Dr. S. S. Harne, Professor and Head of the Department of Forest Products for his expert guidance, suggestions, constant encouragement and love during the entire period of investigations.

It gives me profound pleasure in expressing my heartfelt gratitude the members of my Advisory Committee; Dr. S. S. Harne, Associate of Forestry Dr. PDKV. Akola. Dr. A. U. Nimkar Assistant Professor,

Department of Forestry, Akola. and Dr. H. K. Deshmukh, Department of Forestry, Dr. PDKV. Akola, for their valuable help, suggestions and constant guidance during the period of present research work.

It is my pleasure to express earnest gratefulness to Dr. S. R. Gadakh, Hon. Vice-Chancellor, Dr. PDKV., Akola and Dr. Y. B. Taide, Associate Dean, Post Graduate Institute, Dr. PDKV., Akola for providing necessary facilities during my M.Sc. Forestry degree programme.

I express my gratitude to my teachers Shri S. W. Choudhari Assistant Professor Department of Forestry, Dr. PDKV, Akola, Dr. PDKV, Akola, Dr. A. J Deshmukh, Senior Research Assistant, Dr. PDKV Akola, Dr. V. B. Shambharkar, Associate Professor, Dr. PDKV, Akola, for their valuable inputs, appropriate guidance and constant help and support during the entire course of my research work. My diction doesn't seem too rich enough to provide suitable words to articulate my sincere and heartfelt gratitude to my teachers who has given sound and fruitful advice and constant encouragement throughout the venture of my life and in my studies and their valuable suggestions, encouragement and affection for which I am greatly indebted to their family forever.

My special thanks to University Librarian, Dr. PDKV, Akola and staff for providing library facility and cooperation extended in offering more books during studies. I also thankful to all medicine man and local people of patur area for their co-operation and providing valuable information of flora.

I personally express my deepest respect to Shri. Suresh Wadode Assistant Conservator of Forest in Akola wildlife division and I also thanks to Shri D. D. Madne and Vishwanath Chavan Range Forest Officer in Patur forest, for their cooperation to provide guidelines and required data for my research work. Range accountant and all the staff members, forest labours who helped and co-operated me wholeheartedly. I thank to all from my bottom of my heart for their kindness without them it is not possible to achieve the milestone of the master degree.

Every effort is motivated by an ambition and all ambitions have an inspiration behind. I owe this place to my father Shri. Gopalrao Telang and mother Smt. Sangita Telang for their selfless sacrifice, love, heartful blessings and firm faith which have been made me worthy of accomplishing this task and I therefore dedicate this piece of work to them. It was dedication, inspiration and moral support, which led me to achieve the present goal.

I am delighted in acknowledging all my batchmates in the campus with whom I have shared every moment of my life including the findings of my research work. I am fortunate to have friends Gaurav Meshram, Deepak Jagtap, Dyanesh Desle, Tushar Sarade, Savi Nimbarte, Snehal Shende, Aishwarya Deshmukh, Manisha Uike. Without their pleasant co-operation and constant encouragement, my work would not have been completed so smoothly in time.

Mere words are not enough to express the feelings and the evergreen company of my colleagues Aashish Bramhne who have motivated me many a times with their extraordinary brilliance and encouraged me to do the best in everything. Words can never truly portrait the unflinching support, constant encouragement, warm concern and valuable advices of my dear Dipak Patil who provided much needed shoulders to fall back on in times of need. I have been fortunate in getting the intelligent guidance and support by my seniors especially Pruthviraj Chavhan, Sayali Meshram, Gayatri Bansode. I would be failing in my duty if I do not acknowledge the filial cooperation, affectionate love and encouragement extended by beloved friend Vedant Suradkar whose endless efforts and caring nature would have given the pace to my ideas in compiling of this manuscript.

My heartfelt wishes to all those well-wishers who directly or indirectly helped me to carry out the research work smoothly and made my stay at Post Graduate Institute pleasant. I thank the almighty for.

**Place**: Akola
**Date**: / / 2023

**(TELANG RUSHIKESH GOPAL)**
Enrolment No. OO-1227

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| | |
|---|---|
| % | -Percent |
| / | -Per |
| °C | -Degree Celsius |
| et al. | -et alia (and others) |
| etc. | -Etcetera |
| Fig. | -Figure |
| i.e. | -That is |
| viz. | -Videlicet (Namely) |
| ICF | -Informant Consensus Factor |
| $n_{ur}$ | -Number of used citations in each category |
| $n_t$ | -Number of species used |
| FDCM | Forest Development Corporation of Maharashtra |

## (E) Thesis Abstract

| | | | |
|---|---|---|---|
| **a)** | **Title of the thesis** | **:** | **ETHNOMEDICINAL SURVEY OF PATUR FOREST IN AKOLA DISTRICT** |
| **b)** | **Full name of student** | **:** | **Telang Rushikesh Gopal** |
| **c)** | **Name and address** | **:** | **Shri S. M. Khachane**<br>(Associate Professor)<br>(College Of Forestry, Dr. PDKV Akola) |
| **d)** | **Degree to be awarded** | **:** | M. Sc. (Forestry) |
| **e)** | **Year of award of degree** | **:** | 2024 |
| **f)** | **Major subject** | **:** | Forest Products and Utilization |
| **g)** | **Total number of pages in the thesis** | **:** | 60 |
| **h)** | **Number of words in abstract** | **:** | 522 |
| **i)** | **Signature of student** | **:** | |
| **j)** | **Signature, name and address of forwarding authority** | **:** | |

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## ABSTRACT

The present study entitled “Ethnomedicinal survey of Patur forest in Akola district” was carried out during the year of 2021-2023 at Patur Forest, Akola Wildlife Division, Dist. Akola. The study was attempted to explore and document the medicinal plants used to cure different human diseases by the tribes residing in Patur Forest. Objectives of the study was enumeration of medicinal plants used for the treatment of health problem to humans and identify with categorization those plant species according to their potential uses as well as route of administration practice by local people.

The ethnomedicinal survey of Patur forest range was conducted to document the traditional knowledge of medicinal plants and their uses by the indigenous communities residing in the area. The survey aimed to identify the plant species used for various health conditions, as well as to assess the cultural significance and conservation status of these plants. Data was collected through interviews, field observations, and participatory methods with local healers and community members. The survey revealed a rich diversity of ethnomedicinal plants, with numerous species being used for treating ailments such as gastrointestinal disorders, skin diseases, fevers, and respiratory problems. The study also highlighted the need for conservation efforts to protect these valuable plant resources and preserve traditional knowledge. The findings of this survey can contribute to the development of new pharmaceuticals, as well as the conservation of biodiversity and indigenous cultural heritage.

With the help of local administration, elder recommendations, and community members, 100 informants were chosen from Ten villages— by Patur, Tandali, Shiv, Agikhed, Sotalvan, Shirla (Andhare), Jogtalav, Kapshi, Mahaldoli and Bodkha for study. In this study, 98 traditional medicinal plants were collected and identified. 49 families and 88 genera were represented by these species. With ten species of the Fabaceae family had the most (10.20%). With five species (4.09%) Liliaceae, Ceaselpiniaceae, Anacardiaceae, Verbenceae, Poaceae which were often used medicinal plants in the research area—followed them.

There were 37 species (37.75%) of trees, 35 species (35.72%) of herbs, 19 species (19.39%) of shrubs, and 5 species (5.10%) of climbers among the many plant types. The most often utilized plant parts were leaves, bark, and fruits, which were used by 35 species (27.78%), 14 species (11.11%), and 11 species (8.73%), in that order. In the study area, fresh plant parts were more commonly used than fresh plant materials (67 species, 68.38%) or combined fresh and dry materials (17 species, 17.35%). Informants reported that among the traditional medicinal plants collected, 27 species (21.43%) were utilized as crushing, 25 species (19.84%) as extract, and 23 species (18.26%) are of decoction. Mode of application of the

medicinal plants were mostly done by the oracular 60.31% followed by local 17.45, nasal 13.48%, dermal 8.73%. As source of traditional uses of medicinal remedies are getting from father/ mother mainly with practices. Transfer of knowledge among the community in the study areas has mainly been taking place from the father to the trusted eldest son or selected well behaved son through long time exposure and experience learned and gained from his father. Yet this knowledge could not be transferred freely outside blood relationship of traditional healers.

# CHAPTER I

# INTRODUCTION

## 1.1 Background information

Since the beginning of civilization, human being has been remained constantly dependent on the endemic plants for certain primary needs and specific ailments cure and care. In course of time, his interactions with the wild plants as well as animals increased which has made him a superpower of earth planet. Documentation of human relationship and interactions with the plants in a scientific way has become a prime need of time these days which is called as ethnobotany (Cotton, 1996). In recent years, ethno-pharmaceutical studies are recognized as the most fruitful methods for identifying new sources of drugs. It is interesting to note the most recent popular plant-based drugs of ethnobotanical interests.

Nearly 70 percent of the world population is dependent on the traditional medicines for primary healthcare. India is known for its rich diversity of medicinal plants and hence called botanical garden of the world (Vedavathy *et al.*, 1997). There is increase in the wage of herbal medicines in recent past and almost 95 percent consumption of these plants is made through collections from the forests (Gupta, 2003). The traditional knowledge of medicinal plants in the tribal people is very ideal source for exploring bioactive compounds of therapeutic importance in phytochemical research. This ethno-medicobotanical study of the tribal people can open new frontiers for searching more active and efficient herbal drugs. In an exploratory study of medicinal plants used by tribal communities.

Recent research in plant science has focused mainly on ethnobotanical and ethnomedicinal investigations to fulfill the increasing demand of herbal products. Within the very rich, diverse flora of the Indian subcontinent are to be found many plants having ethnobotanical and ethnomedicinal importance. It has been reported that about 20,000 plant species are found in Indian flora, nearly all with different properties, of which about 7% are on the verge of extinction. Therefore, it is essential to

investigate such plants from core areas and unexplored regions and collect the indigenous knowledge regarding their utilities.

Rural communities in particular depends on plant resources mainly for herbal medicine, food, forage, construction of dwellings making household implement and fuel and shade (Veeramuthu, 2006). The use of medicinal plants as traditional medicine is well known in rural areas of many developing countries. Traditional healers claim that their medicine is cheaper and more effective than modern medicine. The indigenous traditional knowledge of medicinal plants of various communities where it has been transmitted orally for centuries is fast disappearing due to the advent of modern technology and transformation of traditional culture.

The natural vegetation of patur forest includes a variety of plant species having economic importance. It yields timber, gum and resinous plants, food and fodder plants, and plants having medicinal value. Some tribal communities are native to the nearby sanctuary area. These tribals are largely dependent on forest products for their livelihood. They are knowledgeable about the utility of the majority of these plants. They collect gum, resin, fodder, timber and fuel wood from the sanctuary area and offer it for sale in the nearby town.

Therefore, most of the plant species are either becoming less abundant or on the verge of extinction. The tribal communities residing nearby area of patur forest possess indigenous ethnic knowledge about the utility of the majority of plants and they have developed a special herbal health care system for themselves.

Plants used in traditional medicine contain a wide range of substances that can be used to treat chronic as well as infectious diseases. A vast knowledge of how to use the plants against various illness may be expected to be accumulated in area where the use of medicinal plants is still of great importance.

Rural communities depend on plant resources mainly for herbal medicines. The use of medicinal plants as traditional medicines is well known in rural areas of many developing countries. Traditional healers claim that

their medicine is cheaper and more effective than modern medicine. In developing countries, low-income people such as farmers, people of small isolate villages and native communities use folk medicine for the treatment of common infection.

A vast knowledge of how to use the plants against different illnesses may be expected to have accumulated in areas where the use of plants is still of great importance. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive compounds of plants are alkaloids, flavanoids, tannins and phenolic compounds. Some ecologists believe that the loss of biological variety in the world's forests is the most pressing environmental problem of our time, comparable to the extinction of dinosaurs 65 million years ago (Simberloff, 1986 and Wilson, 1988). However, a lack of information has also caused others to wonder if this is truly a catastrophe. A catastrophe shouldn't be necessary to pique interest in biological diversity**.**

The ethnobotanical knowledge about the uses of plants, which is primarily reserved to the elder generation of tribal societies, is on the verge of extinction as a result of the current changing society aimed at modernization. Since traditional knowledge on ethnobotanical plants has been declining due to acculturation and the loss of plant biodiversity, as well as indigenous people and their cultural background, promoting research on these plants is critical in order to safeguard this information for future societies for sustainable use and conservation (Sathyavathi and Janardhanan, 2014).

The medicinal properties of a plant are due to the presence of certain chemical constituents. These chemical constituents, responsible for the specific physiological action, in the plant, have in many cases been isolated, purified and identified as definite chemical compounds. Quite a large number of plants are known to be of medicinal use remain uninvestigated and this is particularly the case with the Indian flora. The use of plants in curing and healing is as old as man himself (Hedberg, 1987). Natural products are also of great interest in the process of drug discovery. Their large diversity in nature, permit the identification of lead molecules of great interest for the

development of new therapeutic agents, as well as biochemical and molecular mechanism of action involved in most physiological and pathological processes. Furthermore, a growing world-wide interest in the use of phytopharmaceuticals as complementary or alternative medicine, either to prevent or to ameliorate many diseases**,** has been noted in recent years.

India is endowed with wealthy biodiversity where medicinal plants diversity is also notable spreading over the country. India is a mega biodiversity country among 12 in the world; it has a forest area of 23.81% of the country's geographical area. Among nearly 45,000 plant species in India about 7,000 - 8,000 species of the plants are reported as medicinal plants utilized by local peoples (Dubey *et al.,* 2004). Ancient method for beginning health care among the local peoples is the utilize of herbal medicines. Around 85 percentage traditional medicines are acquired from herbs and used for several ailments. Used of the herbal medicines based on traditional information is documented by Mukharjee and Wahil (2006). Noted of the medicinal plants is significant not only for focusing of its usefulness but also for the necessity of their conversation.

The importance of *Aushadhi* (drug) and its use as a medicine is well known since Vedic period. Indian systems of medicine are part of our cultural heritage and have rendered cost effective and efficient patient management through the ages. The very first description of medicine can be found in *Rigveda* which is one of the oldest literatures that describes the significance of 67 medicinal plants. *Charaka Samhita and Sushruta Samhita* holds commendable knowledge on therapeutic applications of near about 500 medicinal plants described in various chapters. *Acharya Charaka* has explained the significance of herbal plants in *Sutrasthana* 26th chapter. Acharya *Charaka* has opinion that in this world there is not a single herb which does not have therapeutic value, unless it is used in apt conditions and after proper processing. *Charaka* also mentioned about the habitat of medicinal plants.

India has got a centuries old ethno-medico-botanical heritage since long ago. Even today many people in villages, towns and tribal areas practice home remedies and formulae, called as "Ajibaicha batwa" in Marathi,

which has passed from one generation to other with establishment of an intact and close relationship with the endemic plants for his basic needs and comforts. These relationships and interactions have contributed in the development of the traditional ethno-pharmaceutical knowledge in regard to uses of plants or their parts. 80 % of world's population depends on plants for curing various ailments. In recent years several botanists have brought to light the traditional ethnobotanical knowledge of the people from various parts of the country. The pioneering work of Janaki Ammal triggered interest in ethnobotanical explorations and documentation of traditional ethnobotanical knowledge for human welfare.

Patur (20°30'35'' N latitude and 76°57'45'' E longitude) have one of the most popular forest of Maharashtra. The forest range covers about 89.23 square kilometers area. Plant medicines were regarded as highly important in the lives of our ancestors since they did not have any alternative therapy. Their dependence on the plants in their surroundings made them acquire the knowledge about the medicinal properties of many plants by trial and error. They were also aware of the commercial value of these plants. (Kennedy, 2003)

**1.2 Importance and Need of Study**

The main aim of study is identification and classification of medicinal plants through ethnobotanical survey of patur forest. Forests are the chief resource for the collection and exploration of biological material. The past few decades have witnessed large scale deforestation in India due to substantial pressure generated by population growth demanding more land for agriculture, urbanization and industrial activities in addition to increased demand for fuel, wood and timber.

This has resulted in the loss of soil cover, habitat destruction, environmental degradation and ecological imbalance. This scenario has created a progressive awareness for the conservation and restoration of habitat and thus, resulting in notifying many forest areas into protected zones, such as National Parks, Wildlife Sanctuaries and Biosphere Reserves.

The tribal's have developed their own traditional knowledge related to plant medicine, which has become treasure trove and cultural heritage of our nation. It is therefore, very important to preserve and protect the traditional knowledge and also to established a digital data base of traditional medicines. The indigenous knowledge about the medicinal plants has been passed on from generation to generation as folklore among the tribal peoples. Now days the knowledge of medicinal lants is confined to elderly person only.

There is urgent need to collect information and preserve them for our future needs. The present ethnomedicinal study of medicinal plants will help to classify, store and retrieve this information on traditional medicines of patur forest for the benefits of people lives in area of Patur.

**1.3 Objective of the study**

The present ethnomedicinal studies on medicinal plants of patur forest was carried out with the following objective,

1. Enumeration of medicinal plants used for the treatment of health problem to humans.
2. Classify and categorize these plant species according to their potential uses with family.

**1.4 Scope and limitation**

The scope of ethnomedicine is broad and encompasses a wide range of traditional healing practices, beliefs, and knowledge systems from various cultures around the world. It includes herbal medicine, spiritual healing, rituals, and other traditional healthcare practices that have been passed down through generations within specific cultural groups.

Many ethnomedical practices have not been rigorously tested or scientifically validated according to modern medical standards. Ethnomedical practices are deeply rooted in specific cultural beliefs and may not be easily transferable or applicable to other cultural contexts. Traditional remedies and practices may pose health risks or interact negatively with modern medical treatments. In some cases, ethnomedical knowledge may be restricted to specific cultural groups and not easily accessible to wider populations. It's

important to approach ethnomedicine with respect for cultural diversity and to critically evaluate its potential benefits and limitations within the context of modern healthcare practices.

### 1.5 Hypothesis

Traditional ethnomedicine practices, rooted in cultural beliefs and knowledge, may offer effective and culturally relevant healthcare solutions for certain ailments and conditions, and may provide valuable insights for modern medical research and practice. The tribes have evolved their own traditional knowledge of plant medicine, which has become a national gem and cultural heritage. It is consequently critical to maintain and protect traditional knowledge, as well as to create a computerized database of traditional remedies. In the current study, an attempt was made to collect, identify, and document plants from the study region**.**

## CHAPTER II

# REVIEW OF LITERATURE

Oomachan (1991) enumerated 233 flowering plants from 20 tribal dominated district of Madhya Pradesh and brought out valuable information regarding the use of locally available plants which included *Rauvolifia serpentina* for blood pressure, *Barleria prionitis* for whooping cough and tuberculosis and *Jatropa curcas* for cancer etc.

Chauhan (1999) reported 700 species of medicinal and aromatic plants of Himachal Pradesh. Plants were listed in alphabetical order of Latin name and described with family name, distribution, description of flowering, fruiting, plant parts used, current market price, chemical composition, uses, preparations and cultivation notes. Information on existing resources, utilization potential and conservation needs were also presented

Deka *et al.,* (2007) conducted survey to collect the information about some common medicinal plants used by tribal people of Assam. A total of 68 medicinal plants had been described, out of which 43 plants were used in various diseases of human being. The medicinal uses of roots, rhizomes, barks, bulbs, leaves, flowers, fruits, seeds were also enumerated.

Badgujar *et al.,* (2008) conducted ethno botanical study to investigate the use of medicinal plants for oral health care by different aborigines such as Bhills, Gavits, Konkanis, Mavachis, Valvis, Pawras, Konkanas and Vasaves in the Nandurbar District of Maharashtra. The investigation revealed that a total 20 claims were obtained distributed in 18 genera belonging to 14 families to treat various diseases and disorders of oral cavity, particularly in tooth decay.

Jagtap *et al.,* (2008) reported ethno medicobotanical uses of 13 endemic and RET plants belonging to 12 families used by the Korku tribe of Amravati District, Maharashtra. Effort for their conservation, cultivation and afforestration for sustainable utilization of such plants in future has been discussed.

Gupta *et al.,* (2009) studied ethno botanical plants used by Gond tribe of Bhandara District of Maharashtra in the treatment of diarrhea and dysentery and 38 valuable species belonging to 27 families were identified with relevant information and documented with regards to their botanical name, followed by family name, local name, parts used, mode of preparation and medicinal use.

Kuwar and Bapat (2010) studied medicinal plants used by Paturni tribal's of Nashik district of Maharashtra to cure cuts and wounds. It has been reported that 9 species are used to cure cut and wounds. The knowledge on the ethno botanical uses of the paturni tribal's can help to discover new drugs to cure cut and wounds provided the data given is scientifically evaluated.

Patil *et al.,* (2010) studied plants used in veterinary medicine in Buldhana district of Maharashtra state. During this survey 80 plants species belonging to 44 families have been reported as employed by the rural folk and tribal's. A list of plant species along with their family, local name, plant part used, medicinal recipe and mode of administration for effective control of different ailments is prepared.

Sankarnarayanan *et al.,* (2010) studied that ethnomedicinal of medicinal plants used by traditional user in Villupuram district of Tamil Nadu, India and recorded 46 species belonging to 31 families. The information collected from the traditional healers was used to compare with already accessible literature on the ethno botany of India. The conventional ethno medicinal plants were mostly used for fever, dysentery, skin disease, poison bites, wounds, piles and rheumatism.

Salave *et al.,* (2010) studied on traditional ethno-medico-flora used by Mahadeo koli from Ghatsiras area in Pathardi Taluka of Ahmednagar District and reported 24 plant species belonging to 11 families.

Suravase and Raut (2011) carried out ethno botanical study along with the ethnic groups in the Marathwada region of Maharashtra and recorded 50 plant species belonging to 30 families mostly used for fever,

diarhea, desentery, skin diseases, poision bites, wounds, piles and rheumatism.

Sharma and Kumar (2011) reported some medicinally important plants in Ethnomedicinal studies on Rajsthan. Useful ethno botanical information about the uses of plants by the tribal's of Rajasthan as food, fodder, medicine, timber, fire-wood, tannic, dye, oil, fibre, alcohol, gum, resin etc is collected.

Salave *et al.,* (2011) studied Ethno pharmaceutical claims by Vanjari's from Pathardi Tahsil in Ahmednagar District (MS). Ethno pharmaceutical claims on 24 plant species belonging to 19 families are presented.

Kumar and Abbas (2012) Studied on different medicinal parts of plants for the preparation of ethnomedicine for specific diseases and disorders is gathered by the tribal and forest dwellers in Jharkhand from ambient vegetation of forests. It is very interesting that from a wide range of plant diversity; the selection of plants and preparations of ethnomedicine by making composition over trial on generation to generation is innovation of ethnic people. Like Santhal, Paharia, Oraon, Munda, Kol, Kharwa, Ho etc. have been observed. The tribal people inhabit in the forest areas of Santhal Pargana and Chhota-Nagpur region of Jharkhand and they collect potential and effective medicinal plants, utilized by them for meeting their primary health care. The species are arranged disease wise giving information with botanical names, tribal names and part used. The medicinal uses of plants species have been recorded from the tribal medicine men Jangurus, Ojhas, Manjhis etc. during the survey and field studies among them. The data will serve as useful tools to understand the dependence of ethnomedicinal composition on floristic composition and importance of natural association of Sal forests.

Yumnam *et al.,* (2012) found that people of Manipur use large number of medicinal plant species in the ethnomedicinal treatment for different diseases. The different parts of plant such as leaves, flowers fruits, roots, tubers, rhizomes and bulbs were made into their medicine for treatment

of almost all the commonly occurring health problems. The plants were used either separately or as poly herbal mixture and in their ethnomedicinal system

Soni *et al.,* (2013) revealed ethnomedicinal practices of various diseases among Gond & Halba tribe of Chhattisgarh, India. 29 medicinal plants were identified with relevant information and documented with regard to their botanical name, family, local name & plant parts used and utilization for treatment of 18 types of diseases. The Halba tribe use many medicinal plant species for the treatment of common skin ailments, wounds, eczema as well as gastrointestinal problems such as diarrhea, dysentery, constipation, jaundice, cardio vascular disease, paralysis, cold and cough, asthma, tuberculosis, malaria, arthritis and also for snake bite, scorpion bite, dog bite, fracture of bone, etc.

Bakare (2014) enumerates traditional uses of 48 different plant species of ethnomedicinal plants use by the people of village Nawargaon tahasil Sindevahi of District Chandrapur (M.S.), India. The people from these regions with a vast heritage of diverse ethnic culture and rich biodiversity is said to be a great emporium of ethnobotanical health. Studying medicinal plants helps to understand plant toxicity and protect human and animals from natural poisons. This survey was conducted for documented of traditional knowledge and practices of plants.

Ahmad *et al.,* (2014) worked out investigation on 24 medicinal plants which have been used for the treatment of various diseases like asthma, piles, diabetes, snake bites, skin diseases, ulcer, stomach pain, cough, headache, anemia, rheumatism, purgative, dysentery, leprosy, laxative, astringent, urinary disorder, paralysis, scabies, diarrhea and diuretic etc. Some of them were used as anthelmintic and antiseptic also. 24 plant species belonging to 17 families were reported in which rock, bark, latex, leaves, fruits, and seeds were used medicinally. Those plants were taken internally and applied externally as decoction, paste or powder. Most of the plants used as medicine are either mixed with other ingredients or used singly. Medicinal plant has been enumerated with their botanical name, family's name, and local name part used and ethnomedicinal uses. It was advised that some important medicinal plants need immediate conservation

and their cultivation should be encouraged through which their extinction can be prevented and local village people may also get low-cost cure of their diseases**.**

Jadhav R. R. (2015) studies the ethnomedicinal plants of Kadegaon Tahsil of Sangli district, Maharashtra. Traditional medicine and ethnobotanical information play an important role in scientific research, particularly when the literature and field work data have been properly evaluated. There is no documentation of this ethnomedicinal knowledge. It is thus important to document and understand the medical heritage of a changing culture before it is lost entirely to future generations. The study was carried out in the villages of Kadegaon Tahsil concerns for the medicinal plants used for the treatment of various diseases by local inhabited. 21 plant species belonging 15 families are used for treating various diseases. The information on correct botanical identities, family, local, name, plant parts used & uses of each plant. This study presents the results of a field survey of the plants used medically by the rural people of Kadegaon Tahsil in Sangli districts.

Biswas *et al.,* (2016) have identified 57 numbers of ethno-medicinal plants belonging to 39 families, used for preparing medicinal remedies. The habit of the plants includes 35% trees, 28% shrubs, 23% herbs and 4% climbers. The most frequently utilized plant parts were the roots & tuber roots (26%), Stem which includes bark, tubers, bulb, rhizome, gum, wood & young shoots (24%), leaves (18%), fruits (13%), and seeds (10%). The most frequent happening ailments were asthma and bronchitis, constipation and dyspepsia, diarrhea, dysentery, ulcer, rheumatism, arthritis, fistula and piles troubles. Most of the plants (88%) had more than a single therapeutic use. The most important plant species on the basis of use value were *Smilex ovalifolia, Emblica officinalis, Curculigo orchioides, Croton roxburghii, Asparagus racemosus, Ziziphus nummularia, Ichnocarpus frutescens, Cisssus adnata, Buettneria herbacea, Litsea glutinosa, Vernonia anthelmintica and Chlorophytum borivilianum.*

Sangole (2016) conducted an ethnobotanical study on a different family. The ethnomedicinal data of 20 plants of different family were

collected from Akola District. The study reveals either role of ethnomedicinal plants for the treatment of various diseases and disorders. The study also revealed the indigenous knowledge about part of plant and how whole plant is used for medicinal purpose and making people aware about the botanical names, common names, and its uses of selected family

Goshal and Tamuli (2017) conducted a study on the medicinal plants used for treating various infectious diseases related to ear, nose and throat. They found that the ethnomedicinal plants which were used to treat ear, nose and throat diseases were safe, effective and inexpensive, for which there is a global trend for the revival of traditional herbal medicine. A total of 51 plant species along with their uses have been discussed

Vishnuvardhan *et al.,* (2018) their study provides us information on 67 ethnomedicinal plant species used by tribals of Guntur district for the treatment of 69 human ailments. Plant species such as *Alternantherasessilis, Annonasquamosa, Carica papaya* and *Givotiamoluccana* were used each in the treatment of diseases namely diabetes, jaundice, liver disorders and snakebites. The literature search on tribal ethnomedicine revealed striking coincidences in the ailment and plant species used by various tribes and provides ethnobotanical lead that makes *Gymnemasylvestre, Aristolochiaindica, Calatropisgigantia* and *Phyllanthusamarus* a valuable source of raw materials for further critical evaluation by the pharmacologists and Phyto chemists**.**

Mishra *et al.,* (2021) studies on different ethnomedicinal plants used by Gond and Madia Gond tribes in the Gadchiroli District of Maharashtra (India). After screening, a total of 120 persons belonging to Gond and Madia tribes were interviewed for the use of medicinal plants. As a result of this interaction, a total of 79 medicinal plants were identified to which they claimed to use for the treatment of 34 ailments. These plants belonged to 30 families and 57 genera of the angiosperms. The ethno botanical indices such as the informant consensus factor (ICF), relative frequency of citation (RFC) was also evaluated. The most important plant family was Fabaceae (10.1%) followed by Mimosaceae (7.6%), Moraceae (7.6%), Caesalpiniaceae (6.3%)

and Rubiaceae (6.3%). Some of the dominant genera reported were Ficus (5 species), Acacia (3 species), Terminalia (3 species), and Albizia (2 species).

Wankhade *et al.,* (2021) studies on Banjara tribe of Mantha tahesil district Jalana of Maharashtra, India. Banjara tribes in this area have been using number of plants in their traditional medicine. The ethnomedicinal survey brought to light 51 medicinal plants belonging to 32 families distributed in 23 genera used very commonly by this Tribe. The different plant parts like stem, leaves, fruit, flower, bark, root, seed and pod were used by this tribal community. The plants were identified with relevant information and are documented with their botanical name, family, local name, parts used, mode of preparation and uses. Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources and for the wale fare of human being.

Yogeesha and Krishnakumar (2022) this study has been carried out in Western Ghats of Dakshina Kannada district, Karnataka state, India during 2018 - 2021 to document ethno-medicinal plants used by traditional practitioners to treat migraine. Most people prefer herbal folk therapies against this chronic disorder.

## CHAPTER III

# MATERIAL AND METHODS

### 3.1 General description of the area

The present ethno-botanical study of medicinal plants was conducted in Patur Forest, Akola Wildlife Division, Dist. Akola

#### 3.1.1 Location

The Patur Forest is located in Akola District, near Patur Town of Maharashtra state. The forest was spread over an area of 89.23 sq km and lies in the Melghat region barely 30 km away from Akola. The Patur Forest was surrounded by Patur, Tandali, Shiv, Agikhed, Sotalvan, Shirla (Andhare), Jogtalav, Kapshi, Mahaldoli and Bodkha villages. The forest lies between latitudes 21°12’24.7’’ N and longitudes 79°48’22.8’’ E. (Plate 1)

The total geographical area of Akola Forest Division is 10,59,586ha, out of which 81009.61 ha i.e. 7.64 percentage is under forest cover. As per working plan of Akola Forest division, the total forest area is eight ranges is about 81009.61 ha, out of which 8923.33 Ha forest area is under Patur forest range. (Source: Working Plan for Akola Forest Division, Yavatmal Forest Circle, Vol-I, 2009-10 To 2018-19.)

#### 3.1.2 Boundaries

North: Shirla (Andhare)

South: Bodkha

West-South: Alegaon

East: Khanapur

#### 3.1.3 Climate

The Patur forest is located in the Indian state of Maharashtra. The climate of the region is generally classified as tropical, with hot and dry summers and mild winters. The area experiences a monsoon season from June to September, during which heavy rainfall occurs. The average annual temperature in Patur is around 27°C (81°F). The forest is part of the semi-arid region of Maharashtra, so it receives less rainfall compared to other parts of the state. The vegetation in the Patur forest has adapted to these climatic


**Plate 1. Location Map of Patur Forest Range**

conditions, with many species of drought-resistant plants and trees being found in the area.

There are 48 rainy days on average every year, and the annual rainfall ranges from 600 to 910 mm. After February, the temperature increases quickly until May, when it reaches its peak. The average daily maximum temperature in May is 42.2$^{o}$C, while the average daily minimum is 27.5$^{o}$C. Although the summertime heat is unbearable during the day, it is bearable at night. When the Southwest monsoon arrives by early June, thundershowers can occasionally provide relief from the afternoon heat. The daytime high falls noticeably, and the weather turns more seasonally appropriate. The daytime temperature increases gradually following the monsoon's retreat, reaching its secondary maximum in October. The daytime temperature increases gradually thereafter. However, following September, the nighttime low gradually drops. From October through December, the coldest month of the year, there is a sharp drop in both day and nighttime temperatures. In December, the average daily maximum temperature is 29.30°C, while the average daily lowest temperature is 11.90°C. The cold wave from North India during the winter months causes Western disturbances in North India, which can cause nighttime temperatures to plummet to 20 to 40 °C.

### 3.1.4 Flora

The land vegetation according to Champion and Seth's classification belongs to 5-A/CI-Southern Tropical Dry-deciduous Forest type having *Tectona grandis* as major species. The main associates are *Anogeissus latifolia, Madhuca indica, Emblica officinalis, Terminalia ballerica, Aegle marmelos, and Boswellia serreta, Cassia fistula, Buchanania Lanzan, Butea monosperma, Diospyrous melanoxylon.* Predominent shrubs are *Helictris isora, Ixora parviflora*. In interior parts, Lantana bushes are in plenty, while on peripheral parts *Vitex nigundois* in abundance.

### 3.1.5 Fauna

#### 3.1.5.1 Animals

The common animals that are met with in these Forest range like, Sloth bear, Wild dog, barking deer, Neelgai (Roohi), Spotted deer, Wild-bore, Black buck, Fox, Donkey, Wild cat, Rabbit, Squirrel, Wolf.

#### 3.1.5.2 Birds

Birds such as Peafowl, Green pigeon, are common in all over forests while grey jungle fowl is found only in Bamboo areas. Grey Heron, Cattle Egret, Common Quail, Blue Rock Pigeon, Asian Koel, Spotted owlet, Myna, Forest owlet, Small Blue Kingfisher, Indian Roller, Crow, Sparrow, Crane, Eagle, Parrot, Duck, Owl.

#### 3.1.5.3 Reptiles

In this category there are mainly two categories are found such as Snakes (poisonous and non-poisonous)and Lizard.

### 3.2 Methodology

The methodology was adopted for the site selection, data collection, and analysis of the information collected as per the requirements of the study.

### 3.2.1 Field Survey

Extensive surveys of the forest were carried out in different phases. Later, collections of ethnomedicinal information are obtained from Vaidas, Mukhiya, and other villagers. The data was compiled through a combination of interviews with lots of people from the tribal regions. An ethnomedicinal survey was carried out, by visiting such tribal areas where local people mostly use medicinal plants for healing various diseases. The people from Patur, Tandali, Shiv, Agikhed, Sotalvan, Shirla (Andhare), Jogtalav, Kapshi, Mahaldoli and Bodkha villages were interviewed and different plant species.

### 3.2.2 Site Selection

The Patur Forest was surrounded by Patur, Tandali, Shiv, Agikhed, Sotalvan, Shirla (Andhare), Jogtalav, Kapshi, Mahaldoli and Bodkha

Plate 2. Selection of site: villages and Patur forest

villages. These villages were selected for the ethnobotanical data collection based on the availability of traditional healers, elders, and knowledgeable persons. The .traditional healers were identified with the help of a key person. An ethnomedicinal survey was carried out, by visiting such tribal areas where local people mostly use medicinal plants for healing various diseases. The photographs of patur forest study area shown in plate 2.

### 3.2.3 Selection of informnt

Selection of informants was performed following Martin (1995) who indicated that when recording indigenous knowledge held by knowledgeable traditional healers or by certain social groups the choice of key informant is crucial. 100 informants were selected from the villages of the study site. The age of informants between 0 to 75. The informants were preferentially selected from the villages with the help of local administrators, elders, and other community members. The key informants include healers, elders, and knowledgeable persons. The photographs of selection of informants and interviewing the informants shown in plate 3.

### 3.2.4 Collection of ethno-botanical data

Ethnobotanical data was collected through semi-structured interviews following the methods outlined by Martin (1995) and Cotton (1996), as well as through field observations and group discussions. Information pertaining to the plant part used, preparation, use, application, educational status of medicinal plants, along with other relevant ethnobotanical information was gathered. Essential details about the plants, such as their characteristics and habitats, were recorded. The data was compiled through a combination of interviews with lots of people from the tribal regions. An herbarium was created for all identified medicinal plants, and photographs were taken of selected herbarium specimens and the materials used in their preparation shown in plate 4.

### 3.2.5 Field observation

Field observation was performed with the help of local guides and interviewed informants in the study area. Full notes on facts and information about the respondents, history of the traditional healers, history of

Plate 3. Selection of informants and interviewing the informants


**Plate 4. Herbarium specimen and material used for the preparation of herbarium**

the medicinal plants and other essential information based on the questions was recorded.

### 3.2.6 Group discussion

A brief discussion was made with the informants at each site prior to ethno-botanical data collection. In group discussion educational status of the informants as well as source of traditional knowledge with transferring of gained knowledge of traditional medicinal plants noted. The photographs of group discussion with villagers are shows in plate 5.

### 3.2.7 Plant identification

Voucher specimens were collected for each plant species and identification of some common and well-known species were made in the field. The specimens were dried pressed and mounted on herbarium sheet. The plants that were not identified in the field, those plants were identified with the help of published book on Satpudyatil paramparik vanaspati (Dr. S. H. Patil), Forest flora of Melghat(Patel, 1958), Maharashtra Forest Manual (Compendium) (2013), ( Additions to the flora of Melghat (Bhogaonkar and Devarkar, 1999), The forest flora of Maharashtra state vol.1 (Singh and Karthikeyan,2000) and The forest flora of Maharashtra state vol.2(Singh and Karthikeyan,2001), Maharashtratil vanspatishasrta aani vansampada (Naik,2006) and got assistance from taxonomic personnel and taxonomists. The photograph of flora's and book's used for identification is shown in plate 6.

## 3.3 Data analysis

Ethnomedicinal information was collected from the semi-structured interviews and field observation was computed by preference ranking, paired comparison and direct matrix ranking according to Martin (1995), Alexiades (1996) and Cotton (1996). Informant consensus, ranking and informant consensus factor were computed.

### 3.3.1 Preference ranking

Following Martin (1995), preference ranking was made for five medicinal plants used to treat skin disease that was found to be the most frequently encountered disease in the study area and for which they have

Plate 5. Group discussion with informants

Plate 6. Flora's and book's used for identification of medicinal plants

several alternative plants as readily. Ten preferentially selected key informants from each village were made to participate in this exercise. The informants were given the plants and asked to arrange the five medicinal plants on the basis of their personal preference of efficacy. The medicinal plant that was believed to be the most effective was given the highest value i.e., 10, and the one with the least effectiveness received the lowest value i.e., 1. On the basis of total score of each species the rank was determined and this helped to indicate the most effective medicinal plants used by the community to treat fever.

### 3.3.2 Paired comparison

Following identifying the top five plants based on the informants' reported high usage values, paired comparisons were used as outlined by Martin (1995). The five plants most of the informants identified as the most beneficial at treating wound healing were compared side by side using a random number table and coin tossing. Ten respondents were chosen preferentially from the key informants in each village and allowed to express their opinions independently for two traditional medicinal plants used for joint pain.

### 3.3.3 Informant consensus

Informants' consensus was help to see similarity of information given by informants which was compared it with other information on same topic. Accordingly, disease of humans, numbers of citation and percentage was record.

### 3.3.4 Informant consensus factor

The Informant Consensus Factor (ICF) was calculated for each category to identify of informants for the group of ailments.

Informants consensus factor (ICF) = $n_{ur} - n_t / n_{ur} - 1$

Where, $n_{ur}$ = number of use citation in each category

$n_t$ = number of species used

### 3.3.5 Direct matrix ranking for multiple uses of traditional medicinal plant species

Direct matrix ranking will be conducted for following Cotton (1996) for seven multipurpose medicinal plants commonly reported by informants. The list of attributes will be included medicinal, fire wood, building, charcoal, furniture, edible fruits and fence. The scores will be added in order to compare use values of medicinal plants and help to identify the main causes of over harvesting of the medicinal plants

## CHAPTER IV

# RESULT AND DISCUSSION

The result emerging from the present study entitled “Ethnomedicinal Survey of Patur Forest in Akola District” are presented in this chapter under following

### 4.1 Identified families, genera and number of species.

In the Patur Forest, 98 ethnomedicinal plant species with documented medical uses have been identified (Table 1). The photographs of some of the medicinal plants are shown in plate 7. There were 49 families and 88 genera represented among the species. The Fabaceae family has 10 species (10.20%), followed by the Liliaceae with 4 species (4.09%), the Caselpiniaceae with 4 species (4.09%), Anacardiaceae with 4 species (4.09%), and the Fabiaceae with 4 species (4.09%). The Poaceae families also have 4 species (4.09%), respectively (Table 2). Similar type of study has carried out by Suravase and Raut (2011) on ethno botanical study along with the ethnic groups in the Marathwada region of Maharashtra and recorded 50 plant species belonging to 30 families. Kamble *et al.,* (2010) also studied plants used in traditional medicine by Bhilla tribe of Maharashtra and reported 127 plants species belonging to 116 genera and 59 families of flowering plants and ferns are being used by Bhilla tribe for medicinal purpose. Pradeepkumar and Prathapsena (2003) studied ethno botany of Shoolpaneswar wildlife sanctuary in Gujarat and collected information concerning 50 angiosperms used by the local tribal inhabits in the area of sanctuary. This study deals with the family. botanical name, vernacular name and use of the plants.

**Table 1. Identified medicinal plants in Patur Forest.**

| Scientific name | Family | Local name | Habit | Source |
|---|---|---|---|---|
| *Abelmoachus manihot (L.)* | Malvaceae | Jangli bhendi | Shrub | W |
| *Abrus precatorius L.* | Fabaceae | Gunj | Twiner | W/HG |
| *Acacia nilotica (L)* | Mimosaceae | Babool | Tree | W |
| *Acacia catechu* | Mimosaceae | Khair | Tree | W |
| *Acacia leucophloea* | Mimosaceae | Hiwar | Tree | W |
| *Achyranthes aspera L.* | Amranthaceae | Aghada | Herb | W/HG |
| *Ailanthus excelsa Roxb.* | Simaroubaceae | Maharukh | Tree | W |
| *Aloe vera (L.) Bum. F* | Liliaceae | Korphad | Herb | W |
| *Amorphopalous paeoniifolius (Dennts) Nicols.* | Araceae | Surankand | Herb | W/HG |
| *Andrographis paniculata (Burm. f.) Wall ex Nees* | Acanthaceae | Bhuineem | Herb | W/HG |
| *Angle marmelos (L.)* | Rutaceae | Bel | Tree | W |
| *Annona squamosa L.* | Annonaceae | Sitaphal | Tree | W |
| *Anogeissus latifolia* | Combretaceae | Dhavda | Tree | W |
| *Argemone mexicana L.* | Papaeraceae | Piwla dhotra | Herb | W/HG |
| *Arisaema murrayi (Graham) Hook.* | Araceae | Bhasmakand | Herb | W |
| *Asperagus reemosus Wild* | Liliaceae | Marbat/ Shatawari | Shrub | W |
| *Azadirachta indica A. Juss* | Meliaceae | Nimba/ Neem | Tree | W |
| *Bacopa monnieri (L) Penn.* | Scorphulariaceae | Bramhi | Herb | W |

| | | | | |
|---|---|---|---|---|
| *Bombusa bamboo* | Poaceae | Bamboo | Tree | W |
| *Boerhavia erecta L.* | Nyctaginaceae | Khupri | Shrub | W |
| *Bombax ceiba L.* | Bombacaceae | Katesawar | Tree | W |
| *Boswellia serrat Roxb.* | Burseraceae | Salai | Tree | W |
| *Buchnania lanzan Spreng* | Anacardiaceae | Charoli | Tree | W |
| *Butea monosperman (Lamk.) Taubert* | Fabaceae | Palas | Tree | W |
| *Caesalpinia bondu (L.) Roxb.* | Ceasalpiniaceae | Sagargota | Tree | W |
| *Calotropis procera (Ait.) R. Br.* | Asclepidaceae | Rui | Shrub | W |
| *Cardiospermum halicacbum (L.)* | Sipndaceae | Kapalphodi | Herb | W |
| *Carissa congesta White* | Apocynaceae | Karvand | Shrub | W |
| *Cariya arborea Roxb.* | Lecythidaceae | Jadkumbhi | Tree | W |
| *Cassia fistula L.* | Ceasalpiniaceae | Amaltash | Tree | W |
| *Catunaregam spinosa (Thunb.) Timeng* | Rubiaceae | Gelphal, Madanphal | Tree | W |
| *Cassia tora L.* | Ceasalpiniaceae | Tarota | Herb | W |
| *Ceosia argentea Wild.* | Amranthaceae | Kombada | Herb | W |
| *Chloraphytum borivillium* | Liliaceae | Safed musli | Herb | W |
| *Clerodendrum serratum (L.) Moon* | Verbenaceae | Bharangi | Shrub | W |
| *Clitorea tematea L.* | Fabaceae | Gokarn | Climber | W |
| *Cocculas hirsutus (Linn.) Dies* | Menispermaceae | Vasanvel | Climber | W |
| *Cordia gharaf (Forsk.) Ehernb. & gAsch.* | Boraginaceae | Gondhan | Tree | W |

| | | | | |
|---|---|---|---|---|
| *Costus specious (Koen.) J. E. Sm.* | Zingibraceae | Pev | Herb | W/HG |
| *Curculigo orchiodes Gaertn.* | Hypoxides | Kali musli | Herb | W |
| *Cymapogan citrates stapf.* | Poaceae | Gavti chai | Herb | W/HG |
| *Cymapogan martini (Roxb.) Wats* | Poaceae | Tikhadi zara | Herb | W |
| *Cynadon dactylon (L.) Pers* | Poaceae | Haral | Herb | W |
| *Datura metal L.* | Solanaceae | Dhotra | Herb | W |
| *Desmodium gangeticum* | Fabaceae | Chiktya | Herb | W |
| *Diplocyclon palmatus (L.) C.* | Fabaceae | Shivlingi | Climber | W |
| *Eclipta prostrate (L.) L.* | Asteraceae | Maka | Herb | W |
| *Embelica officinalis* | Euphorbaceae | Awla | Tree | W |
| *Ensete superbum (Roxb.)* | Musaceae | Jangli kel | Herb | W |
| *Eucalyptus globules* | *Myrtaceae* | Nilgiri | Tree | W |
| *Erythrina variegate* | Leguminoaceae | Pangara | Tree | W |
| *Ficus benghalensis* | Moraceae | Wada | Tree | W |
| *Ficus racemose L.* | Moraceae | Umbar | Tree | W |
| *Ficus religiosa L.* | Moraceae | Pipal | Tree | HG |
| *Helicteres isora L.* | Stercullaceae | Murudshing | Shrub | W |
| *Hemidesmus indicus* | Peripioceae | Anantmul | Shrub | W |
| *Hibiscus rosa- senesis L.* | Malvaceae | Jasvand | Shrub | W |
| *Ixora brachiata Roxb.* | Rubiaceae | Lokhandi | Tree | W |

| | | | | |
|---|---|---|---|---|
| *Justica adhatoda* | Acanthaceae | Adulsa | Shrub | W |
| *Kalanchoe pinnata (Lam.) pers.* | Crasulaceae | Panphuti | Herb | W |
| *Kedrostis rostrata* | Cucurbitaceae | Mirchi kand | Herb | W |
| *Lantana camera L.* | Verbenaceae | Ghaneri | Herb | W |
| *Legertroemia parviflora Roxb.* | Lythraceae | Chekre, Jarul | Shrub | W/HG |
| *Madhuca longifolia var. latifolia (Roxb) Chev* | Sapotraceae | Moha | Tree | W/HG |
| *Mangifera indica L.* | Anacardiaceae | Aamba | Tree | W/HG |
| *Mimosa pudica* | Anacardiaceae | Lajari | Herb | W |
| *Moringa oleifera* | Moringaceae | Shevga | Tree | W |
| *Ocimum basilicum* | Laminaceae | Mirkuta | Herb | W |
| *Ocimum gratissimum L.* | Laminaceae | Sabja | Herb | W |
| *Ocimum tenuiflorum L.* | Laminaceae | Tulas | Herb | W |
| *Pergukaria daemia (Forsk.) Chiov* | Asclepiadaceae | Utaran | Shrub | W |
| *Phyllanthus amarus Schum & Thonn.* | Euphorbiaceae | Bhuiawla | Herb | W |
| *Plumbago zeytanica* | Plumbaginaceae | Chitrak | Shrub | W |
| *Pongamia pinnata (L.)* | Fabaceae | Karanj | Tree | W |
| *Pterocarpus marsupium Roxb.* | Fabaceae | Bijasaag | Tree | W |
| *Pueraria tuberosa (Roxb e Wild.) DC.* | Fabaceae | Bharda | Twiner | W |
| *Rauwolfia serpentina* | Apocynaceae | Mungsvel | Shrub | W |
| *Saraca asoca* | Fabaceae | Ashoka | Tree | W |

| | | | | |
|---|---|---|---|---|
| *Sapindus laurifolius* | Sapindaceae | Ritha | Tree | W |
| *Semecrapus anacardium L.* | Anacardiaceae | Bibba | Tree | W |
| *Sesamum oreintale* | Pedaliaceae | Rantil | Herb | W |
| *Syzygium cumini (L.)* | Myrtaceae | Jambhul | Tree | W |
| *Terminalia indica L.* | Caesalpiniaceae | Chinch | Tree | W |
| *Tectona gandis L.* | Verbenaceae | Saag | Tree | W |
| *Tephrosia purpurea (L.) Pers.* | Fabaceae | Unhali | Shrub | W |
| *Termanlia arjuna  roth.* | Combrataceae | Arjun | Tree | W |
| *Terminalia belirica* | Combretaceae | Behda | Tree | W |
| *Thrspesia lampsas (Cav.) Datz. And Gibs.* | Malvaceae | Jangli kapas | Shrub | W |
| *Tinospora cordifolia (Wild)* | Menispermaceae | Guduchi/ Gulvel | Climber | W |
| *Trichosanthes tricuspidata Lour.* | Cucurbitaceae | Gawlan phal | Climber | W |
| *Tridax procumbens L.* | Asteraceae | Kambar modi | Herb | W |
| *Urginea indica (Kunth).* | Liliaceae | Raankanda | Herb | W |
| *Vertilago denticulata Wild.* | Rhamnaceae | Ragatpiti | Herb | W |
| *Vemonia anthelmintica* | Compositae | Jangli jira | Herb | W |
| *Vemonia cinerea* | Compositae | Sahdevi | Herb | W |
| *Vitex nigando* | Verbenceae | Nirgudi | Shrub | W |
| *Wrightia tinctoria* | Apocynaceae | Dudhi/ kala kadu | Tree | W/HG |
| *Zizipus jujibie Mill.* | Rhamnaceae | Ber | Tree | W |

*Datura metal L.* (Dhotra)

*Dalbergia sissoo Roxb.* (Shisam)

*Calotropis procera (Wild) R. Br.* (Rui)

*Tectona grandis L.* (Saag)

*Azadirachta indica A. Juss* (Neem)

*Zizyphus jujuba Mill.* (Bor)

**Plate 7. Medicinal plants of Patur Forest Range**

**Table 2. Identified families, genera, number of species and their percentage**.

| Family Name | No. of Genera | No. of Species | % of No of Species |
|---|---|---|---|
| Malvaceae | 3 | 3 | 3.06 |
| Fabaceae | 10 | 10 | 10.20 |
| Mimosaceae | 1 | 3 | 3.06 |
| Amranthaceae | 2 | 2 | 2.04 |
| Simaroubaceae | 1 | 1 | 1.02 |
| Liliaceae | 4 | 4 | 4.09 |
| Araceae | 2 | 2 | 2.04 |
| Acanthaceae | 2 | 2 | 2.04 |
| Rutaceae | 1 | 1 | 1.02 |
| Annonaceae | 1 | 1 | 1.02 |
| Combretaceae | 2 | 3 | 3.06 |
| Papaeraceae | 1 | 1 | 1.02 |
| Meliaceae | 1 | 1 | 1.02 |
| Scorphulariaceae | 1 | 1 | 1.02 |
| Nyctaginaceae | 1 | 1 | 1.02 |
| Bombaceae | 1 | 1 | 1.02 |
| Burseraceae | 1 | 1 | 1.02 |
| Ceaselpiniaceae | 3 | 4 | 4.09 |
| Asclepidaceae | 2 | 2 | 2.04 |
| Sapindaceae | 2 | 2 | 2.04 |
| Apocynacaeae | 3 | 3 | 3.06 |
| Lecythidaceae | 1 | 1 | 1.02 |
| Anacardiaceae | 4 | 4 | 4.09 |
| Rubiaceae | 2 | 2 | 2.04 |
| Verbenceae | 4 | 4 | 4.08 |
| Minispermaceae | 2 | 2 | 2.04 |
| Boraginaceae | 1 | 1 | 1.02 |
| Zingiberaceae | 1 | 1 | 1.02 |
| Hypoxideace | 1 | 1 | 1.02 |
| Poaceae | 3 | 4 | 4.09 |
| Solanaceae | 1 | 1 | 1.02 |
| Asteraceae | 2 | 2 | 2.04 |
| Euphorbiaceae | 2 | 2 | 2.04 |
| Musaceae | 1 | 1 | 1.02 |
| Moringaceae | 1 | 1 | 1.02 |
| Leguminaceae | 1 | 1 | 1.02 |
| Moraceae | 1 | 3 | 3.06 |

| | | | |
|---|---|---|---|
| Sterocullaeceae | 1 | 1 | 1.02 |
| Peripoceae | 1 | 1 | 1.02 |
| Crasulaceae | 1 | 1 | 1.02 |
| Cucurbitaceae | 2 | 2 | 2.04 |
| Lythraceae | 1 | 1 | 1.02 |
| Sapotaceae | 1 | 1 | 1.02 |
| Laminaceae | 1 | 3 | 3.06 |
| Plumbaginaceae | 1 | 1 | 1.02 |
| Pediliaceae | 1 | 1 | 1.02 |
| Myrtaceae | 2 | 2 | 2.04 |
| Rhamnaceae | 2 | 2 | 2.04 |
| Compositae | 1 | 2 | 2.04 |
| Total **:** 49 | 88 | 98 | 100 |

### 4.2. Source of medicinal plants

In terms of the distribution of Patur Forest's medicinal plants, of the 98 species, 86 (87.75%) were collected from the wild, 11 (11.23%) from home gardens and the wild, and 1 (1.02%) from home gardens (Table 3). This meant that the majority of therapeutic herbs were sourced from the Forest natural vegetation. Since, except few herbs, trees and some cultivated crops, the local people rely on medicinal plants from wild habitats. Rai and Lalramnghinglova (2010) studied ethnomedicinal plants resources of Mizoram and recorded 159 species belonging to 134 genera and 56 families recorded from tropical forest, home gardens, road sides and university campus of Mizoram.(Table 3 & Fig. 1)

**Table 3. Source of Medicinal plants.**

| Source | Number of species | Percentage |
|---|---|---|
| Wild | 86 | 87.75 |
| Wild and home garden | 11 | 11.23 |
| Home garden | 1 | 1.02 |
| Total | 98 | 100 |

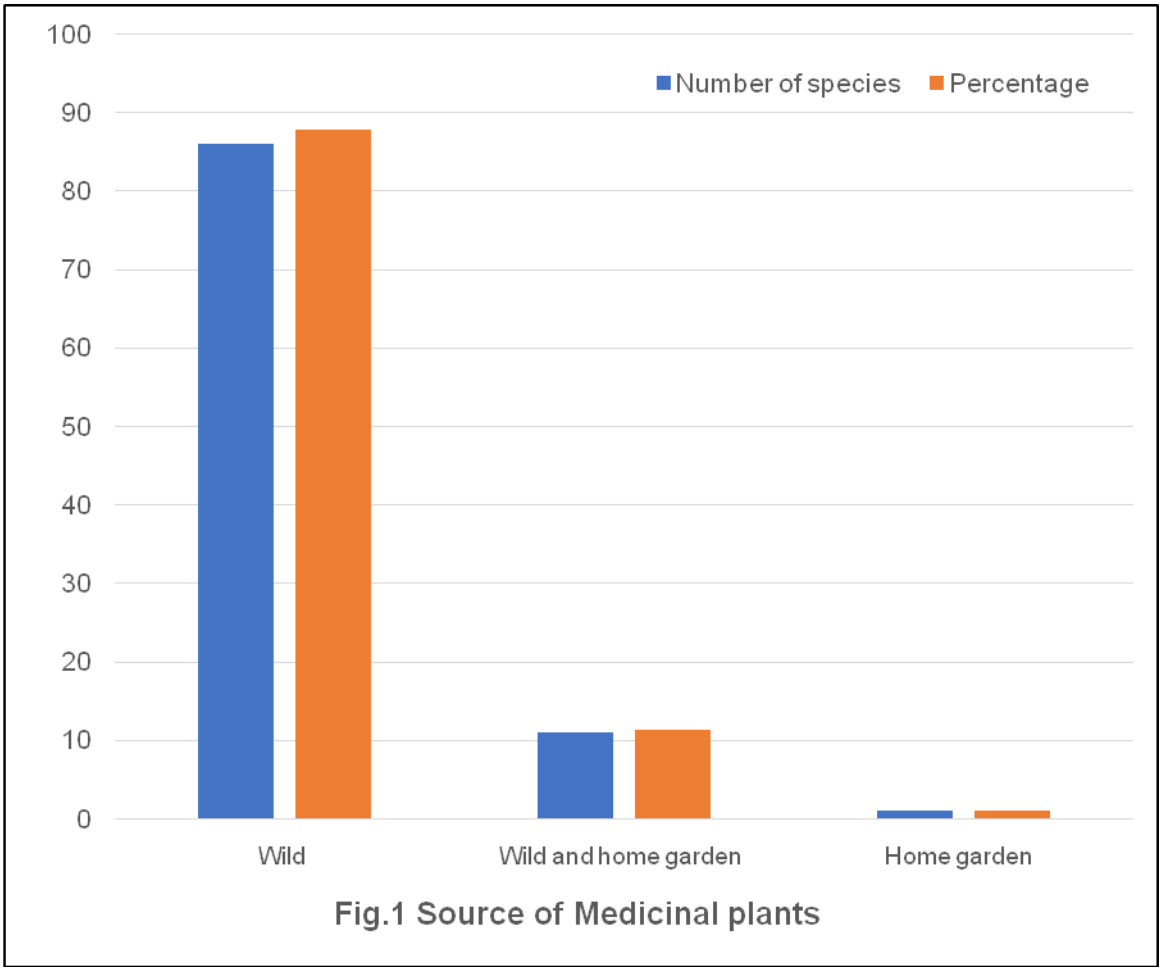


Fig.1 Source of Medicinal plants

The local people cultivate some popular medicinal plants in their home garden for the purpose of medicine such as *Abrus precatorius*, Aloe vera and *Asparagus resemosus*. It was found from the present study area that some traditional healers do not have interest to grow in their home garden some plant species that are used to treat specific ailments in order to keep the secret of their medicinal value. This means that most of the medicinal plants found in the home gardens are those also known to have other uses particularly as food.

### 4.3 Habit of Medicinal Plants

Of the total 98 medicinal plants collected from the study area, 37 species (37.75 %) were tree followed by , 35 species (35.72 %) were herbs, 19 species (19.39%) shrubs, 5 (5.10%) species climber and 2 (2.04%) species twiner (Table 4 and fig. 2).

Geradkar and Yeragi (2006) studied medicinal plants of Tadoba National Park and recorded 91 medicinal plants along with their local names, families, habit and medicinal uses.(Table 4 & Fig.2)

**Table 4. Habits of medicinal plants.**

| Habit | Number of species | Percentage |
|---|---|---|
| Herbs | 35 | 35.72 |
| Shrubs | 19 | 19.39 |
| Trees | 37 | 37.75 |
| Climbers | 5 | 5.10 |
| Twiners | 2 | 2.04 |
| Total | 98 | 100 |

### 4.4. Medicinal plants and their main uses by the local People

Out of the collected 98 medicinal plants from the area of Patur Forest, 98 species were used against 62 human ailments (Table 5 and Appendix 1). Medicinal plants are particularly important among the different forest products collected and used, as they are quite effective in curing

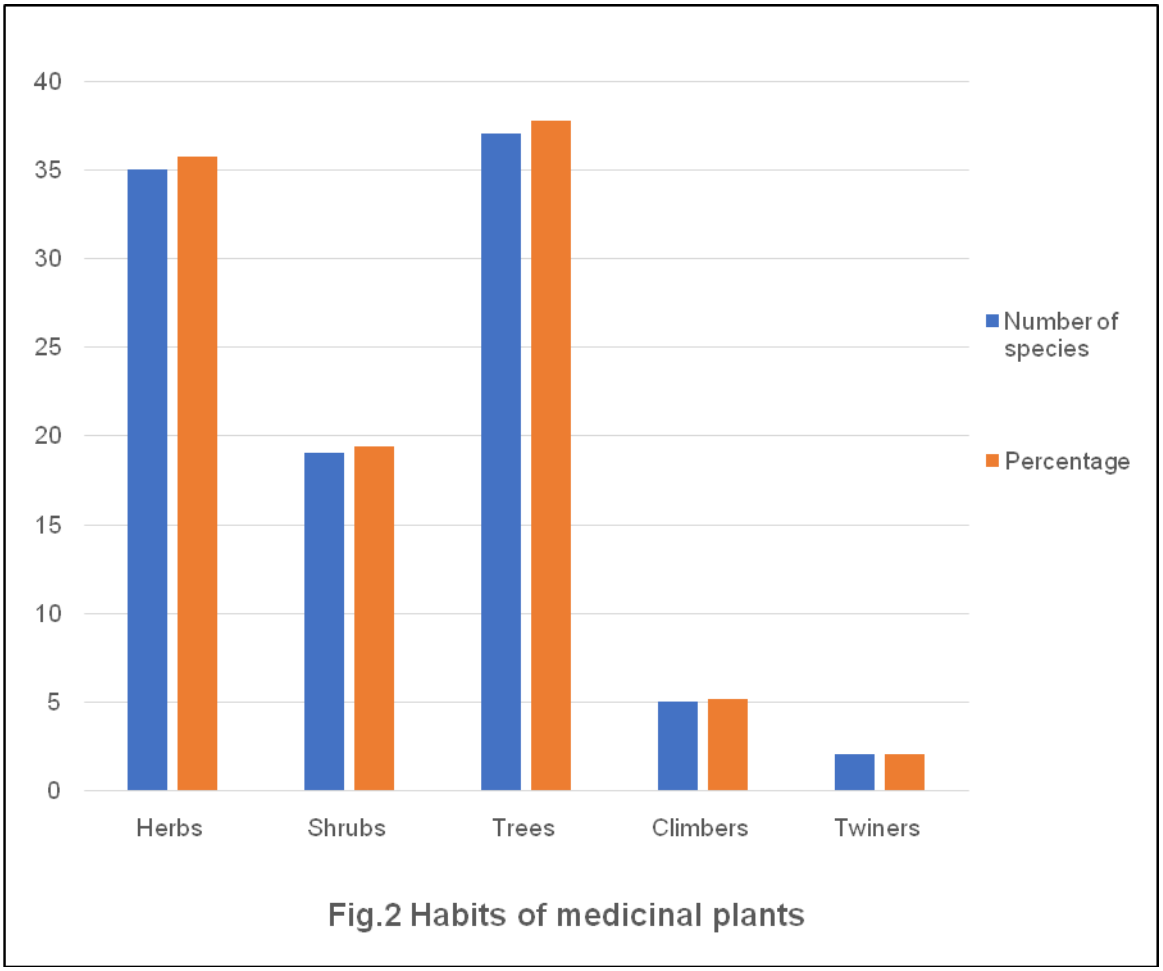


Fig.2 Habits of medicinal plants

numerous diseases. Local individuals, tribal doctors, and forest officials were contacted during survey work and field visits to document the ethno-medicobotanical folk of plants used by diverse tribal populations in the Patur Forest. Personal interviews have also been used to obtain and document this information.

Similar study was carried out by Mohpatra and Sahoo (2008) who gave medicinal plants of Kondha and Gond tribes of Bolangir, Orisa and enumerated 25 plant species used by the Kondha and Gond tribe against human ailments and livestock diseases. These plants are used as folk medicines in the treatment of various diseases. Biswas *et al.,,,,* (2016) have identified 57 numbers of ethno-medicinal plants belonging to 39 families, used for preparing medicinal remedies. The habit of the plants includes 37% trees, 35% herbs, 19% shrubs and % climbers. The most frequently utilized plant parts were the roots & tuber roots (26%), Stem which includes bark, tubers, bulb, rhizome, gum, wood & young shoots (24%), leaves (18%), fruits (13%), and seeds (10%). Most of the plants (88%) had more than a single therapeutic use. (Table 5)

**Table 5. Medicinal plants used to treat human ailments.**

(HB=Habit, H=Herb Sh=Shrub, T=Tree, Cl=Climber, PPU=Plants part used, St=Stem, Sb=stem bark, L=leaves, R=root, Sd=seed, Fr=Fruit, Fl=Flower, Fb=Flower-bud, Cr=Corn, B=Bulb, Gm=Gum, Wp=Whole plant, Lt=Latex, CP=Condition of preparation, F=Fresh D=Dried, F/D=Fresh/Dried)

| Scientific name | Family | Local name | Habit | Plant part used | CP | Application | Route of Administration | Mode of Application |
|---|---|---|---|---|---|---|---|---|
| *Abelmoachus manihot (L.)* | Malvaceae | Jangli bhendi | Shrub | Root | Fresh | Dog bite | Crushed root is applied on bite | External |
| *Abrus precatorius L.* | Fabaceae | Gunj | Twiner | Leaves<br>Seed | Fresh/ Dried | Cough<br>Abortion<br>Skin disease | Leaves are eaten.<br>Seeds are taken with crushed leaves.<br>Root juice applied on infection skin. | Oral<br>Oral<br>External |
| *Acacia nilotica (L)* | Mimosaceae | Babool | Tree | Stem bark | Fresh/ Dried | Teeth ache | Decoction of bark. | Oral |
| *Acacia catechu* | Mimosaceae | Khair | Tree | Leaves | Fresh | Gum, sore throat, ulcers | Decoction of leaves taken for gum problem.<br>Heartwood extraction for catch to cure sore throat and ulcers. | Oral |
| *Acacia leucophloea* | Mimosaceae | Hiwar | Tree | Leaves | Fresh | Scorpion bite | The fresh leaf juice is used to cure scorpion bite. | Oral |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Achyranthes aspera L.* | Amaranthaceae | Aghada | Herb | Leaves | Fresh | Cough | Decoction of leaves drunk. | Oral |
| *Ailanthus excelsa Roxb.* | Simaroubaceae | Maharukh | Tree | Leaves<br>Bark | Fresh | Intestinal worms<br>Body swelling | Crushed leaves are tied on stomach.<br>Bark powder mixed in bath water. | External<br>External |
| *Aloe vera (L.) Bum. F* | Liliaceae | Korphad | Herb | Leaves | Fresh | Stomach ache | Internal fleshy part of leaves is taken. | Oral |
| *Amorphopalous paeoniifolius (Dennts) Nicols.* | Araceae | Surankand | Herb | Corn<br>Corn | Dried<br>Fresh | Ulcers and blood cancer<br>Skin acne | Corn powder taken with honey.<br>Corn is applied on stone and paste is applied. | Oral<br>External |
| *Andrographis paniculata (Burm. f.) Wall ex Nees* | Acanthaceae | Bhuineem | Herb | Leaves<br>Stem | Fresh | Hadi fever/ fever<br>Stomach ache<br>Diarrhoea | Leaf extract/ decoction with sugar.<br>Stem crushed and extract taken with sugar.<br>Decoction of whole dried plant taken. | Oral<br>Oral<br>Oral |
| *Angle marmelos (L.)* | Rutaceae | Bel | Tree | Fruit | Fresh | Stomach problems, digestive | Fruit extract taken with sugar.<br>Fruit pulp + one cup water + one cup milk. | Oral |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Annona squamosa L.* | Ann6onaceae | Sitaphal | Tree | Leaves Seed | Fresh Dried | On head lice | Leaf extract is used on head lice. | External |
| *Anogeissus latifolia* | Combretaceae | Dhavda | Tree | Root | Fresh | Acidity Cough | Decoction of root is drunk. | Oral |
| *Argemone mexicana L.* | Papaeraceae | Piwla dhotra | Herb | Root Leaves | Fresh | Skin disease, worms Cheek swelling in children | Root paste is used. Roots are cooked in rice and given to the children. | External Oral |
| *Arisaema murrayi (Graham) Hook.* | Araceae | Bhasmakand | Herb | Corn | Fresh/ Dried | Rheumatism Piles | Corn paste is boiled is sesamum oil and used for massage in rheumatism. Corn powder with honey and ghee is applied. | External External |
| *Asperagus reemosus Wild* | Liliaceae | Marbat/ Shatawari | Shrub | Root | Fresh/ Dried | Glactogue | Root powder is taken with sugar. | Oral |
| *Azadirachta indica A. Juss* | Meliaceae | Nimba/ Neem | Tree | Stem bark | Dried | Acidity Indigestion | Bark powder is eaten. | Oral |
| *Bacopa monnieri (L) Penn.* | Scorphulariaceae | Bramhi | Herb | Whole plants | Fresh | Cough and respiratory disease Menstrual disorder | Boiled extract of plant is applied on chest Juice of leaves is drunk. | External Oral |
| *Bombusa bamboo* | Poaceae | Bamboo | Tree | Stem, Leaves | Fresh | Vomiting, worm | Leaf buds are directly used on thread worms. | External |

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|---|---|---|---|---|---|---|---|---|
| | | | | | | | Leaf juice is given on vomiting. | |
| *Boerhavia erecta L.* | Nyctaginaceae | Khupri | Shrub | Leaves<br>Leaves | Fresh<br>Fresh | Antidote to poison<br>Eye problem | Leaf juice is drunk.<br>Leaf juice dropped into infected eye. | Oral<br>Local |
| *Bombax ceiba L.* | Bombacaceae | Katesawar | Tree | Flower | Fresh | Menstrual problem | Flower chatani is eaten to prevent bleeding | Oral |
| *Boswellia serrat Roxb.* | Burseraceae | Salai | Tree | Leaves | Fresh | Wound healing<br>Head ache | Crushed leaves are applied<br>Crushed leaves are applied on head for overnight. | External<br>External |
| *Buchnania lanzan Spreng* | Anacardiaceae | Charoli | Tree | Leaves<br>Root<br>Seed<br>Gum | Fresh/ Dried | Chest ache<br>Diarrhoea<br>Skin disease | Heated gum is applied on chest.<br>Crushed root with water drunk.<br>Paste of dry seed is applied on infected part | External<br>Oral<br>External |
| *Butea monosperman (Lamk.) Taubert* | Fabaceae | Palas | Tree | Flower<br>Seed<br>Bark<br>Leaves | Dried/ Fresh | Body itching<br>Sun stroke<br>Menstrual disorder | Flower powder is applied<br>Bark syrup is drunk. | External<br>Oral |
| *Caesalpinia bondu (L.) Roxb.* | Ceasalpiniaceae | Sagargota | Tree | Root, bark | Fresh | Fever | Decoction of bark | Oral |
| *Calotropis procera (Ait.) R. Br.* | Asclepidaceae | Rui | Shrub | Latex, root, leaves | Fresh | Skin ache, teeth ache | Latex is applied.<br>Chewing fresh root. | External |

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|---|---|---|---|---|---|---|---|---|
| *Cardiospermum halicacbum (L.)* | Sipndaceae | Kapalphodi | Herb | Leaves | Fresh | Menstrual problems | Decoction of leaves is given for seven days on irregular menstrual cycle | Oral |
| *Carissa congesta White* | Apocynaceae | Karvand | Shrub | Root | Fresh | Skin allergy, itches | Root paste is applied. | External |
| *Cariya arborea Roxb.* | Lecythidaceae | Jadkumbhi | Tree | Fruit | Fresh Dried | Asthma cough | Fruit powder is given. | Oral |
| *Cassia fistula L.* | Ceasalpiniaceae | Amaltash | Tree | Fruit | Fresh | Dysentery | Fruit pulp is given to child. | Oral |
| *Catunaregam spinosa (Thunb.) Timeng* | Rubiaceae | Gelphal, Madanphal | Tree | Fruit | Fresh | Vein swelling Acidity | Fruit pulp is applied on swelling vein. Fruit pulp is applied. | External Oral |
| *Cassia tora L.* | Ceasalpiniaceae | Tarota | Herb | Leaves Seed | Fresh/ Dried | Ringworm Skin disease Stroke | Leaf paste is applied. Seed powder is used. Dru fruit powder is taken | External External Oral |
| *Ceosia argentea Wild.* | Amranthaceae | Kombada | Herb | Roots | Fresh | Teeth problem | Chewing root on teeth ache. | Oral |
| *Chloraphytum borivillium* | Liliaceae | Safed musli | Herb | Tubers | Dried | General and sexual disabilities | Tubers are powdered are taken with milk | Oral |
| *Clerodendrum serratum (L.) Moon* | Verbenaceae | Bharangi | Shrub | Roots Leaves Seed | Fresh | Wounds healing Skin acne | Root paste is applied on wounds. Leaf juice is applied . | External External |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Clitorea tematea L.* | Fabaceae | Gokarn | Climber | Root Leaves | Fresh | Menstrual disorder | Root Paste is given with ginger. | Oral |
| *Cocculas hirsutus (Linn.) Dies* | Menispermaceae | Vasanvel | Climber | Leaves | Fresh | Foot palm irritation | Ground leaves are sieved through cloth and kept in bowl jelly is formed. This jelly is applied on foot palm. | External |
| *Cordia gharaf (Forsk.) Ehernb. & gAsch.* | Boraginaceae | Gondhan | Tree | Leaves | Fresh | Fever | Decoction of leaves is given. | Oral |
| *Costus specious (Koen.) J. E. Sm.* | Zingibraceae | Pev | Herb | Fruit | Fresh | Stomach ache | Half cup fruit juice is taken | Oral |
| *Curculigo orchiodes Gaertn.* | Hypoxides | Kali musli | Herb | Root Bulb | Fresh/ Dried | Sterility and disabilities Wood healing | Root paste or powder is given with milk. Bulb is rubbed on stone and applied on wound. | Oral External |
| *Cymapogan citrates stapf.* | Poaceae | Gavti chai | Herb | Leaves | Fresh | Cough and cold | Decoction of leaves is taken | Oral |
| *Cymapogan martini (Roxb.) Wats* | Poaceae | Tikhadi zara | Herb | Leaves | Fresh | Hair growth | Oil is applied on head to promote hair growth | External |
| *Cynadon dactylon (L.) Pers* | Poaceae | Haral | Herb | Whole plant | Fresh | Urinary problems Piles | Decoction of whole plant is given Juice of whole plant is given. | Oral Oral |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Datura metal L.* | Solanaceae | Dhotra | Herb | Leaves<br>Fruit<br>Seed | Fresh/<br>Dried | Asthma<br>Wound healing/<br>Antiseptic | Dried leave is smoked for treating asthma.<br>Seed paste is directly applied on wounds for aseptic. | Oral<br>External |
| *Desmodium gangeticum* | Fabaceae | Chiktya | Herb | Root | Fresh | Bone fracture | Layer of crushed leaves are applied on bone fracture | Oral |
| *Diplocyclon palmatus (L.) C.* | Fabaceae | Shivlingi | Climber | Seed | Dried | For child | Seed are given to women after the days of menstrual cycle for child | Oral |
| *Eclipta prostrate (L.) L.* | Asteraceae | Maka | Herb | Leaves | Fresh | Hair fall<br>Wound healing | Leaf juice with sesame oil, kambar-modi juice, Awla juice is applied on head to control hair fall Leaf juice is applied on wounds. | External<br>External |
| *Embelica officinalis* | Euphorbaceae | Awla | Tree | Leaves | Fresh/<br>Dried | Wound healing | Leaves are burned and powdered and applied | External |
| *Ensete superbum (Roxb.)* | Musaceae | Jangli kel | Herb | Seed<br>Corn<br>Root | Dried<br>Fresh<br>Fresh | Kidney stone<br>Kestoda<br>Delivery problem | Seed is powdered and taken 21 days, 10 grams for each day.<br>Boiled corn is | Oral<br>External<br>External |

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| | | | | | | | applied<br>Root is kept in hair for easy delivery. | |
| *Eucalyptus globulus* | Myrtaceae | Nilgiri | Tree | Leaves | Fresh | Cough, cold, fever | The paste of boiled leaves is applied on face to cure cough & cold | |
| *Erythrina variegate* | Leguminoaceae | Pangara | Tree | Stem bark | Fresh | Wound warms<br>Eye problem | Bark juice is used.<br>Bark decoction is used for better sight. | External<br>External |
| *Ficus benghalensis* | Moraceae | Wada | Tree | Latex | Fresh | Foot crack<br>Teeth ache | Latex is applied.<br>Latex is applied on teeth. | External<br>Oral |
| *Ficus racemose L.* | Moraceae | Umbar | Tree | Stem bark | Dried | Gum ache | Bark powder is applied for strengthening of gum. | Oral |
| *Ficus religiosa L.* | Moraceae | Pipal | Tree | Stem bark | Dried | Asthma | Bark powder is given. | Oral |
| *Helicteres isora L.* | Stercullaceae | Murudshing | Shrub | Root<br>Fruit<br>Pod | Fresh | Stomach ache in children | Root paste/ fruit is given to cure stomach ache children. | Oral |
| *Hemidesmus indicus* | Peripioceae | Anantmul | Shrub | Root | Fresh | Jaundice | Root pieces are given. | Oral |
| *Hibiscus rosa- senesis L.* | Malvaceae | Jasvand | Shrub | Leaves | Fresh | Intestinal problem | Leaf paste with sugar is given. | Oral |

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|---|---|---|---|---|---|---|---|---|
| *Ixora brachiata Roxb.* | Rubiaceae | Lokhandi | Tree | Stem bark | Fresh | Teeth ache | Bark is chewed. | Oral |
| *Justica adhatoda* | Acanthaceae | Adulsa | Shrub | Leaves | Fresh | Cough and joint pain | Decoction of leaves is drunk. | Oral |
| *Kalanchoe pinnata (Lam.) pers.* | Crasulaceae | Panphuti | Herb | Leaves | Fresh | Skin acne | Juice of leaves is applied on acne. | External |
| *Kedrostis rostrata* | Cucurbitaceae | Mirchi kand | Herb | Bulb | Dried | Stomach ache Cold and fever | Powdered bulb is taken. | Oral |
| *Lantana camera L.* | Verbenaceae | Ghaneri | Herb | Whole plant | Fresh | Intoxicant | Occasionally used as intoxicant externally. | Oral |
| *Legertroemia parviflora Roxb.* | Lythraceae | Chekre, Jarul | Shrub | Leaves | Fresh | Snake bite | Leaf paste is applied on bitten part to reduce swelling. | External |
| *Madhuca longifolia var. latifolia (Roxb) Chev* | Sapotraceae | Moha | Tree | Fruit | Dried | Sexual impotency | Flower powder is mixed with milk and taken to overcome sexual impotency. | Oral |
| *Mangifera indica L.* | Anacardiaceae | Aamba | Tree | Latex | Fresh | Antidotes | Latex is applied on scorpion bite for quick relief | External |
| *Mimosa pudica* | Anacardiaceae | Lajari | Herb | Root | Fresh | Cough in child | Roots is tied in neck | External |
| *Moringa oleifera* | Moringaceae | Shevga | Tree | Stem Leaves | Fresh/ Dried | Gum, wound healing, stomach problem | Leaf powder is used to on wounds and stomach problem. Leaves chewing is also used for the gum problem. | Oral External |

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|---|---|---|---|---|---|---|---|---|
| *Ocimum basilicum* | Laminaceae | Mirkuta | Herb | Seed | Fresh | Jaundice | Crushed seed are mixed in water and taken half cup (twice in a day) for seven days to cure jaundice. | Oral |
| *Ocimum gratissimum L.* | Laminaceae | Sabja | Herb | Leaves | Fresh | Intestinal worms | Leaf extract is given. | Oral |
| *Ocimum tenuiflorum L.* | Laminaceae | Tulas | Herb | Leaves | Fresh | Cough<br>Stroke | Decoction of leaves is given<br>Leaf juice is given | Oral<br>Oral |
| *Pergukaria daemia (Forsk.) Chiov* | Asclepiadaceae | Utaran | Shrub | Root | Fresh | Tonsils | Crushed root is applied on tonsils tumour | External |
| *Phyllanthus amarus Schum & Thonn.* | Euphorbiaceae | Bhuiawla | Herb | Whole plant | Fresh | Urinary problem<br>Jaundice | Juice of whole plant is drunk on often urinal problem.<br>Juice of whole plant is drunk. | Oral<br>Oral |
| *Plumbago zeytanica* | Plumbaginaceae | Chitrak | Shrub | Root | Fresh | Tonsil | Crushed roots is applied tonsil tumour. | External |
| *Pongamia pinnata (L.)* | Fabaceae | Karanj | Tree | Stem bark | Fresh | Joint pain | Bark+ Nirgudi bark+ Lokhandi bark are boiled in water and steam is given to the joint pain. | External |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Pterocarpus marsupium Roxb.* | Fabaceae | Bijasaag | Tree | Stem | Dried | Diabetes<br>Wound healing | Glass of stem is prepared. Water is kept overnight in it and drunken in a morning. Crushed leaves are applied. | Oral<br>External |
| *Pueraria tuberosa (Roxb e Wild.) DC.* | Fabaceae | Bharda | Twiner | Root | Dried | Wound healing | Root powder mixed with coconut oil and applied on wounds. | External |
| *Rauwolfia serpentina* | Apocynaceae | Mungsvel | Shrub | Root | Fresh | Stomach ache | Root paste is given. | Oral |
| *Saraca asoca* | Fabaceae | Ashoka | Tree | Leaves | Dried | Skin problem | Leaf powder applied on skin. | External |
| *Sapindus laurifolius* | Sapindaceae | Ritha | Tree | Root<br>Fruit | Fresh | Intestinal worms | Root/ fruit paste with water is drunk. | Oral |
| *Semecrapus anacardium L.* | Anacardiaceae | Bibba | Tree | Flower | Fresh | Stroke | Flowers are eaten to cure stroke. | Oral |
| *Sesamum oreintale* | Pedaliaceae | Rantil | Herb | Seed | Dried | Joint pain | Oil is applied on joint pain and massage is given. | External |
| *Syzygium cumini (L.)* | Myrtaceae | Jambhul | Tree | Leaves | Fresh | Dysentery | Leaf juice is given on dysentery | Oral |
| *Terminalia indica L.* | Caesalpiniaceae | Chinch | Tree | Fruit | Fresh/ Dried | Indigestion<br>Acidity | Fruit pulp with jaggery is drunk | Oral |
| *Tectona gandis L.* | Verbenaceae | Saag | Tree | Seed | Dried | Kidney stone<br>indigestion | Seeds are rubbed on stone with water taken.<br>Seed powder is given. | Oral<br>Oral |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Tephrosia purpurea (L.) Pers.* | Fabaceae | Unhali | Shrub | Root | Dried | Sun stroke | Root powder is given with water. | External |
| *Termanlia arjuna roth.* | Combretaceae | Arjun | Tree | Stem bark | Fresh | Health tonic | Decoction of bark is drunk. | Oral |
| *Terminalia belirica* | Combretaceae | Behda | Tree | Fruit | Fresh | Cough | Fruits are eaten. | Oral |
| *Thrspesia lampsas (Cav.) Datz. And Gibs.* | Malvaceae | Jangli kapas | Shrub | Root | Dried | Jaundice | Root powder with glass of water is taken to cure jaundice. | Oral |
| *Tinospora cordifolia (Wild)* | Menispermaceae | Guduchi/ Gulvel | Climber | Leaves | Fresh | Fever | Decoction of leaves taken | Oral |
| *Trichosanthes tricuspidata Lour.* | Cucurbitaceae | Gawlan phal | Climber | Seed | Dried | Stomach ache | Seed area eaten | Oral |
| *Tridax procumbens L.* | Asteraceae | Kambar modi | Herb | Leaves<br>Whole plant | Fresh<br>Fresh | Wound healing<br>Diarrhoea | Crushed leaves are applied on wounds.<br>Whole plant paste is taken | External<br>Oral |
| *Urginea indica (Kunth).* | Liliaceae | Raankanda | Herb | Bulb | Fresh | Asthma<br>Cough | Bulb juice is given. | Oral |
| *Vertilago denticulata Wild.* | Rhamnaceae | Ragatpiti | Herb | Stem bark | Fresh | Loose motion | Fresh bark is crushed and the extract is given twice in a day (one cup) | Oral |
| *Vemonia anthelmintica* | Compositeae | Jangli jira | Herb | Fruit | Dried | Fever | Powder of fruit is mixed with jaggery and tablet are made. | Oral |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Vemonia cinerea* | Compositeae | Sahdevi | Herb | Whole plant | Fresh | Fever in child | Whole plant is crushed and paste is applied on forehead | External |
| *Vitex nigando* | Verbenceae | Nirgudi | Shrub | Leaves | Fresh | Bone fracture<br>Joint pain | Crushed leaves area tied with piece of cloth | External |
| *Wrightia tinctoria* | Apocynaceae | Dudhi/ kala kadu | Tree | Stem bark<br>Seed<br>Stem bark<br>Root | Fresh<br>Dried<br>Dried<br>Fresh | Bone ache<br>Malaria fever<br>Fever<br>Dysentery | Bark paste is applied.<br>Seed powder is drunk with water.<br>Brak is powdered and drunk with water.<br>Decoction of root is given. | External<br>Oral<br>Oral<br>Oral |
| *Zizipus jujibie Mill.* | Rhamnaceae | Ber | Tree | Stem bark | Fresh | Teeth ache<br>Dysentery | Bark is chewed.<br>Bark is eaten | Oral<br>Oral |

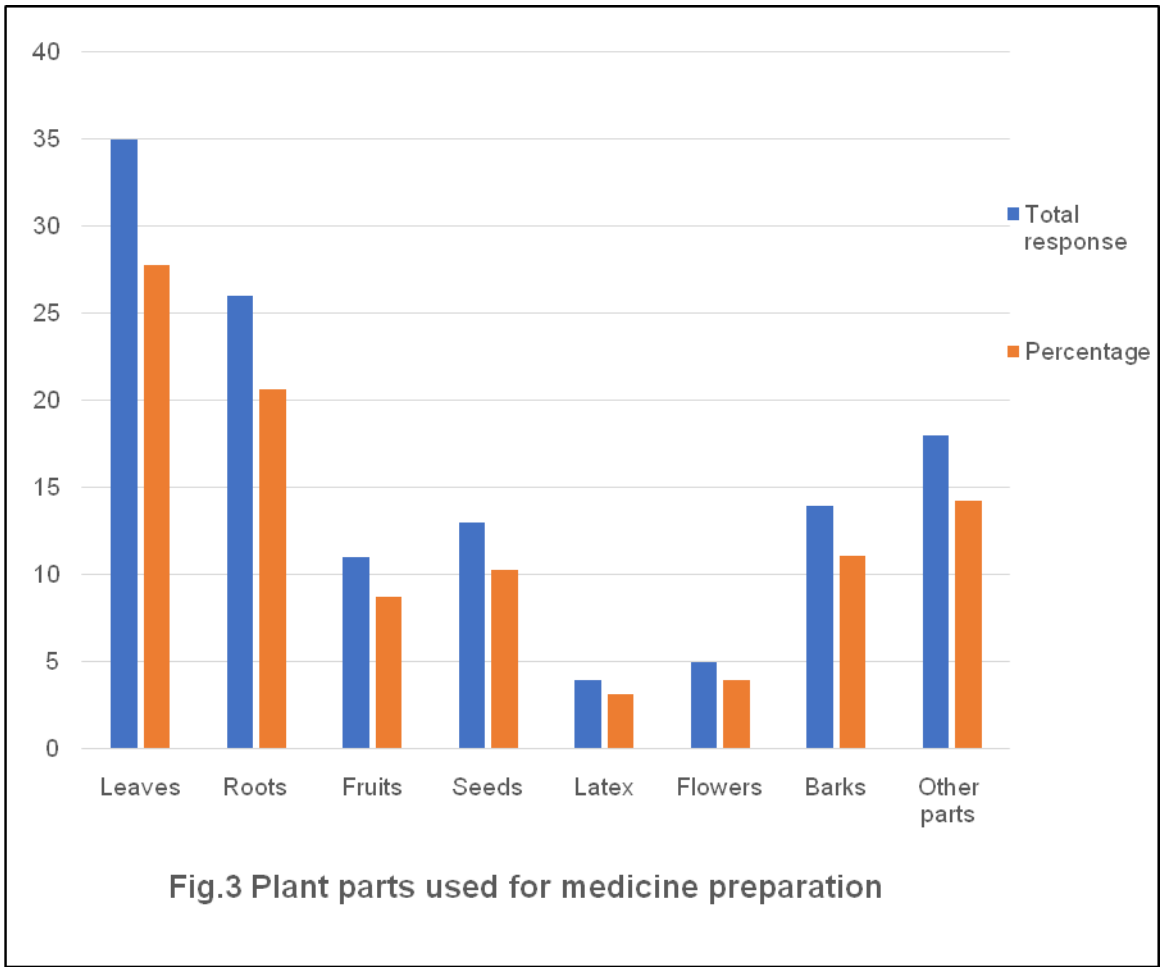


Fig.3 Plant parts used for medicine preparation

### 4.5 Plants parts used for medicine.

According to the interview result leaves are the most commonly used plant parts accounting for 27.78% of the total, followed by roots (20.64%) and bark (11.11%). Use of other plant parts is as indicated in Table 8. Similarly, Deka *et al.,,,,* (2007) conducted survey to collect the information about some common medicinal plants used by tribal people of Assam. A total of 68 medicinal plants had been described, out of which 43 plants were used in various diseases of human being. The medicinal uses of roots, rhizomes, barks, bulbs, leaves, flowers, fruits, seeds were also enumerated. Yumnam *et al.,,,,* (2012) found that people of Manipur use large number of medicinal plant species in the ethnomedicinal treatment for different diseases. The different parts of plant such as leaves, flowers fruits, roots, tubers, rhizomes and bulbs were made into their medicine for treatment of almost all the commonly occurring health problems. .(Table 6 & Fig.3)

**Table 6. plant parts used for medicine preparation.**

| Plant parts | Total response | Percentage |
|---|---|---|
| Leaves | 35 | 27.78 |
| Roots | 26 | 20.64 |
| Fruits | 11 | 8.73 |
| Seeds | 13 | 10.33 |
| Latex | 4 | 3.17 |
| Flowers | 5 | 3.96 |
| Barks | 14 | 11.11 |
| Other parts | 18 | 14.28 |
| Total | 126 | 100 |

### 4.6 Condition of preparation of herbal remedies.

Herbal remedies are prepared using fresh material from 67 of the species (68.38%), while 14 (14.27%) species is used in the case of dried plant material. There were 17 (17.35%) species in which the local people use either dried or fresh materials for the treatment of ailments (Table 7 and fig.4).

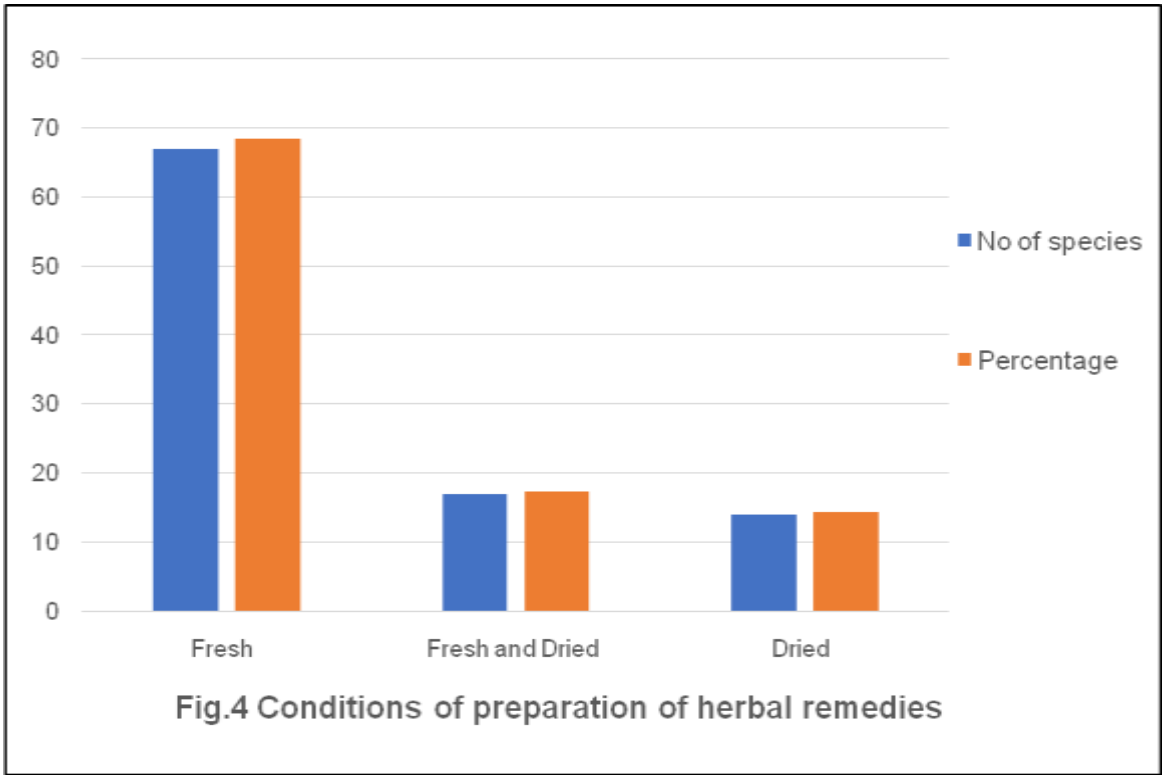


Fig.4 Conditions of preparation of herbal remedies

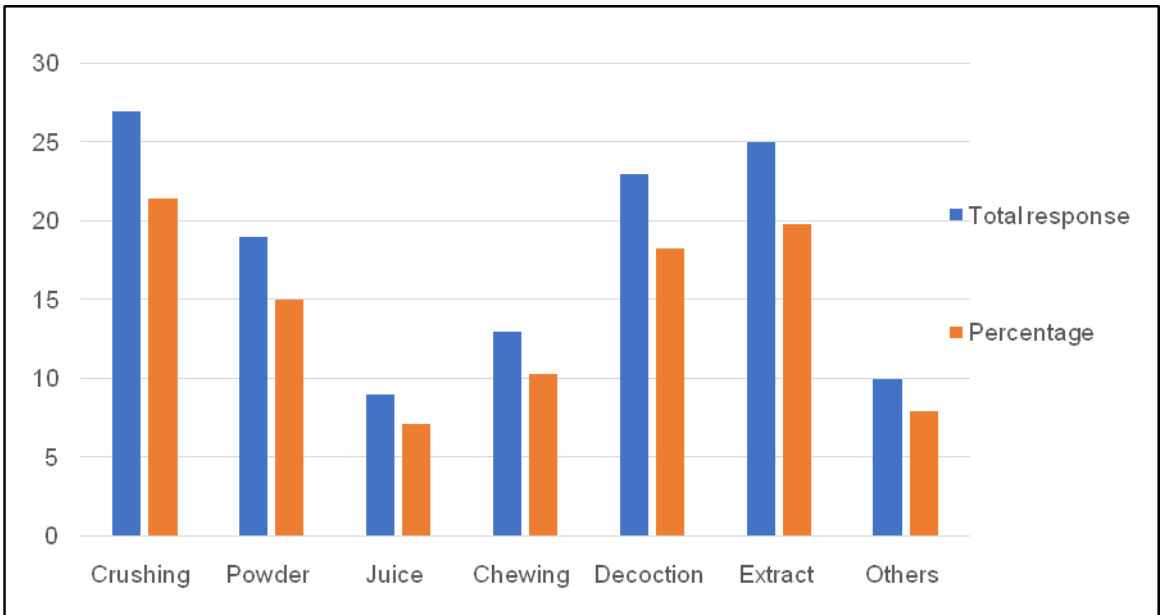


Fig.5 Preparation methods of herbal medicine

**Table 7. Conditions of preparation of herbal remedies.**

| Condition of preparation | **No of species** | **Percentage** |
|---|---|---|
| Fresh | **67** | **68.38** |
| Fresh and Dried | **17** | **17.35** |
| Dried | **14** | **14.27** |
| Total | **98** | **100** |

### 4.7 Preparation, routes of administration and application of medicinal plants.

The local people employed several methods of preparation of traditional medicines. The result of the current study showed that the most popular mode of preparation was in the form of crushing 27 (21.43%) followed by juicing 9 (7.14%), 19(15.08%) as a powder, 23(18.26%) as decoction, 13(10.32%) in the form chewing, as extract 25(19.84%). Other methods of preparation were 10 (7.93%) of the total 126 responses (Table 8 and fig.5).

In a similar study done by Bhosle *et al.,,,,* (2009), reported 77 species belonging to 30 families and 56 genera used as an ethno-medicine by the tribe people of Purandar in Maharashtra, and also described preparation methods like decoction, powder, juice, paste. The majority of the preparations are made from mixture of different plant species with water and different additive substances like honey, sugar, butter, and salt and milk. Additives are used reduce poisons, improve flavour and as antidotes during adverse effects such as vomiting and diarrhoea.

**Table 8. preparation methods of herbal medicine**

| **Forms of preparation** | **Total response** | **Percentage** |
|---|---|---|
| Crushing | 27 | 21.43 |
| Powder | 19 | 15.08 |
| Juice | 9 | 7.14 |
| Chewing | 13 | 10.32 |
| Decoction | 23 | 18.26 |
| Extract | 25 | 19.84 |
| Others | 10 | 7.93 |
| Total **:** | 126 | 100 |

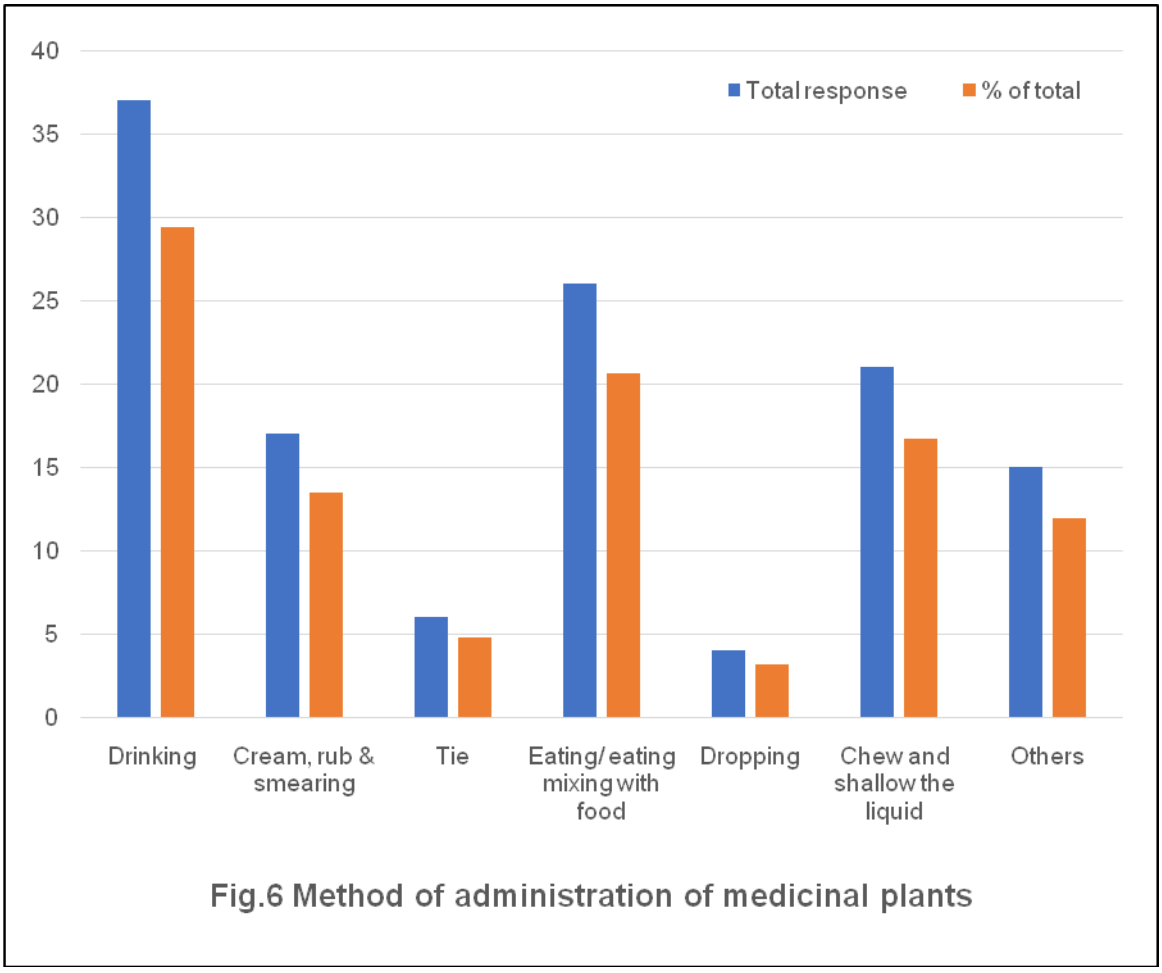


Fig.6 Method of administration of medicinal plants

### 4.7.1 Modes of administration

According to the informants indicated that drinking was the highest mode of administration with 37 (29.36%) reported case followed by 26 (20.64%) eating or eating mixing with food, Chew and shallow the liquid 21 (16.68%), Cream, rub & smearing 17 (13.49%), Tie 6 (4.76%), 4 (3.17%) dropping and 15 (11.90%) other modes of administration were recorded (Table 9 and Fig. 6). Yogeesha and Krishnakumar (2022) this study has been carried out in Western Ghats of Dakshina Kannada district, Karnataka state, India during 2018 - 2021 to document ethno-medicinal plants used by traditional practitioners to treat migraine. Most people prefer herbal folk therapies against this chronic disorder.

**Table 9. Method of administration of medicinal plants**

| Wasy of application | Total response | % of total |
|---|---|---|
| Drinking | 37 | 29.36 |
| Cream, rub & smearing | 17 | 13.49 |
| Tie | 6 | 4.76 |
| Eating/ eating mixing with food | 26 | 20.64 |
| Dropping | 4 | 3.17 |
| Chew and shallow the liquid | 21 | 16.68 |
| Others | 15 | 11.90 |
| Total | 126 | 100 |

### 4.7.2 Mode of application of traditional medicines.

The greater proportion of application of medicinal plant preparation oral with 76 (60.31%) followed by local 22 (17.45%), nasal 17 (13.48%) and Dermal application was lower with 11(8.73%) . There are various routes of administration routes of traditional medicinal plants in the study area by the local community. The major routs of administration by the peoples under study are in the study area oral, dermal, nasal, anal, oracular and local. Similarly, Goshal and Tamuli (2017) conducted a study on the medicinal plants used for treating various infectious diseases related to ear, nose and throat. They found that the ethnomedicinal plants which were used

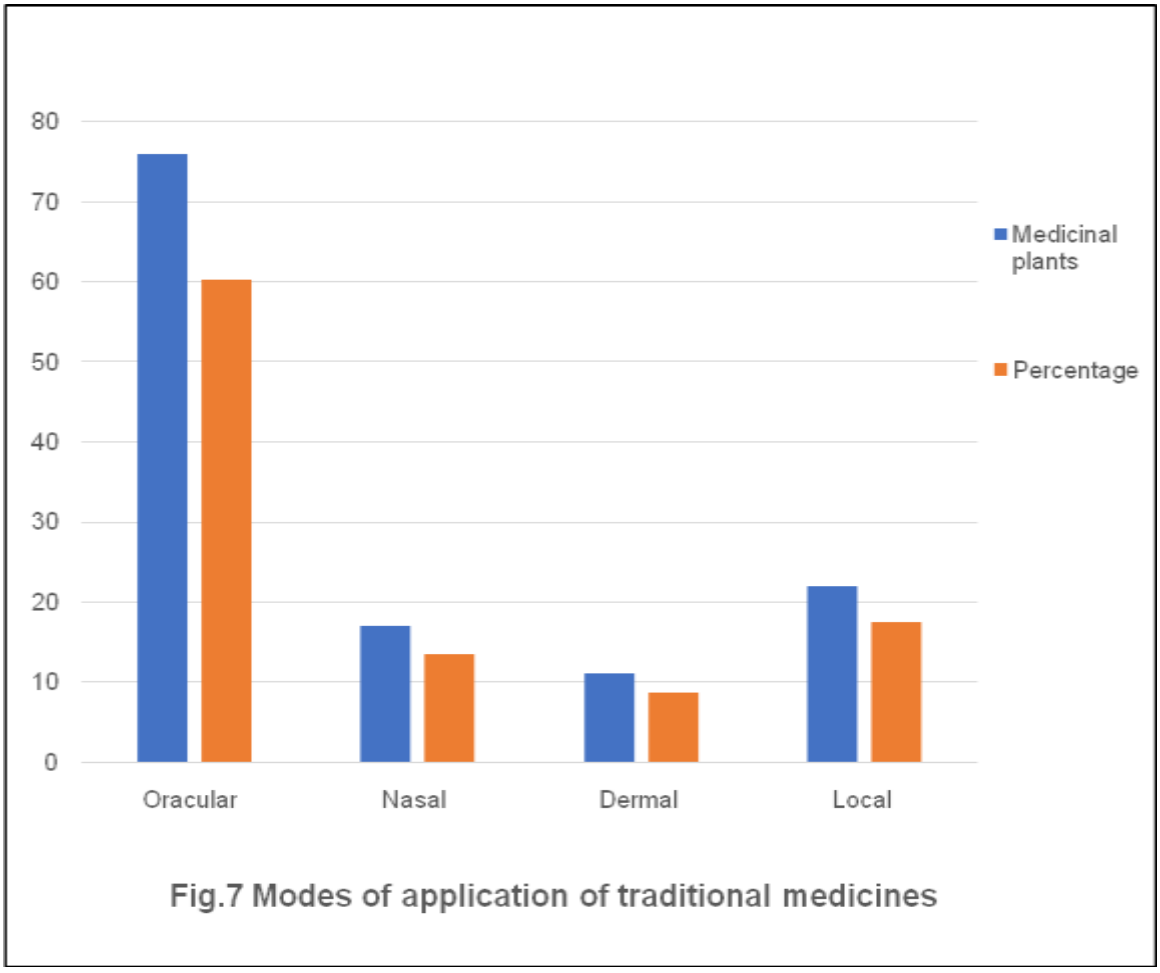


Fig.7 Modes of application of traditional medicines

to treat ear, nose and throat diseases were safe, effective and inexpensive, for which there is a global trend for the revival of traditional herbal medicine. A total of 51 plant species along with their uses have been discussed. (Table 10 and fig.7).

**Table 10. Modes of application of traditional medicines.**

| Route of application | Medicinal plants | Percentage |
|---|---|---|
| Oracular | 76 | 60.31 |
| Nasal | 17 | 13.48 |
| Dermal | 11 | 8.73 |
| Local | 22 | 17.45 |
| Total | 126 | 100 |

**4.8 Ranking of most important medicinal plants.**

Ranking of most important medicinal plants Preference ranking of five medicinal plants that were reported as effective to treat fever which was the most common disease in the studied area, was conducted after selecting 10 key informants. Andrographis paniculata scored 55 and stood first, indicating that it is the most effective in treating fever followed by *Wrightia tinctoria* and the least effective was *Tinospora cordifolia* (Table 11).

**Table 11. Preference ranking of medicinal plants used for treating fever.**

| List of medicinal plants | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | Total | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Andrographis paniculate* | 5 | 6 | 4 | 5 | 9 | 3 | 7 | 3 | 8 | 5 | 55 | 1st |
| *Wrightia tinctoria* | 4 | 5 | 3 | 6 | 4 | 6 | 8 | 7 | 2 | 9 | 54 | 2nd |
| *Caesalpinia bondu* | 2 | 3 | 5 | 7 | 6 | 4 | 9 | 5 | 3 | 8 | 52 | 3rd |
| *Vemonia anthelmintica* | 7 | 5 | 3 | 5 | 5 | 4 | 2 | 7 | 7 | 2 | 47 | 4th |
| *Tinospora cordifolia* | 3 | 5 | 5 | 3 | 4 | 6 | 4 | 4 | 7 | 4 | 45 | 5th |

R= Informants

**4.8 Importance of medicinal plants in the study area.**

A paired comparison made to determine the most preferred medicinal plants among the five species that were used to treat joint pain in

the studied area, the responses of ten key informants, showed that *Justica adhatoda* ranked first followed by *Vitex nigando* (Table 12). Therefore, this result indicated that Eucalyptus globulus is the most favoured while *Pongamia pinnata* is the least favoured over the other plant species cited in treating joint pain.

**Table 12. Paired comparison of five medicinal plants species used to treat joint pain.**

| Plant species | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | Total | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Justica adhatoda* | 5 | 4 | 8 | 6 | 6 | 7 | 5 | 6 | 5 | 3 | 55 | 1st |
| *Vitex nigando* | 7 | 5 | 4 | 6 | 6 | 4 | 3 | 4 | 2 | 5 | 46 | 2nd |
| Eucalyptus globulus | 6 | 9 | 3 | 2 | 7 | 3 | 4 | 2 | 4 | 3 | 42 | 3rd |
| *Sesamum oreintale* | 3 | 4 | 8 | 4 | 3 | 5 | 5 | 5 | 3 | 4 | 41 | 4th |
| *Pongamia pinnata* | 5 | 4 | 2 | 5 | 4 | 5 | 5 | 3 | 2 | 3 | 38 | 5th |

R= Informants

### 4.9 Direct matrix ranking

Direct matrix ranking was performed to assess the relative importance and to check the major impacts on each of the plant. The result of the direct matrix ranking showed that *Sorbus aucupar* stood first in being the most multipurpose medicinal plant followed by Tectona grandis and *Albizzia lebbeck* was least in the studied area (Table 13).

**Table 13. Direct matrix ranking for multiple used of medicinal plants.**

| Use | *Dalbergia sissoo* | *Tectona grandis* | *Sorbus aucupar* | *Acacia catechu* | *Albizzia lebbeck* | *Pterocarpus marsupium* | *Acacia nilotica* |
|---|---|---|---|---|---|---|---|
| Medicinal | 4 | 4 | 2 | 4 | 3 | 3 | 3 |
| Charcoal | 1 | 3 | 4 | 3 | 2 | 4 | 2 |
| Firewood | 1 | 2 | 2 | 3 | 4 | 3 | 3 |
| Construction | 3 | 4 | 5 | 2 | 1 | 4 | 3 |
| Furniture | 4 | 5 | 4 | 3 | 2 | 2 | 2 |
| Edible fruit | 1 | 3 | 4 | 1 | 0 | 1 | 4 |
| Fence | 3 | 2 | 4 | 3 | 4 | 3 | 5 |
| **Total** | 17 | 23 | 25 | 19 | 16 | 20 | 22 |
| **Rank** | 6th | 2th | 1th | 5th | 7th | 4th | 3th |

### 4.10 Popular medicinal plants used to treat different ailments.

Analysis of informants' consensus was used to investigate the degree of agreement on each medicinal plant reported by informants and the popularity of some medicinal plants to treat different health problems. Accordingly, Butea monosperma is the most popular, cited by 45 informants out of the total 52 informants (86.53%) for its medicinal value to treat body itching, sun stroke, menstrual disorder, cold and cough and diarrhea followed by wrightia tinctoria mentioned by 36 informants (69.23%) to treat bone ache, malaria fever, dysentery, Maduca longifolia mentioned by 35 informants (67.30%) to treat sexual impotency and Boswellia serrata mentioned by 35 informants (67.30) to treat head ache and wound healing (Appendix 6). This shows that the mentioned medicinal plants are well known within the tribal communities for their effectiveness regarding specific and different health problems. Medicinal plants that are considered to be effective in treating a certain disease have higher ICF values. As can be seen from Table 14 some of the categories of ailments that are common in the study area are: joint pain (88.89%), jaundice (87.5%), Diarrhoea and Dysentery (85.36%) and Stomach ache (75.67%). This may point out high incidence of these types of diseases in the study area, possibly due to the poor socio-economic, sanitary conditions and may be due to the spiritual perception of the people.(Table 14)

**Table 14. Types of disease for informant consensus.**

| Category of disease | Number of species | Number of informants cited | ICF | % ICF |
|---|---|---|---|---|
| Fever | 9 | 31 | 0.7334 | 73.34 |
| Joint pain | 4 | 28 | 0.8889 | 88.89 |
| Wounds | 11 | 39 | 0.7368 | 73.68 |
| Jaundice | 4 | 25 | 0.875 | 87.5 |
| Diarrhoea and Dysentery | 7 | 42 | 0.8536 | 85.36 |
| Stomach ache | 10 | 38 | 0.7567 | 75.67 |

### 4.11 Medicinal plants used to treat one ailment.

Of the 98 medicinal plants that were cited by informants, 54(55.10%) were used to treat a specific ailment, 28(28.57%) plants were used to treat two aliments, 14(14.28%) plants were used to treat three aliments and 2 (2.05%) plants were used to treat more than three aliments (Table 15 & Fig 8).

**Table 15. Number of plant species, number of ailments and total percentage of plant species.**

| Ailments | Plants | Percentage |
|---|---|---|
| One | 54 | 55.10 |
| Two | 28 | 28.57 |
| Three | 14 | 14.28 |
| More than three | 2 | 2.05 |
| Total | 98 | 100 |

### 4.12 Source and transferring of indigenous knowledge.

#### 4.12.1 Age of Informants.

The distribution of informants with respect to age class shows that, the majority of knowledgeable elders are in the age class of 50 to 75 (Table16).

| Informants age | No. of informants | Percentage |
|---|---|---|
| 0-25 | 4 | 4.00 |
| 25-50 | 24 | 24.00 |
| 50-75 | 72 | 72.00 |
| Total | 100 | 100 |

#### 4.12.2 Educational status of informants.

According to the data documented from the study area, most of the informants that used medicinal plants as remedies for different health problems. The result shows that 33 informants (33.00%) were taken primary education and 27 (27.00%) were known writing and reading. Therefore, this

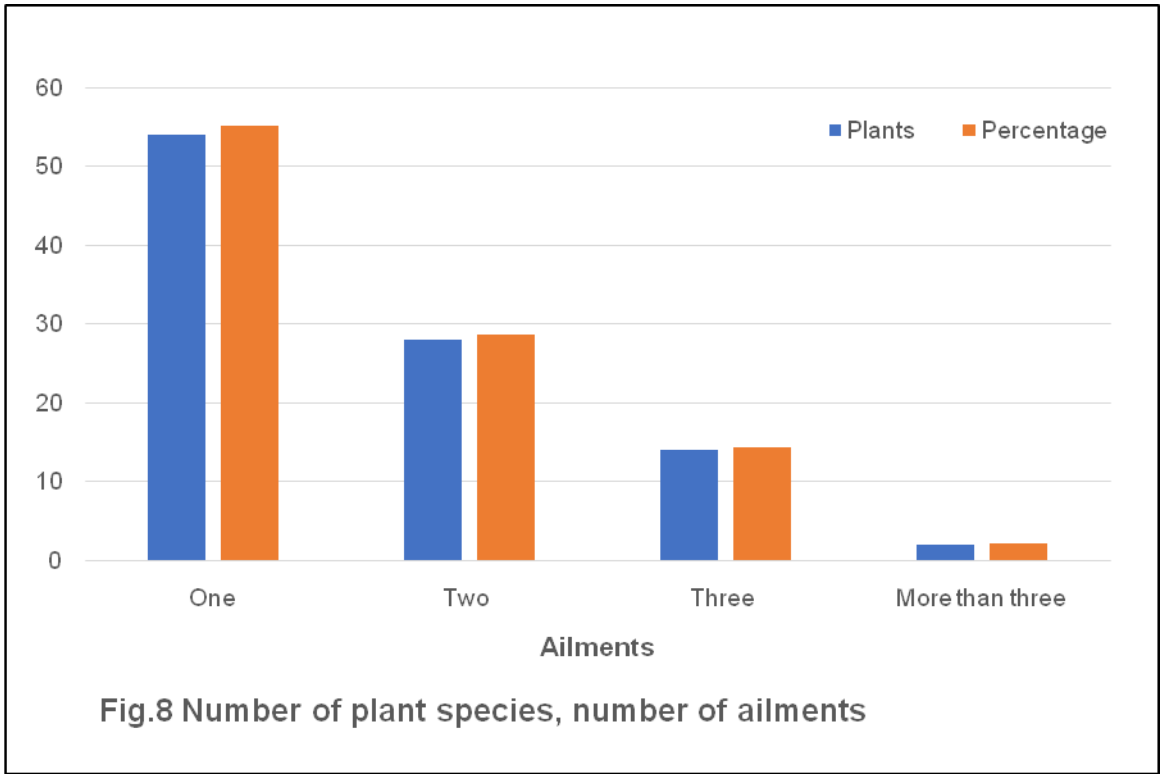


Fig.8 Number of plant species, number of ailments

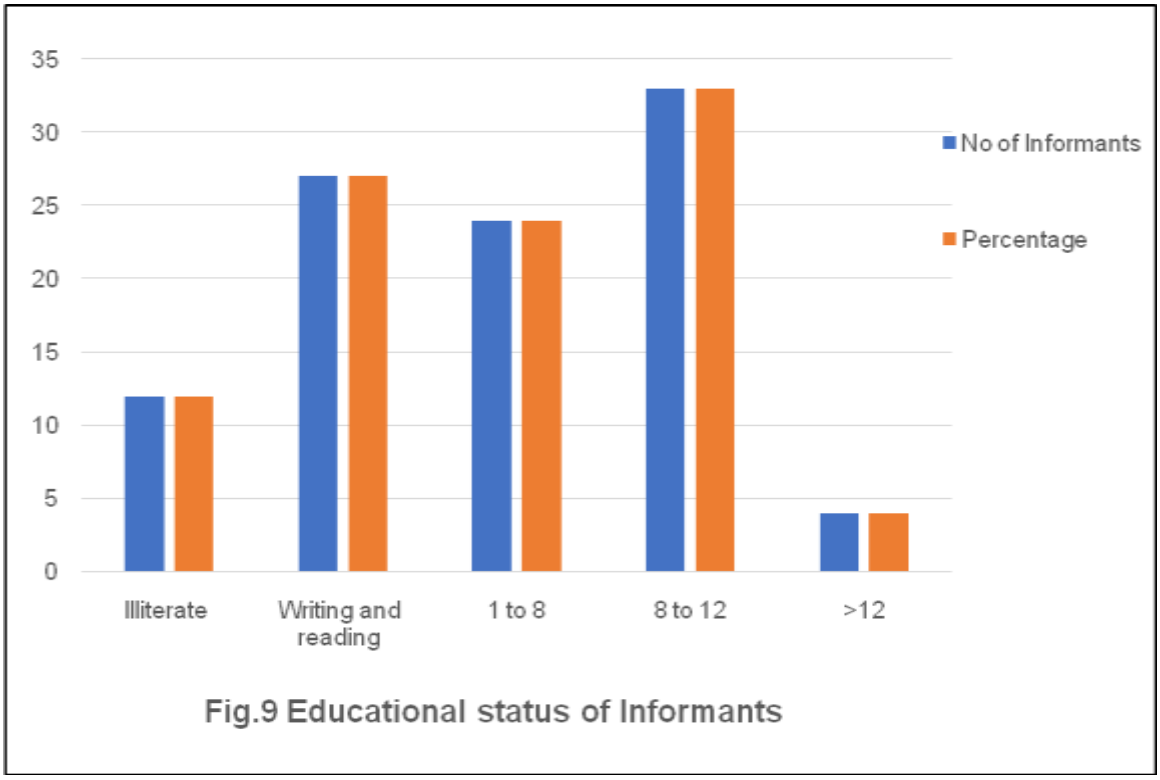


Fig.9 Educational status of Informants

indicates that modern education limits the acceptance of traditional medicinal plants (Table 17 & Fig 9).

**Table 17. Educational status of Informants.**

| Educational Status | No of Informants | Percentage |
|---|---|---|
| Illiterate | 12 | 12.00 |
| Writing and reading | 27 | 27.00 |
| 1 to 8 | 24 | 24.00 |
| 8 to 12 | 33 | 33.00 |
| >12 | 4 | 04.00 |
| Total | 100 | 100 |

### 4.12.3 Source of traditional knowledge practice

The highest number of traditional medicinal plant knowledge gain from to be 31 (31.00%) father/mother followed by 13(13.00%) from wife/husband and 8(8.00%) from friends, neighbourhood 7 (7.00%) sister/brother 11(11.00) uncle /aunt 18(18.00) and others12(12.00) (Table 18 & Fig 10).

Table 18. Source of knowledge on the practice of traditional medicine.

| Source of knowledge for traditional healer | Informants | Percent |
|---|---|---|
| Father/ Mother | 31 | 31.00 |
| Wife/ Husband | 13 | 13.00 |
| Neighbourhood | 7 | 7.00 |
| Friends | 8 | 8.00 |
| Sister/ Brother | 11 | 11.00 |
| Uncle/ Aunt | 18 | 18.00 |
| Other | 12 | 12.00 |
| Total | 100 | 100 |

### 4.12.4 Transferring knowledge of traditional medicinal plants.

According to data from the study of geographical area, the eldest son earned the highest number of comments 25(25.00%) for ways of passing on knowledge about traditional medicinal herbs, followed by all children of the family 21(21.00%) and wife 11(11.00%) (Table 19 & Fig 11).

**Table 19. Transferring of knowledge of traditional medicinal plants.**

| To whom transferred | Informants | Percentage |
|---|---|---|
| Eldest son | 25 | 25.00 |
| All children | 21 | 21.00 |
| Eldest daughter | 7 | 7.00 |
| Wife | 11 | 11.00 |
| All family member | 10 | 10.00 |
| Husband | 9 | 9.00 |
| Brothers/ sister | 6 | 6.00 |
| Not to all | 4 | 4.00 |
| To all freely | 7 | 7.00 |
| Total | 100 | 100 |

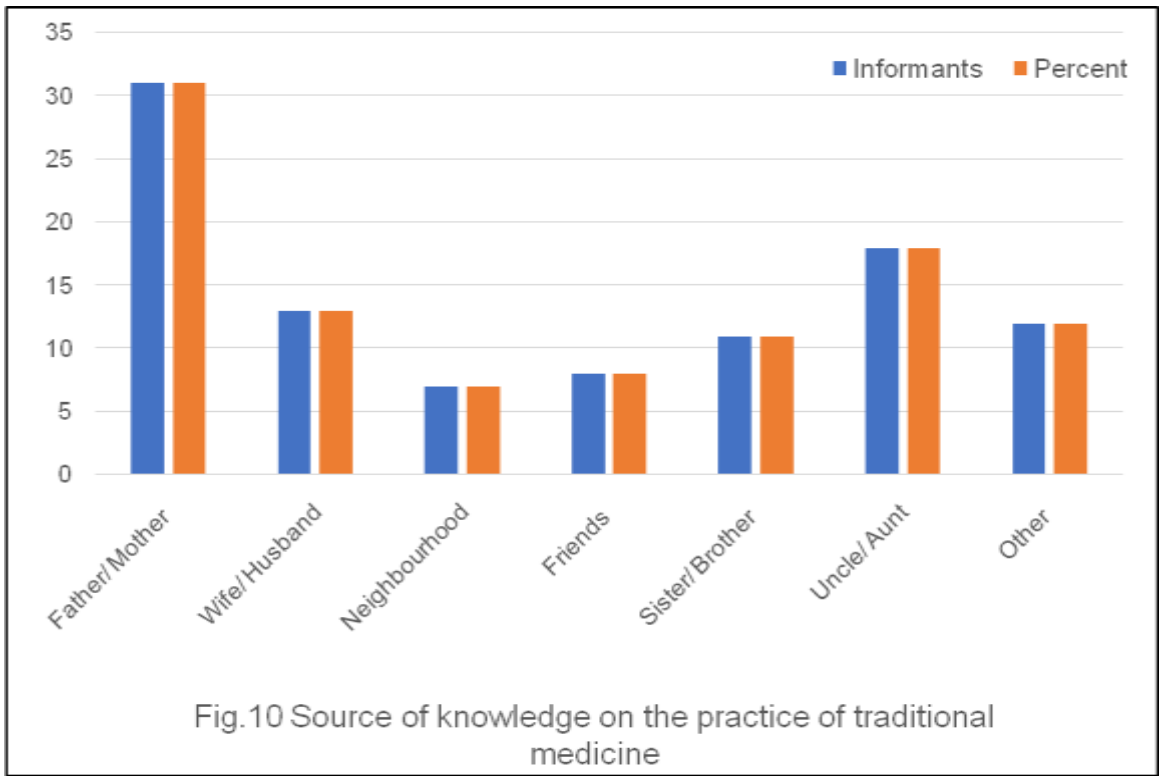


Fig.10 Source of knowledge on the practice of traditional medicine

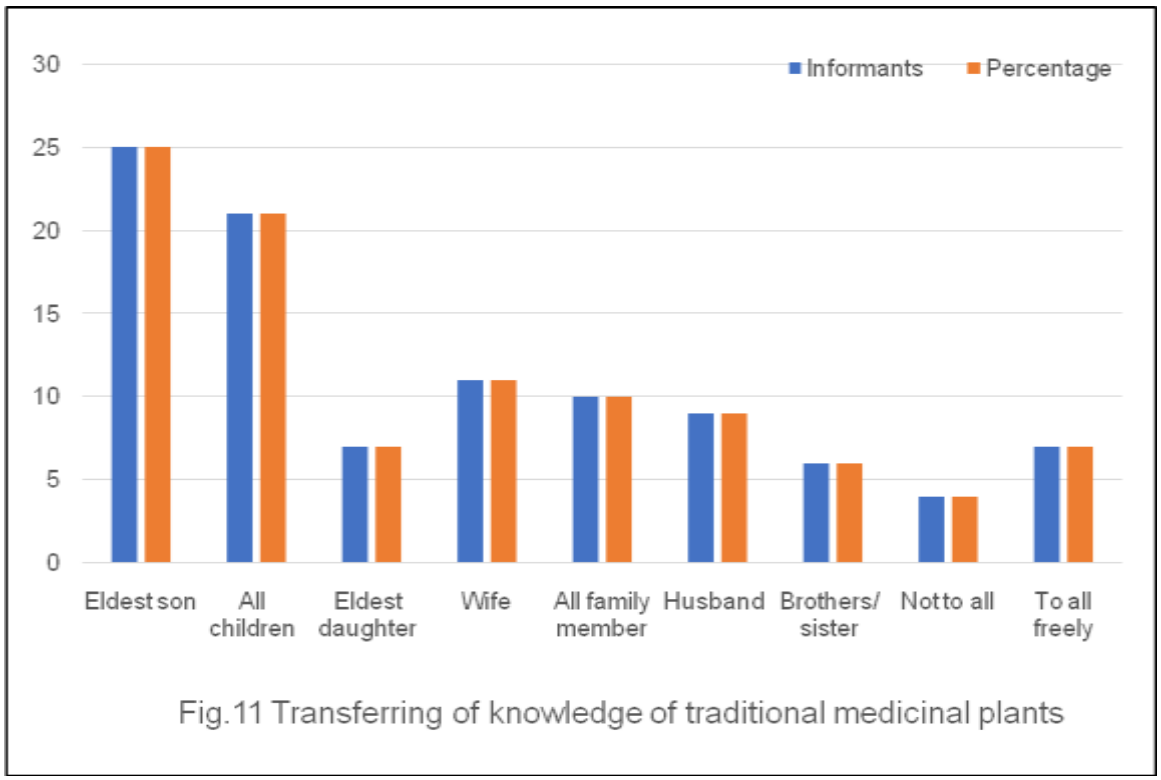


Fig.11 Transferring of knowledge of traditional medicinal plants

## CHAPTER V

# SUMMERY AND CONCLUSION

- A total of 98 plant species were found and documented in the studied area for potential uses in medicine. 86 species (87.75%) were obtained from wild 11 (11.23%) from both home and garden with 1 species (1.02%) from home garden.
- Information given by the informants in the study area, trees 37 (37.75%) herbs 35 (35.72%) which were highly used in therapeutic purpose than shrubs and climber.
- The study recorded 98 species of medicinal plants which will treat about 57 human ailments out of which majorly cure skin problem, fever, jaundice, cough, cold, dysentery, wounds, etc
- According to individuals interviewed for the study, the most often utilized plant parts were leaves, which accounted for 35(27.78%) of the total, followed by root 26 (20.64%), bark 14 (11.11%), and seed 13 (10.33%)
- Medication was prepared using fresh material from 67 of the species (68.38%), while 14 (14.27%) species of dried and 17 (17.35%) species of dried material and from fresh as a result, this finding may expose the region to a reducing in a variety of plant species.
- Most popular mode of preparation was in the form of crushing 27 (21.43%) followed by extract 25(19.84), decoction 23(18.26%), powder 19(15.08%) others with 10 (7.93%)
- The greater proportion of application of medicinal plant preparation oral with 76 (60.31%) followed by local 22 (17.45%), nasal 17 (13.48%) and Dermal application was lower with 11(8.73%) .
- In preference ranking assessment, *Azadirachta indica* recorded 55 points with 1$^{st}$ ranking which is most effective in treating skin disease followed by *Calotropis procera* and the less effective was *Aloe barbadensis.*

- In paired comparison *Argemone Mexicana* was the most favoured while *Moringa oleifera* is least responses over the other plant species in treating wound healing.
- Maximum percentage of ICF was noticed in fever (88.68%) while the minimum percentage of ICF recorded in diarrhoea & dysentery (49.02%).
- In the research area, the majority of the knowledge regarding herbal medicines was focused on older adults, specifically those aged 41 to 50. This demonstrates that there was an issue with the information transfer from the older generation to the younger one.
- There is no established method for determining the dosage of traditional medicinal herbs. This will have detrimental effects on society's general well-being

**CONCLUSION**

- In conclusion, ethnomedicine is a valuable field of study that helps to preserve traditional knowledge of plants and their uses in different cultures. By understanding the cultural significance of plants and how they are used in different societies, we can gain insight into the potential benefits of plants for human health and well-being.
- This knowledge can also inform modern medicine and contribute to the conservation of plant species. Overall, ethnomedicine plays a crucial role in preserving traditional knowledge and understanding the relationship between people and plants.
- The majority of the plants used by traditional healers still grow organically since they are thought to be more effective in both preventing and curing different diseases and health issues. As a result, most traditional healers cultivate medicinal plants in their native habitats on a daily basis, following a cultural practice.

## CHAPTER VI

# LITERATURE CITED


Ahmad, F., Tiwari, S., & Awasthi, A. (2014).Ethnomedicinal plants resources of Jabalpur region used by traditional healers. *Life*, *11*(1), 27-30.

Alagesaboopathi, C. (2013). Ethnomedicinal plants used for the treatment of snake bites by Malayali tribal's and rural people in Salem district, Tamilnadu, India. *Int J Biosci*, *3*(2), 42-53.

Alexiades, M. 1996. Collecting Ethnomedicinal data. An introduction to basic concepts and techniques. In: Selected Guideline for Ethnomedicinal research: *A Field Manual, U.S.A. The New York. Botanical Garden*, pp.58-94

Anonymous, 1987. Technologies to maintain biological diversity U.S. Congress office of technology assessment. Washington, DC, UTA-F-330.

Badgujar, S.B., R.T. Mahajan and S.B. kosale, 2008. Traditional practice for oral health care in Nandurbar District of Maharashtra, India. Ethnomedicinal Leaflets. 12: 1137-1144.

Bakare, S. S. 2014, Ethnomedicinal plants diversity around Nawargaon village of Chandrapur district, Maharashtra, India. Weekly Sci. Res. J, 1(24), 1-10.

Balick, M.J. and Cox, P.A. 1996. Plants, people and Culture: Science of Ethnobotany. NewYork, USA.

Bhosle, S. V., Ghule, V. P., Aundhe, D. J., & Jagtap, S. D. 2009. Ethnomedical Knowledge of Plants used by the Tribal people of Purandhar in Maharashtra, India. Ethnobotanical Leaflets, 2009(11), 3

Biswas, S., Shaw, R., Bala, S., & Mazumdar, A. (2017). Inventorization of some ayurvedic plants and their ethnomedicinal use in Kakrajhore forest area of West Bengal. *Journal of ethnopharmacology*, *197*, 231-241.

Chadwick, D. J. 1994. "Ethnobotany and the Search for New Drugs, " Ciba Foundation Symposium 185. John Wiley and Sons.

Chauhan, N. S. (1999). Medicinal and aromatic plants of Himachal Pradesh. Indus publishing.

Cotton, C. M. (1996). *Ethnobotany: Principles and Applications*. John Wiley & Sons.

Dambatta, S. H., & Aliyu, B. S. (2011). A survey of major ethno medicinal plants of Kano north, Nigeria, their knowledge and uses by traditional healers. *Bayero Journal of Pure and Applied Sciences*, 4(2), 28-34.

Deka, S. J., & Deka, S. P. (2007). Survey of medicinal plants used against leprosy disease by the tribal (Lalung) people of Myong area of Morigaon District, Assam, India. *Plant Archives*, *7*(2), 653-655.

Devi, A., Baidya, S., & Thakur, B. (2020). Ethnomedicinal plants of the sacred groves and their uses by Karbi tribe in Karbi Anglong district of Assam, Northeast India. *Indian Journal of Traditional Knowledge (IJTK)*, *19*(2), 277-287.

Gupta, R., M.G. Vairale, P. P. Chaudhari and S.R. Wate, 2009. Ethnomedicinal plants used by Gond Tribe of Bhandara District, Maharashtra in the treatment of diarrhoea and dysentery. *Ethnomedicinal Leaflets* 13: 900-909

Gupta, S. B. P. (2005). Prospects for commercial production of non-timber products in Nepal.Integrated watershed management, 331.

Hedberg, I. 1987. Research on Medicinal and Poisonous plants of tropics: Past, present and future in medicinal and poisonous plants of the tropics (Eds. Leewenerg, A. J. M.) International Book distribution, Dehra Dun, India, pp. 9-15

Imtienla, M.S. 2005. Katepurna wildlife sanctuary- where history and nature mingle in harmony. http://www.Akola.nic.in

Jadhav, R.R., 2015. Ethnobotanical and ethnomedicinal Survey of Kadegaon Tahsil, Sangli (Maharashtra) India. *Journal of Medicinal Plants Studies* 2016; 4(1): 11-14.

Jagtap, S.D., S.S. Deokule and S.V. Bhosale, 2008. Reported ethnomedicobotanical uses of endemic and RET plants utilised by the Korku tribe of Amravati District, Maharashtra. *Indian J. of Traditional Knowledge*. 7(20): 284-287.

Kamble, S.Y., T.N. More, S.R. Patil, S.G. Pawar, R. Bindurani, and S.L. Bodhankar. 2008. Plant used by the tribe of North West Maharashtra for the treatment of gstrointestinal disorders*. Indian J. of Traditional Knowledge.* 7(2): 321-325.

Khan, I., Razzaq and Islam, M. 2007. Ethnomedicinal Studies of Some Medicinal and Aromatic Plants at Highest Altitudes of Pakistan. American –*Eurasian J. Agric. and Environ. Sci.,* 2(5):470-473.

Kshirsagar, R. D. & Singh, N. P., 2000. Less-known ethno medicinal uses of plants in Coorg District of Karnataka state, Southern India. *Ethnobotany*. 12: 12-16.

Kuru, S., R.K. Kottaimuthu, T. S. J. Norman, R. Kumuthakalwall and S.M. Simon, 2011. Ethnomedicinal study of medicinal plants used by Malyali tribals in Kollihills of Tamilnadu, India. *International Journal of Research in Ayurveda & pharmacy.* 2 (2) : 502-508.

Kuvar, S.D. and U.C. Bapat, 2010. Medicinal plants used by Paturni tribe of Nashik district, Maharashtra to cure cuts and wounds. *Indian J. of Traditional Knowledge*. 9 (1): 114-115.

Lott, E.J.; Bullock,S.H.G. and Selis-Magallanes, J.A. 1987. Floristic diversity and structure of upland and arroyo forsts of Coastal Jalisco. *Biotropica*. 19(3):228-235

Manilal, K.S. 1980; Malayalam plant names from Hortus Malabaricus in modern botanical nomenculature. In: Manilal, K.S. ed. *Botany and History of Hortus Malabaricus*. Pp. 70-71.

Martin, G.J. 1995. Ethnobotany: A method Manual. Chapman and Hall, London. Pp. 265-270.

Megersa, M. (2010). Ethnobotanical study of medicinal plants in Wayu Tuka Wereda, East Wollega zone of Oromia region, Ethiopia. *Addis Ababa University*.

Mishra, Virendra Kumar, Prabhu Nath Shukla, Gurudatta Singh, Deepak Gupta, Guruvaiya Bhanaviya Durge 2021. Ethnomedicinal applications of forest plants for the treatment of common ailments by Gond and Madia tribes of Maharashtra, India. *Environmental Sustainability* (2021) 4:123–142.

Mohammed, I. C., Khan, M. A. and Hanif, W. 2006. An Ethnomedicinal Inventory of Plants Used for Family Planning and Sex Diseases Treatment in Samahni Valley, Pakistan. *Pakistan Journal of Biological Sciences* 9 (14)**:** 2546- 2555.

Mukherjee, P. K., Wahile, Atul, 2006. Integrated approaches towards drug development from Ayurveda and other Indian systems of medicines. *Journal of Ethnopharmacology* 103, 25-35.

Oomachan, M. M., & Masih, S. K. (1991). Ethno-botanical and conservation aspects of Medicinal Plants of Madhya Pradesh. *J of Pure and Appli Sci*, *6*, 39.

Patil, D. A., Patil, P. S., Ahirrao, Y. A., Aher, U. P., & Dushing, Y. A. 2010. Ethnobotany of Buldhana district (Maharashtra: India): plants used in veterinary medicine. Journal of Phytology, 2(12), pp 22-34.

Raj, A.J., Biswakarma, S., Pala, N.A. *et al.,,,* Indigenous uses of ethnomedicinal plants among forest-dependent communities of Northern Bengal, India. *J Ethnobiology Ethnomedicine* **14**, 8 (2018). https://doi.org/10.1186/s13002-018-0208-9

Salave, A.P., P.G. Reddy and P.G. Divakar, 2010. Studies on traditional ethno-medico-flora used by Mahadeo Koli from ghatsiras area in Pathardi Taluka of Ahmednagar District (M.S.), India. *Asian J. Exp. Sci. Spl*: 69-74.

Salve, A.P., P.G. Reddy and P.G. Divakar, 2011. Ethnomedicinal Claims by Vanjaris from pathardi Tahasil in Ahmednagar district (M.S.) India. *Asian j. Exp. Bio. Sci. Spl*: 2(1): 69-74.

Sangole, A. A. (2016). To study the ethnomedicinal survey of selected family.*Journal of Ethnobiology & Ethnomedicine*, *3*(1), 1-4.

Sankaranarayanan, S., P. Bamal, J. Ramchandran, P.T. Kalaichelvan and Deccaraman, 2010. Ethnomedicinal study of medicinal plants used by traditional user in Villupuram District of Tamil Nadu, India. at http://www.academicjournals.org.

Sathyavathi, R., and Janardhanan, K. 2014. Wild edible fruits used by Badagas of Nilgiri District, Western Ghats, Tamilnadu, India. *J Med Plants Res*, 8(2), 128-132.

Schwretz, M.W. 1988. Species diversity patterns in woody flora of treww North American paninsulas. *Journal of Biogeography.* 15(5-6):759-774.

Sharma, H. and A. Kumar, 2011. Ethnomedicinal studies on medicinal plants of Rajsthan (India): *A review. J. of medicinal Plant Research*. 5(90): 1107-1112.

Simberloff, D. 1986. Are we on the verge of a mass extinction of tropical reinforests? In: Elliott, D.L. ed. Dynamics of Extinction wiley, New Delhi.

Soni, P.K., A.Varoda and M. Mitra, 2013. Ethnomedicinal Practices among Gond & Halba Tribe of Chhattisgarh, India. International Journal of Science And Research. pp. 955-958.

Survase, S.A. and S.D. Raut, 2011. Ethnomedicinal study of some tree medicinal plants in Marathwada, Maharashtra. *J. of Ecobiotechnology*, 3(2): 17-21.

Uniyal, B.P. and Mehrotra, B.N. 1979. Festuca arundianacea Scrub in India Bull. *Bot. Soc. India.*

Veeramuthu, D. Antibacterial activity of some ethnomedicinal plants used by paliya tribe from Tamil Nadu, India*. Entomology Research institute, loyala college.* 6:35.

Vedavathy, S., Sudhakar, A., and Mrdula, V., 1997. Tribal medicinal plants of Chittoor. Ancient science of life, 16(4), 307.

Wankhade, M.S., Bokhad M.N. 2021. Investigation of Ethano Medicinal Plant used by Banjara Tribe in Mantha Tahasil, District Jalana, Maharashtra*. International Journal for Modern Trends in Science and Technology,* 7(10): 17-22, 2021.

Wilson, E.O. 1988. The current state of biodiversity. In: Wilson, E.O.: and Peters, F.M. eds. Biodiversity. Washington: *National academy Press*, pp.3-18.

Yogeesha, A. and Krishnakumar G. 2022. Ethnobotanical exploration of medicinal plants for the treatment of migraine in Dakshina Kannada district of Western Ghats, Karnataka, India. *Plant science today* ISSN 2348-1900 (online) Vol 9(4): 867–873.

Yumnam, R. S., Devi, C. O., Abujam, S. S., & Chetia, D. (2012). Study on the ethnomedicinal system of Manipur. *Int J Pharm Biol Arch*, *3*(3), 587-591.

# VITA

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5. Academic Qualification

| Sr no. | Name of degree awarded | Year in which obtained | Division/ Class | Name of awarding university | subject |
|---|---|---|---|---|---|
| 1 | B.Sc. (Agriculture) | 2020 | Second | Dr. P.D.K.V., Akola | Agriculture and Allied |

6. Research paper Published : Nil
7. Field of interest : Research & Development

**Place:** Akola

**Date :** / /2023

**Signature of Student**
**Telang Rushikesh Gopal**

**Appendix 1. List of human ailments, number of informants cited and percentage**.

| Sr. no | Ailments | Number of informants cited | Percentage (%) |
|---|---|---|---|
| 1 | Dog bite | 8 | 0.97 |
| 2 | Cough | 26 | 3.15 |
| 3 | Abortion | 9 | 1.09 |
| 4 | Skin disease | 22 | 2.66 |
| 5 | Teeth ache | 18 | 2.17 |
| 6 | Skin ache | 13 | 1.57 |
| 7 | Tumour | 9 | 1.09 |
| 8 | Intestinal worm | 8 | 0.97 |
| 9 | Body swelling | 9 | 1.09 |
| 10 | Stomach ache | 29 | 3.51 |
| 11 | Ulcers | 19 | 2.29 |
| 12 | Blood cancer | 3 | 0.36 |
| 13 | Hadi fever | 8 | 0.97 |
| 14 | Fever | 32 | 3.86 |
| 15 | Diarrhoea | 27 | 3.26 |
| 16 | Digestive problem | 14 | 1.69 |
| 17 | Head lice | 6 | 0.72 |
| 18 | Acidity | 24 | 2.90 |
| 19 | Worms | 17 | 2.05 |
| 20 | Cheek swelling in children | 3 | 0.36 |
| 21 | Rheumatism | 4 | 0.48 |
| 22 | Piles | 17 | 2.05 |
| 23 | Galactogen | 6 | 0.72 |
| 24 | Kidney stone | 18 | 2.18 |
| 25 | Urinary problems | 9 | 1.08 |
| 26 | Indigestion | 26 | 3.15 |
| 27 | Respiratory disease | 8 | 0.97 |
| 28 | Menstrual disorder | 7 | 0.84 |
| 29 | Jaundice | 23 | 2.78 |
| 30 | Intestinal problems | 12 | 1.45 |
| 31 | Malaria fever | 7 | 0.84 |
| 32 | Antidote to poisons | 4 | 0.48 |
| 33 | Eye problem | 10 | 1.21 |
| 34 | Delivery problem | 6 | 0.72 |
| 35 | Wound healing | 30 | 3.62 |
| 36 | Head ache | 22 | 2.66 |
| 37 | Chest ache | 13 | 1.57 |
| 38 | Body itching | 12 | 1.45 |
| 39 | Sun stroke | 18 | 2.17 |
| 40 | Skin allergy | 14 | 1.69 |
| 41 | Itching | 15 | 1.81 |

| | | | |
|---|---|---|---|
| 42 | Asthma | 9 | 1.08 |
| 43 | Dysentery | 23 | 2.78 |
| 44 | Vein swelling | 5 | 0.60 |
| 45 | Ring worms | 11 | 1.34 |
| 46 | Brain tonic | 3 | 0.36 |
| 47 | Joint pain | 27 | 3.27 |
| 48 | Teeth problem | 20 | 2.41 |
| 49 | General & sexual disease | 2 | 0.24 |
| 50 | Foot palm irritation | 4 | 0.48 |
| 51 | Sterility & disabilities | 2 | 0.24 |
| 52 | Cold | 14 | 1.69 |
| 53 | Hair growth | 13 | 1.57 |
| 54 | Bone facture | 15 | 1.81 |
| 55 | Hair fall | 8 | 0.97 |
| 56 | Foot crack | 11 | 1.34 |
| 57 | Snake bite | 5 | 0.60 |
| 58 | Sexual impotency | 4 | 0.48 |
| 59 | Tonsils | 15 | 1.81 |
| 60 | Diabetes | 18 | 2.17 |
| 61 | Loose motion | 22 | 2.66 |
| 62 | Bone ache | 12 | 1.45 |
| Total : | | 828 | 100 |

**Appendix 2. Informants' consensus of medicinal plants.**

| Sr no. | Scientific name | Local name | Number of informants | % of total informants |
|---|---|---|---|---|
| 1 | *Abelmoachus manihot (L.)* | Jangli bhendi | 12 | 12 |
| 2 | *Abrus precatorius L.* | Gunj | 8 | 8 |
| 3 | *Acacia nilotica (L)* | Babool | 32 | 32 |
| 4 | *Acacia catechu* | Khair | 38 | 38 |
| 5 | *Acacia leucophloea* | Hiwar | 31 | 31 |
| 6 | *Achyranthes aspera L.* | Aghada | 27 | 27 |
| 7 | *Ailanthus excelsa Roxb.* | Maharukh | 27 | 27 |
| 8 | *Aloe vera (L.) Bum. F* | Korphad | 40 | 40 |
| 9 | *Amorphopalous paeoniifolius (Dennts) Nicols.* | Surankand | 24 | 24 |
| 10 | *Andrographis paniculata (Burm. f.) Wall ex Nees* | Bhuineem | 42 | 42 |
| 11 | *Angle marmelos (L.)* | Bel | 32 | 32 |
| 12 | *Annona squamosa L.* | Sitaphal | 36 | 36 |
| 13 | *Anogeissus latifolia* | Dhavda | 22 | 22 |
| 14 | *Argemone mexicana L.* | Piwla dhotra | 24 | 24 |
| 15 | *Arisaema murrayi (Graham) Hook.* | Bhasmakand | 18 | 18 |
| 16 | *Asperagus reemosus Wild* | Marbat/ Shatawari | 23 | 23 |
| 17 | *Azadirachta indica A. Juss* | Nimba/ Neem | 41 | 41 |
| 18 | *Bacopa monnieri (L) Penn.* | Bramhi | 19 | 19 |
| 19 | *Bombusa bamboo* | Bamboo | 17 | 17 |
| 20 | *Boerhavia erecta L.* | Khupri | 17 | 17 |
| 21 | *Bombax ceiba L.* | Katesawar | 14 | 14 |
| 22 | *Boswellia serrat Roxb.* | Salai | 29 | 29 |
| 23 | *Buchnania lanzan Spreng* | Charoli | 16 | 16 |
| 24 | *Butea monosperman (Lamk.) Taubert* | Palas | 32 | 32 |
| 25 | *Caesalpinia bondu (L.) Roxb.* | Sagargota | 28 | 28 |
| 26 | *Calotropis procera (Ait.) R. Br.* | Rui | 24 | 24 |
| 27 | *Cardiospermum halicacbum (L.)* | Kapalphodi | 21 | 21 |
| 28 | *Carissa congesta White* | Karvand | 17 | 17 |
| 29 | *Cariya arborea Roxb.* | Jadkumbhi | 19 | 19 |

| | | | | |
|---|---|---|---|---|
| 30 | *Cassia fistula L.* | Amaltash | 22 | 22 |
| 31 | *Catunaregam spinosa (Thunb.) Timeng* | Gelphal, Madanphal | 14 | 14 |
| 32 | *Cassia tora L.* | Tarota | 28 | 28 |
| 33 | *Ceosia argentea Wild.* | Kombada | 24 | 24 |
| 34 | *Chloraphytum borivillium* | Safed musli | 32 | 32 |
| 35 | *Clerodendrum serratum (L.) Moon* | Bharangi | 14 | 14 |
| 36 | *Clitorea tematea L.* | Gokarn | 19 | 19 |
| 37 | *Cocculas hirsutus (Linn.) Dies* | Vasanvel | 22 | 22 |
| 38 | *Cordia gharaf (Forsk.) Ehernb. & gAsch.* | Gondhan | 23 | 23 |
| 39 | *Costus specious (Koen.) J. E. Sm.* | Pev | 16 | 16 |
| 40 | *Curculigo orchiodes Gaertn.* | Kali musli | 19 | 19 |
| 41 | *Cymapogan citrates stapf.* | Gavti chai | 45 | 45 |
| 42 | *Cymapogan martini (Roxb.) Wats* | Tikhadi zara | 18 | 18 |
| 43 | *Cynadon dactylon (L.) Pers* | Haral | 25 | 25 |
| 44 | *Datura metal L.* | Dhotra | 21 | 21 |
| 45 | *Desmodium gangeticum* | Chiktya | 23 | 23 |
| 46 | *Diplocyclon palmatus (L.) C.* | Shivlingi | 18 | 18 |
| 47 | *Eclipta prostrate (L.) L.* | Maka | 16 | 16 |
| 48 | *Embelica officinalis* | Awla | 27 | 27 |
| 49 | *Ensete superbum (Roxb.)* | Jangli kel | 17 | 17 |
| 50 | *Eucalyptus globulus* | Nilgiri | 39 | 39 |
| 51 | *Erythrina variegate* | Pangara | 28 | 28 |
| 52 | *Ficus benghalensis* | Wada | 31 | 31 |
| 53 | *Ficus racemose L.* | Umbar | 36 | 36 |
| 54 | *Ficus religiosa L.* | Pipal | 39 | 39 |
| 55 | *Helicteres isora L.* | Murudshing | 34 | 34 |
| 56 | *Hemidesmus indicus* | Anantmul | 21 | 21 |
| 57 | *Hibiscus rosa- senesis L.* | Jasvand | 26 | 26 |
| 58 | *Ixora brachiata Roxb.* | Lokhandi | 12 | 12 |
| 59 | *Justica adhatoda* | Adulsa | 42 | 42 |
| 60 | *Kalanchoe pinnata (Lam.) pers.* | Panphuti | 24 | 24 |
| 61 | *Kedrostis rostrata* | Mirchi kand | 16 | 16 |
| 62 | *Lantana camera L.* | Ghaneri | 36 | 36 |

| | | | | |
|---|---|---|---|---|
| 63 | *Legertroemia parviflora Roxb.* | Chekre, Jarul | 29 | 29 |
| 64 | *Madhuca longifolia var. latifolia (Roxb) Chev* | Moha | 28 | 28 |
| 65 | *Mangifera indica L.* | Aamba | 37 | 37 |
| 66 | *Mimosa pudica* | Lajari | 18 | 18 |
| 67 | *Moringa oleifera* | Shevga | 26 | 26 |
| 68 | *Ocimum basilicum* | Mirkuta | 22 | 22 |
| 69 | *Ocimum gratissimum L.* | Sabja | 21 | 21 |
| 70 | *Ocimum tenuiflorum L.* | Tulas | 45 | 45 |
| 71 | *Pergukaria daemia (Forsk.) Chiov* | Utaran | 14 | 14 |
| 72 | *Phyllanthus amarus Schum & Thonn.* | Bhuiawla | 34 | 34 |
| 73 | *Plumbago zeytanica* | Chitrak | 19 | 19 |
| 74 | *Pongamia pinnata (L.)* | Karanj | 12 | 12 |
| 75 | *Pterocarpus marsupium Roxb.* | Bijasaag | 17 | 17 |
| 76 | *Pueraria tuberosa (Roxb e Wild.) DC.* | Bharda | 17 | 17 |
| 77 | *Rauwolfia serpentina* | Mungsvel | 29 | 29 |
| 78 | *Saraca asoca* | Ashoka | 15 | 15 |
| 79 | *Sapindus laurifolius* | Ritha | 24 | 24 |
| 80 | *Semecrapus anacardium L.* | Bibba | 32 | 32 |
| 81 | *Sesamum oreintale* | Rantil | 25 | 25 |
| 82 | *Syzygium cumini (L.)* | Jambhul | 29 | 29 |
| 83 | *Terminalia indica L.* | Chinch | 26 | 26 |
| 84 | *Tectona gandis L.* | Saag | 31 | 31 |
| 85 | *Tephrosia purpurea (L.) Pers.* | Unhali | 13 | 13 |
| 86 | *Termanlia arjuna roth.* | Arjun | 12 | 12 |
| 87 | *Terminalia belirica* | Behda | 18 | 18 |
| 88 | *Thrspesia lampsas (Cav.) Datz. And Gibs.* | Jangli kapas | 19 | 19 |
| 89 | *Tinospora cordifolia (Wild)* | Guduchi/ Gulvel | 46 | 46 |
| 90 | *Trichosanthes tricuspidata Lour.* | Gawlan phal | 14 | 14 |
| 91 | *Tridax procumbens L.* | Kambar modi | 18 | 18 |
| 92 | *Urginea indica (Kunth).* | Raankanda | 16 | 16 |
| 93 | *Vertilago denticulata Wild.* | Ragatpiti | 21 | 21 |
| 94 | *Vemonia anthelmintica* | Jangli jira | 32 | 32 |

| | | | | |
|---|---|---|---|---|
| 95 | *Vemonia cinerea* | Sahdevi | 17 | 17 |
| 96 | *Vitex nigando* | Nirgudi | 29 | 29 |
| 97 | *Wrightia tinctoria* | Dudhi/ kala kadu | 24 | 24 |
| 98 | *Zizipus jujibie Mill.* | Ber | 27 | 27 |

**Appendix 3. List of informants Participated.**

| Sr no | Name | Sex | Age | Marital Status | Locality | Education status |
|---|---|---|---|---|---|---|
| 1 | Uttam Adsakar | M | 60 | Married | Shirla | 5 |
| 2 | Dadarao Andhare | M | 53 | Married | Shirla | 7 |
| 3 | Vinayak Nilkanth | M | 65 | Married | Shirla | 4 |
| 4 | Ganesh Andhare | M | 50 | Married | Shirla | 9 |
| 5 | Arjun Dhale | M | 45 | Married | Shirla | 10 |
| 6 | Haridas Dhale | M | 50 | Married | Shirla | 10 |
| 7 | Vithoba Anbaji Dante | M | 52 | Married | Shirla | 8 |
| 8 | Gopal Pralhad Dhore | M | 43 | Married | Shirla | 11 |
| 9 | Gajanan Tulashiram Thakre | M | 60 | Married | Shirla | 4 |
| 10 | Umesh Kokate | M | 68 | Married | Shirla | 2 |
| 11 | Shankar Mahadeo Tale | M | 60 | Married | Patur | 4 |
| 12 | Mahendra Suryabhan Nilkandre | M | 55 | Married | Patur | 6 |
| 13 | Anil Ramrao Ugle | M | 50 | Married | Patur | 8 |
| 14 | Panjab Theyabamk Toranmal | M | 50 | Married | Patur | 7 |
| 15 | Kuldeep Topsingh Chauhan | M | 35 | Married | Patur | 10 |
| 16 | Gopal Shevraman Shone | M | 50 | Married | Patur | 7 |
| 17 | Gajanan Bappu Sambhukar | M | 45 | Married | Patur | 8 |
| 18 | Kisan Purnaji Avchar | M | 55 | Married | Patur | 5 |
| 19 | Pralhad Shriram Bhondne | M | 60 | Married | Patur | 5 |
| 20 | Dinesh Shivram Dhone | M | 55 | Married | Patur | 7 |
| 21 | Devidas Shivlal Chatarkar | M | 56 | Married | Khanapur | 4 |
| 22 | Vitthal Pralhad Chatarkar | M | 54 | Married | Khanapur | 4 |
| 23 | Purushottam Yeole | M | 56 | Married | Khanapur | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 24 | Pawan Subhash Parkhale | M | 35 | Married | Khanapur | 8 |
| 25 | Gajanan Ambadas Chatarkar | M | 58 | Married | Khanapur | 2 |
| 26 | Kishor Manatkar | M | 56 | Married | Khanapur | 4 |
| 27 | Sanjay Raut | M | 48 | Married | Khanapur | 9 |
| 28 | Bansilal Suroshe | M | 64 | Married | Khanapur | 4 |
| 29 | Gajanan Rathod | M | 54 | Married | Khanapur | 4 |
| 30 | Santosh Vinayak Chatarkar | M | 44 | Married | Khanapur | 8 |
| 31 | Vikas Wankhade | M | 29 | Unmarried | Bodkha | 5 |
| 32 | Kishan Rathod | M | 42 | Married | Bodkha | 12 |
| 33 | Premsingh Rathod | M | 45 | Married | Bodkha | 11 |
| 34 | Amol Rathod | M | 30 | Married | Bodkha | Graduate |
| 35 | Sachin Chauhan | M | 40 | Married | Bodkha | 12 |
| 36 | Tulshiram Chauhan | M | 60 | Married | Bodkha | 5 |
| 37 | Vinod Pature | M | 47 | Married | Bodkha | 12 |
| 38 | Vaibhav Diware | M | 34 | Married | Bodkha | Graduate |
| 39 | Yashwant pachare | M | 52 | Married | Bodkha | 5 |
| 40 | Aakash Gaikwad | M | 31 | Married | Bodkha | 12 |
| 41 | Kishor Rathod | M | 38 | Married | Mahaldoli | 12 |
| 42 | Ganesh Rathod | M | 43 | Married | Mahaldoli | 10 |
| 43 | Vinod Ade | M | 30 | Married | Mahaldoli | 12 |
| 44 | Manohar Chauhan | M | 36 | Married | Mahaldoli | 12 |
| 45 | Deva Shinde | M | 32 | Married | Mahaldoli | 12 |
| 46 | Kailash Dhoke | M | 30 | Married | Mahaldoli | 9 |
| 47 | Shiva Shinde | M | 24 | Unmarried | Mahaldoli | Graduate |
| 48 | Shankara Howare | M | 24 | Unmarried | Mahaldoli | 11 |
| 49 | Umesh Chauhan | M | 38 | Married | Mahaldoli | 10 |
| 50 | Suresh Raoji Rathod | M | 58 | Married | Mahaldoli | 8 |
| 51 | Sadashiv Rathod | M | 71 | Married | Shiv | Illiterate |
| 52 | Anita Shinde | F | 32 | Married | Shiv | 10 |
| 53 | Vijay Singh Rathod | M | 58 | Married | Shiv | 4 |
| 54 | Sindhubai Rathod | F | 48 | Married | Shiv | 7 |
| 55 | Ravi Kamble | M | 58 | Married | Shiv | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 56 | Youvraj Narayan Adhav | M | 65 | Married | Shiv | 2 |
| 57 | Shobhabai Chauhan | F | 45 | Married | Shiv | 8 |
| 58 | Ranjendra Dharmaji Kamble | M | 55 | Married | Shiv | 9 |
| 59 | Avinash Mulchand Chauhan | M | 35 | Married | Shiv | 12 |
| 60 | Digambar Ambhore | M | 62 | Married | Shiv | 2 |
| 61 | Narayan Bachhu Chauhan | M | 71 | Married | Jogtalav | Illiterate |
| 62 | Jawed Jammu Boniwale | M | 58 | Married | Jogtalav | 4 |
| 63 | Jagdish Pahare | M | 53 | Married | Jogtalav | 4 |
| 64 | Sanjay Ghuge | M | 60 | Married | Jogtalav | 4 |
| 65 | Bandu Sarate | M | 67 | Married | Jogtalav | 2 |
| 66 | Pradip Gawande | M | 52 | Married | Jogtalav | 6 |
| 67 | Ramdas Mankar | M | 72 | Married | Jogtalav | Illiterate |
| 68 | Gopal Thakre | M | 43 | Married | Jogtalav | 9 |
| 69 | Gopal Bhaltilak | M | 51 | Married | Jogtalav | 8 |
| 70 | Amol Lodhe | M | 42 | Married | Jogtalav | 8 |
| 71 | Vijay Ramrao Gende | M | 65 | Married | Sotalvan | 3 |
| 72 | Shubham Ashok Bangale | M | 35 | Married | Sotalvan | 10 |
| 73 | Vinod Gadge | M | 50 | Married | Sotalvan | 3 |
| 74 | Suresh Gobra Rathod | M | 57 | Married | Sotalvan | 7 |
| 75 | Radha Rathod | F | 48 | Married | Sotalvan | 2 |
| 76 | Suresh Shriram Pal | M | 50 | Married | Sotalvan | 6 |
| 77 | Vaghu Rathod | M | 27 | Unmarried | Sotalvan | 12 |
| 78 | Dyanu Rathod | M | 59 | Married | Sotalvan | 1 |
| 79 | Dnyaneshwar Gaonole | M | 74 | Married | Sotalvan | Illiterate |
| 80 | Nitesh Bhakre | M | 46 | Married | Sotalvan | 8 |
| 81 | Prakash Awchar | M | 43 | Married | Agikhed | 9 |
| 82 | Chinnaji Gulde | M | 65 | Married | Agikhed | 1 |
| 83 | Shivdas Khandare | M | 57 | Married | Agikhed | 5 |
| 84 | Babarao Awchar | M | 68 | Married | Agikhed | 1 |
| 85 | Sunil Ingle | M | 52 | Married | Agikhed | 9 |
| 86 | Subhash Gulde | M | 61 | Married | Agikhed | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 87 | Keshav Ghuge | M | 52 | Married | Agikhed | 10 |
| 88 | Vijay Ugle | M | 48 | Married | Agikhed | 10 |
| 89 | Mayur Uparwat | M | 36 | Married | Agikhed | 11 |
| 90 | Sonu Arkrao | M | 44 | Married | Agikhed | 10 |
| 91 | Anil Sheshrao Nemade | M | 62 | Married | Tandali | 7 |
| 92 | Kisan Sukhdeo Gale | M | 75 | Married | Tandali | Illiterate |
| 93 | Devidas Shriram Ramteke | M | 58 | Married | Tandali | 9 |
| 94 | Uddhav Borde | M | 52 | Married | Tandali | 10 |
| 95 | Manoj Nakat | M | 47 | Married | Tandali | 10 |
| 96 | Nikhil Petkar | M | 34 | Married | Tandali | 12 |
| 97 | Gajanan Nakat | M | 65 | Married | Tandali | 4 |
| 98 | Sachin Borde | M | 37 | Married | Tandali | 10 |
| 99 | Vikky Borde | M | 24 | Unmarried | Tandali | 11 |
| 100 | Uttam Gangaram Nakat | M | 69 | Married | Tandali | 2 |