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An Ethnobotanical study of traditionally used medicinal plants of Ranikhet Tehsil, Almora district, Uttarakhand, India

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ABSTRACT
Medicinal plants play a vital role in livelihood local peoples of Ranikhet Uttarakhand. These plants used in the Indian traditions from the formerly centuries for the treatment of various ailments. The aim of this study was to collect the data and documented the medicinal value of medicinal plants from the different villages of Ranikhet Tehsil. In which Jainoli, Jala, Turiya Suyal and Chaubatia (settlement) was included, where Peoples traditionally used the medicinal plants for different diseases. Survey was conducted on November 2024. The valuable information collected from the local healers and old age peoples belongs from Ranikhet villages. This survey described a total of 33 plants species of medicinal plants belonging to 27 families; out of which 9 Herbs, 10 Shrubs, 2 Climbers and 12 Trees. The purpose of this study was to promote the traditional values of the ethno-medicinal plants because they shows less side effects and more effectively comparison to modern medicines.

Keywords: *Traditional, Ethno-botanical, Herbal, Ranikhet, Himalayan, Uttarakhand*

1. INTRODUCTION

Ethno-botany is the branch of sciences which deals that how the people utilize plants and/or their products for medicinal, ornamental, or traditional and cultural purposes. Many modern medicines are derived from plants through the ethno-botanical research. Ethnobotanical research area played a crucial role in identification of plants with medicinal properties, leading to the development of numerous modern drugs.

The traditional understanding of native plants plays an significant role in the discovery of number of important modern day drugs. Nearly 25% of medicines in current scenario are obtain from plants (Munir et al. 2022) In developing countries, approximately 80% people depend on traditional medicines for the various ailments (WHO 2002). India has all the three elements that contribute to ethno-botanical richness of any area they are floristic diversity, ethnic diversity and rich cultural diversity. Uttarakhand is located at the latitude of 28043'.45"-3108'10" N and the longitudes of 77035'5"- 8102'25" E, it is a part of Indian Himalayan region. (Pandey et al. 2016). This Himalayan region has tremendous variability of physiographic and climatic conditions along with biodiversity of flora and fauna, which is the reason for its rich biodiversity (Vishnoi at el. 2021). Over the years, Uttarakhand's abundance of medicinal plants has drawn a lot of attention for its ability to treat a variety of health disorders (Kala, 1998, 2007). People who live in Uttarakhand's mountainous region lead modest lives in tough climatic condition depend and mostly on farming and forests for their livelihood. The local population has developed rich traditional ethno-botanical knowledge to cope with harsh environmental conditions. In addition to being used for shelter, food, fodder, and other necessities, medicinal plants have long been used in the area to treat a variety of illnesses and ailments (Singh et al., 2017). 65 % of people in the state of Uttarakhand belongs to the rural areas. The states have a relatively small number of primary health centres. Even though the hilly region of Uttarakhand is expected to cover 20,000 peoples at each primary health centre serves over 31,000 people (Samal et al., 2004).An essential component of the northern Indian state of Uttarakhand is the Kumaon Himalayan region. In addition to herbal remedies and a wealth of endemic and rare plants, it is one of the main hubs for cultural and traditional diversity. This region's rural communities depend mostly on biological resources for their survival (Singh et al. 2014).

Additional government of Uttarakhand improved speculation in tourism area and open several roadways to explore new tourists' sites, which can improve the economic status of local public (Sarswat and Rama, 2017). In present scenario plant based raw material used as medicinal plant is on high demand as 15%-25% annually (Bhatt et al. 2020). The national and international institutions along with other people endeavour the information on medicinal plants and their cultural knowledge

to spread quickly and constantly (Pandey et al. 2021). Many works have conducted specific studies on Uttarakhand medico botany. In order to provide a through description of the medicinal plant in Ranikhet region extensive medico botany has also been conducted there. Bhattacharyya et al. (2010) founded some new folk medicines in Kalika forest of Uttarakhand medicinal plant from the Ranikhet region or the specific uses described here have not been reported. Ethno-botanical investigations in Ranikhet region has not been much studies their is a requirement for a detailed investigation and exploration of this issue. Therefore, we conducted a study in this region to explore the ethno-botanical/traditional system of medicinal practices. Three villages and one settlement are the sites of the survey to explore the medicinal values of the plants.

2. MATERIAL AND METHODS

2.1 Study design and sampling

Ranikhet is a hill station situated in the lower Himalayan (Kumauni) region of district Almora in Uttarakhand (India). Ranikhet tehsil situated in 29029'50" North 79026 East on one of the ridge of Kumaon region of Himalayan, The majority of the region surrounding the Ranikhet is protected by reserved forest. The forest of the West Almora Division Ranikhet range specially encloses the cantonment. (Ashfaque Ahmed, 2012). A survey was conducted in three villages (Jainoli, Jala and Turiya Suyal) along with one settlement named as Chaubatia of the Ranikhet area (Fig. 1). The detailed geographical localization of these sites is provided in the table given below (Table 1).

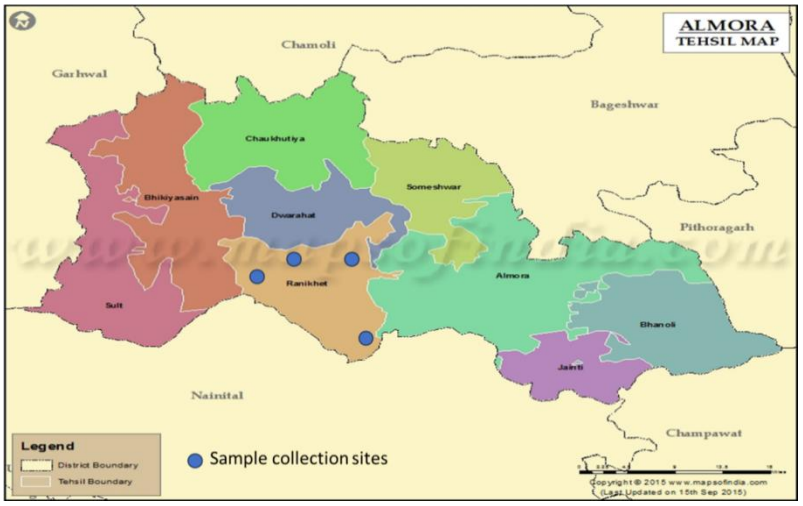


Fig:1-The survey area of Ranikhet Tehsil, Uttarakhand
(Source:https://www.mapsofindia.com/maps/uttarakhand/tehsil/almora.html

Table 1: Geographical locations of the areas of Ranikhet (Almora) of Uttarakhand included in the survey

S. No.	Study area	Location
1.	Jainoli	29.6079° N, 79.4458° E
2.	Jala	29.57990 N, 79.48020E
3.	Turiya Suyal	29.6001° N, 79.4465° E
4.	Chaubatia	29.6138° N, 79.4563° E

2.2 Scope of the study

The primary objective of this study is to understand the complex relationship between people and the plants. This survey reveal the way in which the communities use the plant for food rituals, medicines and other uses. In order to obtain a thorough understanding of medicinal plants used in various diseases, field survey and interviewed were conducted.

2.3 Survey methods and Data collection

A semi-structured questionnaire prepared for gathered information from the peoples of Ranikhet Tehsil. Survey was conducted in three villages and one settlement near the study area namely, Jainoli, Jala and Turiya Suyal and Chaubatia (settlement) of Ranikhet in November 2024. A total of 132 people was intracted in which 72 males and 60 females was randomly selected from the study area during the field investigation. (Fig.2). During the survey, local people were

interviewed and information on ethno-medicinal utilization of plants and their parts used was recorded. The intraction was also recoreded from the local medicinal practitioners who are using medicinal plants for their practices to cure diseases. Throughout the investigation, every efforts was taken to cover every aspect of the study, in accordance with established to herbarium procedures standard guidance with adhered for the collection, mounting, preparation and maintenance of plant. Herbarium sheets prepared and submitted in botany department of the IFTM University Moradabad, India. The plants were identified with the help of (Hooker, J.D 1875-1897), (Pusalkar and Shrivastava 2018), (Chakre, O.J., 2010). Plants under study were categorized according their size as herb, shrubs, climber and tree. They were further sub-categorized according their parts of applications as flower, leaves, barks, roots, fruit and seeds.

Fig: 2- Interaction with local native for gathering information at different selected sites of Ranikhet tehsil, Almora district, Uttarakhand.

3. RESULT & DISCUSSION

Due to a lack of contemporary medical facilities, the majority of people use plants for their medical need. All medicinal plants those are used as medicines to cure various diseases are arranged in alphabetical order and the scientific names of plant species are given with their Common name, family name, plant part used and mode of use (Shown in table 3). Some plants are extensively used in this area like *Acalypha wilkesiana*, *Achyranthes aspera*, *Araucaria hetrophylla*, *Asparagus racemosus*, *Bauhinia variegate*, *Berberis vulgaris*, *Boerhavia diffusa*, *Cannabis sativa*, *Cassia angustifolia*, *Cassia fistula*, *Cedrus deodara*, *Combretum indicum*, *Curcuma longa*, *Cyanthillium cinereum*, *Euphorbia hirta*, *Ficus religiosa*, *Grevillea robusta*, *Ipomoea triloba*, *Lantana camara*, *Mandevilla sanderi*, *Nyctanthes arbortristis*, *Ocimum tenuiflorum*, *Pedilanthus tithymaloides*, *Phyllanthus emblica*, *Pinus roxburghii*, *Psidium guajava*, *Pteris vittata*, *Rhododendron arboretum*, *Sida acuta*, *Solanum nigrum*, *Tecoma stans*, *Urtica dioica*, *Ziziphus mauritiana*. Most common *Berberis vulgaris* also called the barberry or daru haldi highly effective to treating the kidney stone. *Cannabis sativa* is most popular in all over the world and it is traditionally used in the festivals The biodiversity of *Urtica dioica* is very high in this region of study area, this is a perennial herb belongs to Urticaceae family, commonly known as "*Sisun ka Sag" or "Bichhu ghas"*. This is the most popular in this region and easily available, taken in a form of soup for the warmth. *Rhododendron arboretum* commonly known as the *buransh* in this region, the blooming time is late February and late April, flower are very attractive and used in the fever and diabetes. *Cedrus deodara*, evergreen tree whose male cone is smaller than female cone. Its bark powder is used to control blood sugar level. *Nyctanthes arbortristis* flowers are used in religious ceremonies and rituals. Our study includes a total of 37% Tree, 27% herbs, 30% shrubs and 6% climbers (Shown in figure- 3) and the ratio of the plant parts used as medicines study stated in the table -2

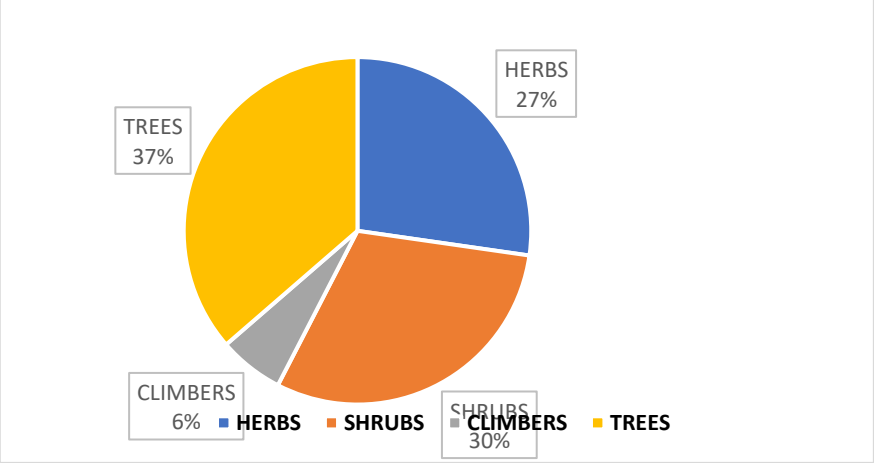


Fig: 3- Showing the percentage of plants according to their habitat

S. No.	Plant part used	Percentage of plant part used in cure
1.	Root	12 %
2.	Leaves	55 %
3.	Bark	15 %
4.	Fruit	05 %
5.	Rhizome	03 %
6.	Flower	05 %
7.	Seed	05 %

Table 2: Percentage of plant part used in cure

Among all parts of the plant leaves are widely used by the people in different forms for the treating of various diseases.

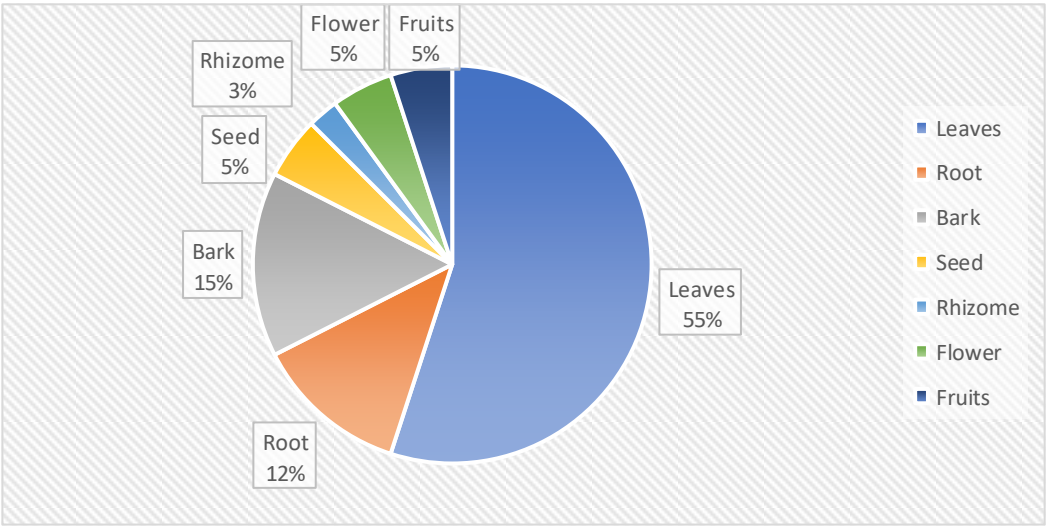


Fig: 4- Frequency of Plant parts used for medicinal applications

The most common form for preparing the medicines was, paste (11 record), powder (10 records), leaf juice (6 records), decoction (4 records), seed oil (6 records), resin (1 records), other (3 record) (Fig:-5). The dose response is depending on

some important factors like- Age, sex, body mass, and the intensity of diseases.

The parts of *Acalypha wilkesiana* , *Achyranthes aspera, Boerhavia diffusa, Cassia fistula, Combretum indicum, Curcuma longa, Lantana camara, Mandevilla sanderi, Pinus roxburghii, Pteris vittata,* and *Urtica dioica* plants are made into paste and used in various diseases. Some plants are used as the form of Powder that are *Asparagus racemosus, Cassia angustifolia, Euphorbia hirta, Grevillea robusta, Mandevilla sanderi, Nyctanthes arbortristis, Phyllanthus emblica, Pedilanthus tithymaloides, Tecoma stans.* The plants which are being used in diseases in the form of decoction are *Bauhinia variegate, Ipomoea triloba, Nyctanthes arbortristis, Psidium guajava.* Plants those are use in the form of leaf juice are *Cassia angustifolia, Ocimum tenuiflorum, Ficus religiosa, Rhododendron arboretum, Solanum nigrum, Ziziphus mauritiana*.

The resin of *Araucaria hetrophylla* used in the treatment of healing of wounds. And seed oil of the *Cannabis sativa* used in pain, induced sleep loss and discomfort. In other the form given elsewhere that are the fresh leaves of *Berberis vulgaris* taken in early morning at empty stomach for the kidney stone and dried root of *sida acuta* chewed to relieve toochache and its soaked leaves with water used as conditioner or shampoo for scaly hair.

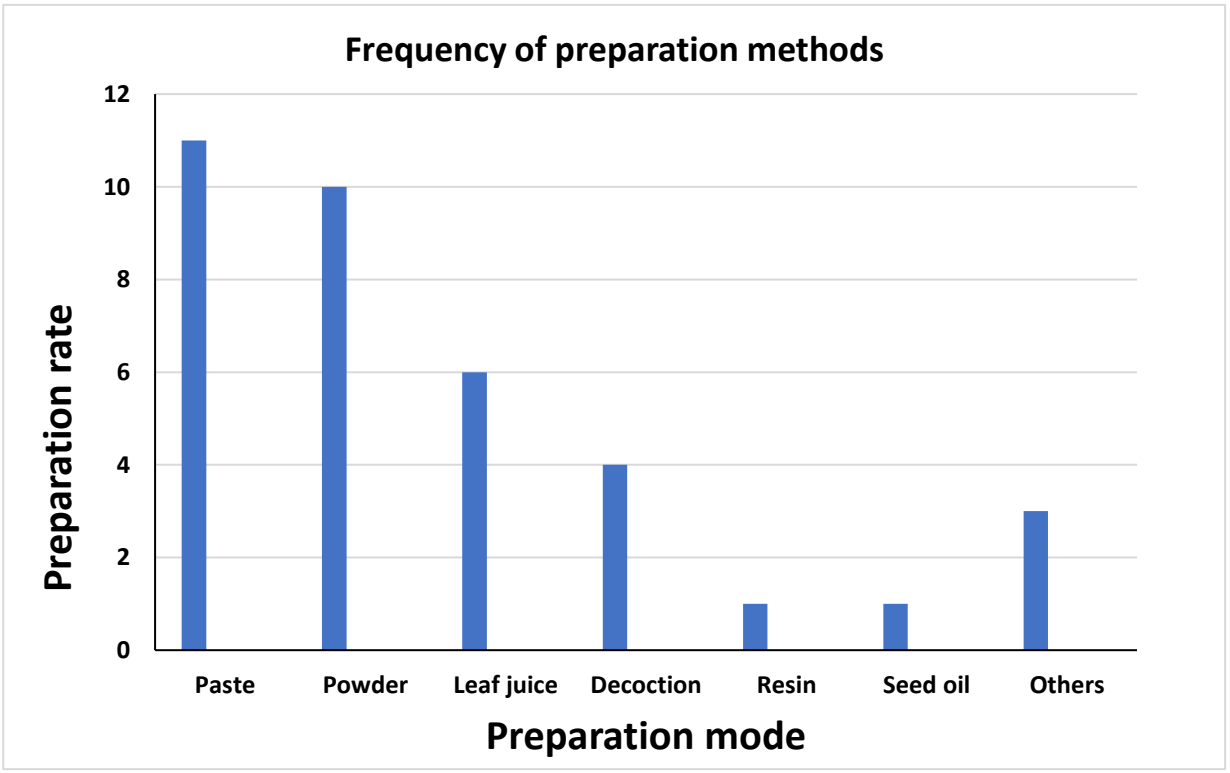
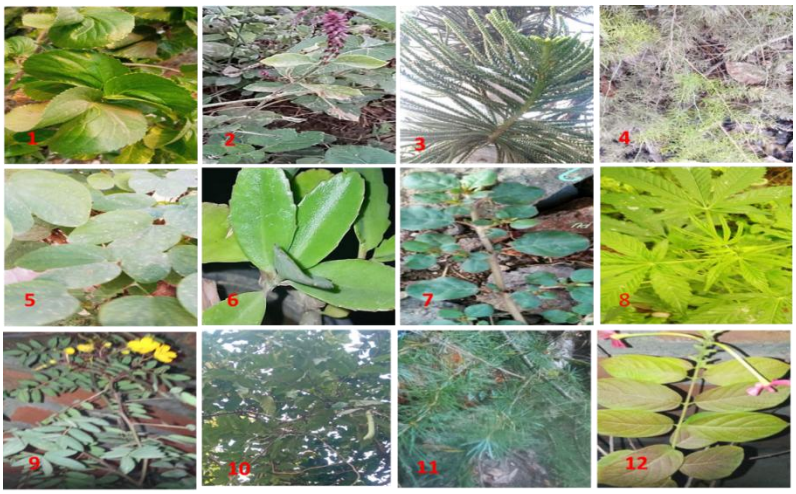
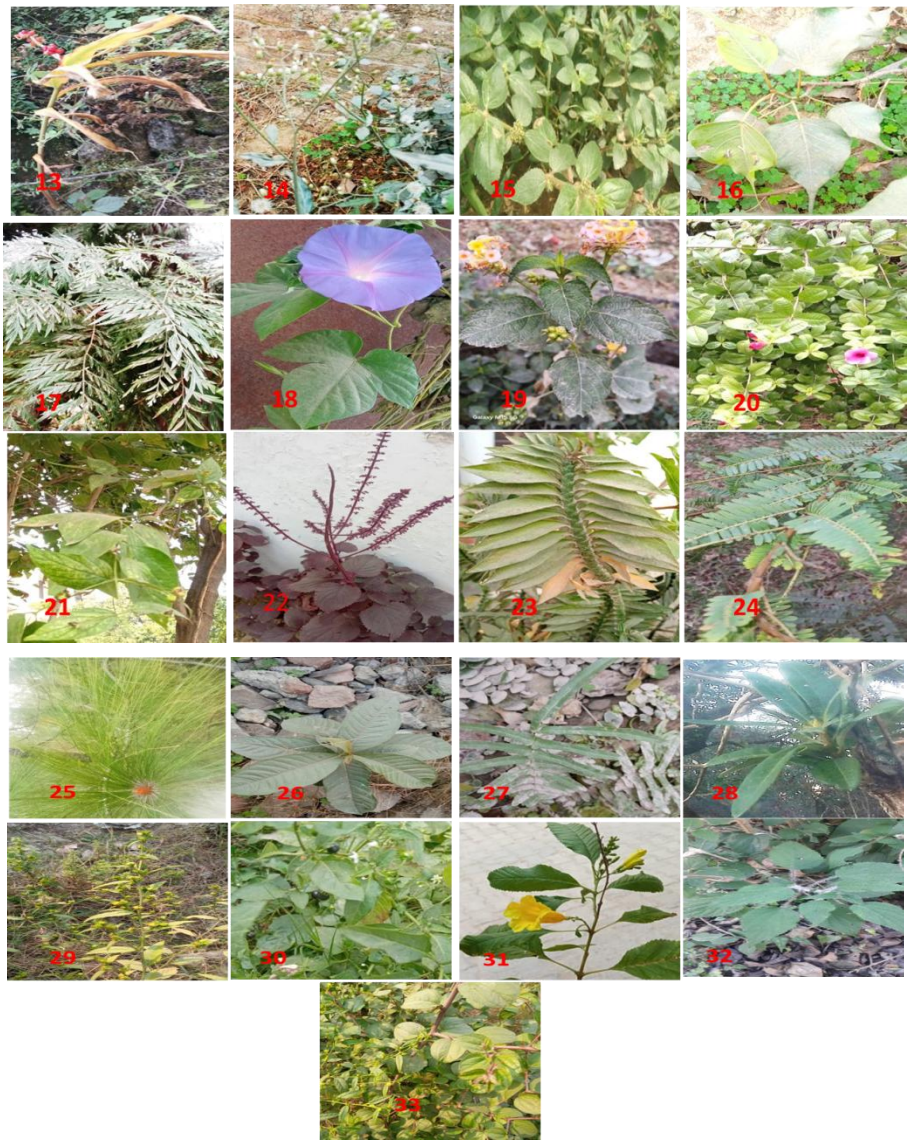


Fig: 5- Frequency of preparation method





1. *Acalypha wilkesiana*, 2. *Achyranthes aspera*, 3. *Araucaria hetrophylla*, 4. *Asparagus racemosus*, 5. *Bauhinia variegate*, 6. *Berberis vulgaris*, 7. *Boerhavia diffusa*, 8. *Cannabis sativa*, 9. *Cassia angustifolia*, 10. *Cassia fistula*, 11. *Cedrus deodara*, 12. *Combretum indicum*, 13. *Curcuma longa*, 14. *Cyanthillium cinereum*, 15. *Euphorbia hirta*, 16. *Ficus religiosa*, 17. *Grevillea robusta*, 18. *Ipomoea triloba*, 19. *Lantana camara*, 20. *Mandevilla sanderi*, 21. *Nyctanthes arbortristis*, 22. *Ocimum tenuiflorum*, 23. *Pedilanthus tithymaloides*, 24. *Phyllanthus emblica*, 25. *Pinus roxburghii*, 26. *Psidium guajava*, 27. *Pteris vittata*, 28. *Rhododendron arboretum*, 29. *Sida acuta*, 30. *Solanum nigrum*, 31. *Tecoma stans*, 32. *Urtica dioica*, 33. *Ziziphus mauritiana*.

Table:3 Table that illustrates how various plants are used to treat different diseases

S. No.	Plant name	Common Name	Family	Habit	Plant part utilized	Mode of administration	Cure/Medication	References
	Acalypha wilkesiana (Müll. Arg.)	Copper leaf	Euphorbiaceae	Shrub	Leaf	Leaf pastes with salt (NaCl)	Skin diseases like itching and ringworm	Afreen et al. (2021); Makgobole et al. (2023)
	Achyranthes	Latjira/Chirchita	Amaranthaceae	Herb	Leaf/root	Leaf/root paste mixed with water	Skin diseases	Ganesh et al. (2021)

aspera (L.)					or milk		
Araucaria hetrophylla (Salisb.)	Christmas tree	Araucariaceae	Tree	Bark	Bark resin	Wound healing	Younis et al. (2022)
Asparagus racemosus (Willd.)	Shatavari	Asparagaceae	Climber	Tuberous root	Powder with cow's milk in the morning	To increase milk production in lactating mothers	Kumar et al. (2014); Goyal et al. (2003)
Bauhinia variegata (L.)	Kachnar	Leguminosae	Tree	Bark	Decoction of bark	Used for the treatment of ulcers	Irchhaiya et al. (2014)
*Berberis vulgaris (*L.*)*	Barberry	Berberidaceae	Shrub	Leaves	Fresh leaves consumed at early morning per day	Highly effective for cure of the kidney stone	(Madiseh et al. 2017)
Boerhavia diffusa (L.)	Patarsakha	Nyctaginaceae	Herb	Root	Pate of fresh roots mixed with ghee	To cure fever taken twice per day	Nayak and Thirunavoukkarasu (2016); Gour, R. (2021)
Cannabis sativa (L.)	Bhang	Cannabaceae	Herb	Seed	Seed oil	Taken in pain, induced sleep loss and discomfort	ElSohly et al. (2017)
Cassia angustifolia (Vahl.)	Senna or Sanay	Fabaceae	Shrub	Leaves	Leaf powder in hot water or tea	Constipation treatment	Mangmeesri et al. (2013); Thaker et al. (2023)
Cassia fistula (L.)	Amaltas	Caesalpiniaceae	Tree	Leaves /bark	Leaves and bark paste	Applied on white spots of leprosy and areas affected by ringworm infection	Majhi et al. (2015); Panda et al. (2016)
Cedrus deodara (Roxb., Loud.)	Deodar	Pinaceae	Tree	Bark	Bark powder	To control blood sugar levels	Jain et al. (2014)
Combretum indicum (L.)	Madhumalti	Combretaceae	Shrub	Leaves /seed	Paste of crushed fresh leaves and seeds	To reduce swelling and pain	Alam et al. (2011)
Curcuma longa Linn.	Haldi	Zingiberaceae	Herb	Rhizome	Paste of rhizome	Applied on the skin infection and	Kundu et al. (2005); Velayudhan et al. (2012),

						wounds.	Sabalingam, Siriwardhene (2022)
Cyanthillium cinereum (L.)	Sahadevi	Asteraceae	Herb	Leaves	Leaf juice	A drop of leaf juice instilled in the eye for relieves eye pain.	Ojastha et al. (2023)
Euphorbia hirta (L.)	Dudhi	Euphorbiaceae	Herb	Leaves	The powder of Leaves	It given to patients of asthma and also beneficial for foot pain, weakness, and cough	Mahapatra et al. (2021)
Ficus religiosa (L.)	Peepal	Moraceae	Tree	Leaves	5-10 ml Leaves juice of peepal, mixed with mildly hot water, and consume it before going to bed	It given for constipation.	Singh et al. (2011)
Grevillea robusta (A. Cunn. ex R. Br.)	Silky oak	Proteaceae	Tree	Bark	Bark powder	It used for the treatment of earaches and headache	Jhuma and Vineet (2021); Mathur and Joshi (2013)
Ipomoea triloba (L.)	Ghantibel/Morning glory	Convolvulaceae	Climber	Leaves	The decoction of leaves	Helpful in stomach-aches and also used to treatment of wounds healing.	Srivastava and Rauniyar (2020)
Lantana camara (L.)	Panchphooli	Verbenaceae	Shrub	Leaves	Fresh leaves Crushed and make a paste or boil the leaves	Apply this paste to the chest at the symptoms of fever and cough.	Sukumaran et al. (2014)
Mandevilla sanderi (Hemsl.)	Mandevilla	Apocynaceae	Shrub	Root and leaves	Powder of root and leaf paste	Root powder used for the cough and the paste of leaves used to relieved fever and wounds	Adams et al (2007)
Nyctanthes arbortrist	Parijat or Harshringar	Oleaceae	Tree	Flower/Leaves	Powder of dried flower with warm milk and	Powders can relief for digestion. And the	Gupta et al. (2021)

is (L.)					Leave decoction	decoction of leaves effective for the joint pain.	
Ocimum tenuiflorum (L.)	Krishna Tulsi	Lamiaceae	Shrub	Leaves	The juice of Tulsi leaves mixed with black salt or lemon juice	Used for cough and cold.	Bhattarai et al. (2024)
Pedilanthus tithymaloides (L.)	Zigzag plant/Vilati kharsani	Euphorbiaceae	Shrub	Leaves	Powder of leaf mixed with olive oil	and applied as a poultice on burns	Prabhat et al. (2016)
Phyllanthus emblica (L.)	Amla	Phyllanthaceae	Tree	Fruit	Powder of Amlas taken in empty stomach per day	Recommended for managing blood sugar levels.	Priya and Islam (2019), Mirunalini, S. and Krishnaveni,(2010)
Pinus roxburghii (Sarg.)	Chir/Pine	Pinaceae	Tree	Leaves	The paste of the leaves	Applied to wounds or cuts to relieve them. The leaves of this plant help to treat ulcers.	Kumar et al. (2024), Negi et al (2011)
Psidium guajava (L.)	Amrud	Myrtaceae	Tree	Leaves	Decoction of guava leaf	Helps in low blood sugar levels. It helps to treat acne	Gutiérrez et al. (2008), Khanna et al. (2025)
Pteris vittata (L.)	Fern	Pteridoideae	Herb	Leaves	Leaves paste	It used for healing of wounds	Singh et al. (2008)
Rhodendron arboreum (L.)	Burans	Ericaceae	Tree	Flower	Juice of flower or extract	Mostly used in the, fever, diabetes, headache, diarrhea	Madhvi et al. (2019)
Sida acuta (Burm. f.)	Bariyara	Malvaceae	Herb	Root/Leaves	Dried Roots and leaves soaked with water	Dried root chewed for relieve toothache and leaves used for hair conditioner/ shampoo for scaly skin.	Benjumea et al. (2016)
Solanum nigrum (L.)	Makoi	Solanaceae	Herb	Leaves	Leaf juice mixed with Ghee	Applied on the Gums, when baby's teeth are	Bakhru (1992), Khondu and Gujarathi

						coming out, it relief to gum pain.	(2024)
Tecoma stans (L.)	Piliya	Bignoniaceae	Shrub	Bark	leaves or bark powder	helps to treating stomach pains and for improving digestion system	Gupta and Behl (2021)
Urtica dioica (L.)	Bichhu ghas	Urticaceae	Herb	Leaves	Leaf paste / leaves extractes	Paste of leaves used to treat skin allergies. Fresh leaves extracted help as blood purifier	(Dar et al. 2013)
Ziziphus mauritiana (Lamk.)	Ber	Rhamnaceae	Small tree	Fruit	Juice of Fruit and infusion of leaves	Fruit juice taken for boosting overall health and infusion of the leaves taken to reduce stress and anxiety	Akhtar and Bashir (2021)

4. CONCLUSION

The study concluded that there are 33 plants commonly used for the different diseases which are easily available in the studied region mostly, the leaf root, fruit and seeds of the plants are used for the treatment. In the present scenario of medical sciences modern medicines are mainly in use. On the other hands the due to climate change and urbanization the covered green are is reducing potentially which create danger for many of the plant species of medicinal used. It is necessary to aware the society about the practices of Ethno botany in medical field, as it is cost effective with lesser or no side effect and also a sustainable practices

5. ACKNOWLEDGMENTS

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