

CONSERVATION ASSESSMENT OF ETHNOMEDICINAL PLANTS OF MANDI DISTRICT, HIMACHAL PRADESH

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ABSTRACT- Himachal Pradesh is one of the most species rich regions in the world and a key center for the origin and diversity of numerous plant species. Ethnobotanical research is essential for exploring these diverse biological resources for medicinal uses. This study aimed to record the traditional knowledge of the tribal communities in Himachal Pradesh concerning the use of medicinal plants for treating diseases in human and livestock. Despite this richness, there is lack of detailed documentation about the use of therapeutic plants in this area. Study was conducted in Mandi district of Himachal Pradesh. Data was gathered through field surveys, open interviews and discussions. Twenty-two plants were reported that are used by traditional healers. *Vitex negundo* has the highest use value among all the reported plants.

Keywords: Conservation, Ethnobotany, Himachal Pradesh, Mandi, Use value

1. INTRODUCTION

Relationship of people with plants is ethnobotany. It is the universal way that calls for cooperation between indigenous people and plants. How plant species are identified and used in human societies is ethnobotany (Schutles, 1962; Ford, 1980). Harshberger (1895) used “ethnobotany” which comprises many plants that are used in making of dyes, medicines, food, and tannins. Ethnobotany account its role in supplementary, new, affordable or wild type of crop, wild varieties of cultured plant, novel medicinal plants, inexpensive compositions and importantly, foods and medicines which are readily accepted by the basic and tribal community (Jain, 1987).

Ethnobotanical studies are essential in the quest for modern drugs derived from natural medicinal plant resources. For rural communities in developing countries, the application of plants extract as medicines which provide a good alternative to health care systems. It was reported that 80% of the population in developing countries depends on traditional medicines for primary health care. These plant species are frequently reported as safe, cheap and easily available from the surroundings. In India, approximately 7500 plant species have

been reported for medicinal use in indigenous health practices and modern system of medicines (Bhardwaj et al., 2017).

Since Vedic times, plants have been used for medicinal purposes and human sustenance in India. Rig Veda and Atharveda were the first to discuss the medicinal use of plants. In India approximately 75% of the population lives in rural areas. In periods of food scarcity, most rural communities depend on natural resources such as wild edible plants to meet their food requirements. The biodiversity of the Indian Himalayan region millions of years ago has long been considered an important foundation for traditional medicines. Indian Himalayan region is enriched with unique location, geography and culture. It is one amongst the biodiversity hotspots. It harbors more than 9000 plant species, of which nearly 33% are endemic. Various studies on medicinal and aromatic plants have been studied in the Indian Himalayan Region. However, in particular Pradesh, such studies are incomplete and mainly focused on inventory. Some workers have mentioned medicinal uses of plants in ethnobotanical notes, floristic and biodiversity studies (Chauhan et al., 1984).

Plants are gifts of God for mankind and are the basis of life on Earth. The tradition of consuming wild plants as a source of food still persists in rural communities, despite their primary reliance on agriculture and animal husbandary. Many medicinal plants play an important role in Ayurvedic, Unani and other systems of medicines. The use of medicinal plants in India goes back thousands of years. Plants have been used for medicinal purposes long before prehistoric period (Dhaliwal et al., 1999).

Some researchers have attempted to document useful indigenous information on the medicinal uses of plants from Jhanjheli valley. There is no

record of potential of nanoparticles from this area. The survey of this study region can be a good preliminary point for new phytopharmacological research in the medicinal domain. There is no proper record available for traditional medicinal knowledge of plants used by the rural population of the Jhanjheli valley. These objectives were finalized for the current research investigation by keeping these in mind (Gautam AK, 2009).

2. MATERIALS AND METHODS

The knowledge of plants can be considered a distinct cultural domain with clear boundaries that contributes to the comprehension of human knowledge. When conducting field research, language is crucial for accessing this area and the knowledge expressed through naming has been referred to as “lexical” knowledge. This study focuses mainly on the ethnobotanical surveys of medicinal plants, drug formulations of multi remedial medicine by the local people and preparation of nanoparticles from the selected medicinal plant based on the use value of plants.

The present study was carried out in Jhanjheli valley region of North Western Himalaya, India. This area is located in North part of Mandi district and lies in the catchments of Uhl River. Jhanjheli valley is attached to Siraj valley and surrounded by parts of the Dhauladhar range of the Himalayas and lies between 32°2’11” North Latitude; 76°50’51” East Longitude and the altitude varies from 1850-2850 metres (fig. 1). The green fields and snow clad mountains will take you to the dream land. An extensive ethno-botanical survey was carried out in Jhanjheli valley of Himachal Pradesh during October 2022 to April 2023 for collection of information on ethnomedicinal plant species being used by the local people in the study area. Information was gathered by conducting interviews

and group discussions on the indigenous uses of plant species as medicine. All the interviews and discussions were made with the informants in Hindi and Pahari language for their ease.

The use value index, initially developed by Prance and co-workers in 1987, depends only on various plant uses. Phillips and Gentry (1993) improved this index by considering the number of informants who mentioned the uses of the particular plant. The objective is to assess the importance of species in a community. Use value gives an idea about the important species used by a community.

The use values index, thus, is calculated by the formula:

$$UV = \frac{\sum U}{n}$$

Where UV is the use value of a species, U is the number of use information mentioned by each informant for a given plant species and n is the total number of informants questioned for a given plant. The UV is helpful in finding the plants with the maximum use (most frequently indicated) in the treatment of a disease. UVs are high when there are numerous use-reports for a plant and low when there are a few reports associated to its use. The use value, however does not distinguish whether a plant is used for single or multiple purposes (Musa et al., 2011).

3. RESULTS

Use-Value (UV) is an ethnobotany index widely used to quantify the relative importance of useful plants. As shown, the use-value (UV) of each medicinal plant was determined to assess the common use of each plant in the entire study area. The use-value of ethnomedicinal plants was calculated on the basis of information collected from the informants (Table) (Trotter and Logan, 1986):

Table: Ethnomedicinal Plants, Disease/Disorder Cured and Use-Value

Botanical Name	Disease/Disorder Cured	$\sum Us$	$\frac{\sum Us}{N}$
<i>Acacia catechu</i> (L.) Willd.	Gall disorders, semen problems, sore throat, cough, eye problems, mouth ulcer, forehead	13	0.061

	acne & pimples		
<i>Achyranthes aspera</i> L	Premature-ejaculation, physical weakness, tooth problems, smallpox, cold fever, Pregnancy problems, renal colic	11	0.052
<i>Acorus calamus</i> L.	Headache, throat pain, memory problems, goitre, epilepsy, dry cough, intestinal worm, delivery weakness, snakebite, flatulence	9	0.043
<i>Adiantum venustum</i> G. Don.	Diabetes, bacterial infections, hairfall problems, liver problems, bleeding disorders	3	0.014
<i>Aegle marmelos</i> (L.) Correa.	Digestion problems, fever, piles problems, weak eyesight, rheumatism, deafness, weakness, diabetes, body heat, heart problems	33	0.016
<i>Aerva sanguinolenta</i> (L.) Blume	Wound healing, intestinal worms, diabetes, liver problems	5	0.024
<i>Ajuga bracteosa</i> Wall. ex. Benth.	Abdominal pain, headache, intestinal worms	19	0.090
<i>Allium cepa</i> L.	Piles problems, bloody diarrhea, abscess, bad breath, indigestion, constipation, swelling,	47	0.223
<i>Aloe barbadensis</i> Mill.	Skin infections, abdominal colic, stomach problems, constipation, spleen largement, liver problems	79	0.376
<i>Alternanthera pungens</i> Kunth.	Respiratory problems, neuralgia, hypertension, gonorrhoea	7	0.033
<i>Andrographis paniculata</i> Nees.	Liver problems, jaundice, stomach problems, diabetes, bug bite	13	0.062
<i>Annona squamosa</i> L.	Ulcers, heart problems, diabetes, physical weakness, anemia	7	0.033
<i>Argemone mexicana</i> L.	Intestinal worms, jaundice, scorpion bite, dysmenorrhoea	21	0.100
<i>Artocarpus heterophyllus</i> Lam.	Bleeding from the mouth, semen disorders, cholera, throat problems, abdominal diseases	14	0.067
<i>Asparagus adscendens</i>	Whooping cough, male sterility problems, leucorrhoea, nightfall,	23	0.109

Roxb.	common cold, impotency, polyuria, colic pain, premature ejaculation		
<i>Azadirachta indica</i> A. Juss.	Wound bleeding, ear discharge, kidney stone, malaria, tooth problems, vomiting, cough, diarrhoea, fever	31	0.147
<i>Bambusa vulgaris</i> L.	Deafness, dysmenorrhea, uterus problems, urinary tract infections, polyuria, respiratory disease	10	0.048
<i>Bauhinia variegata</i> (L.) Benth.	Cough, tonsillitis, dysentery, dental pain, piles problems, jaundice, snakebite	23	0.109
<i>Berberis aristata</i> DC	Piles problems, arthritis, fever, diarrhoea	31	0.148
<i>Bixa orellana</i> L.	Fever, jaundice	2	
<i>Boerhavia diffusa</i> L.	Jaundice, swelling, kidney problems, wound healing, heart problems, scorpion bite	20	0.095
<i>Broussonetia papyrifera</i> (L.) Vent	Bleeding, impotency, oedema	22	0.105

The Use-Value (UV) index was applied to quantify the relative cultural importance and frequency of citation of ethnomedicinal plants in the study area following the method of Trotter and Logan (1986). The UV was calculated as:

$$UV = \frac{\sum U_s}{N}$$
 where $\sum U_s$ represents the total number of use-reports cited by informants for a given species, and N denotes the total number of informants interviewed.

A total of 22 ethnomedicinal species were recorded. The highest UV was observed for *Aloe barbadensis* Mill. (UV = 0.376; $\sum U_s$ = 79), followed by *Allium cepa* L. (UV = 0.223; $\sum U_s$ = 47), *Berberis aristata* DC. (UV = 0.148; $\sum U_s$ = 31), and *Azadirachta indica* A. Juss. (UV = 0.147; $\sum U_s$

= 31). Moderate UV values were recorded for *Asparagus adscendens* Roxb. (0.109), *Bauhinia variegata* (L.) Benth. (0.109), and *Argemone mexicana* L. (0.100). Lower UV values were found for *Adiantum venustum* G. Don. (0.014), *Aegle marmelos* (L.) Correa. (0.016), and *Aerva sanguinolenta* (L.) Blume. (0.024), indicating comparatively restricted traditional use.

The recorded species were employed to treat a wide spectrum of ailments including gastrointestinal disorders, respiratory infections, dermatological problems, reproductive disorders, metabolic diseases (e.g., diabetes), liver ailments, urinary tract infections, and wound healing. Species such as *Andrographis paniculata* Nees., *Boerhavia diffusa* L., and *Acorus calamus* L. were primarily

cited for hepatic and digestive disorders, while *Asparagus adscendens* Roxb. and *Achyranthes aspera* L. were frequently used for reproductive health and vitality-related conditions.

Field observations revealed that most of these high-UV species are subjected to unsustainable harvesting from wild populations. No structured *in situ* or *ex situ* conservation initiatives were observed in the study area.

4. DISCUSSION

The Use-Value analysis demonstrated that species with high UV scores are culturally salient and frequently used in primary healthcare, corroborating previous ethnobotanical studies that identify UV as a reliable indicator of plant importance (Phillips and Gentry, 1993; Heinrich et al., 1998; Albuquerque et al., 2006). High UV values of *Aloe barbadensis*, *Allium cepa*, and *Azadirachta indica* suggest their broad therapeutic applications and strong cultural acceptance.

The predominance of treatments for gastrointestinal disorders, respiratory ailments, and reproductive problems aligns with patterns reported in Himalayan ethnomedicine (Shinwari, 2010; Kumar et al., 2015). Species such as *Berberis aristata* and *Andrographis paniculata* have documented pharmacological validation for antimicrobial and hepatoprotective properties (Fabricant and Farnsworth, 2001; WHO, 2013). However, the high demand for species like *Asparagus adscendens* and *Berberis aristata*, which involve destructive harvesting of roots or bark, increases their vulnerability. Similar trends of overexploitation have been reported in other Himalayan regions (Kala, 2005; Ved et al., 2015). The absence of community-based conservation, nurseries, or cultivation initiatives exacerbates pressure on natural populations.

The findings indicate a transition risk where traditionally abundant species may decline due to commercial extraction and expanding therapeutic reliance. Integrating indigenous knowledge with

sustainable resource management is essential for biodiversity conservation and livelihood security (Gadgil et al., 1993; Hamilton, 2004).

5. CONCLUSION

The study highlights the significant ethnomedicinal value of 22 plant species in the traditional primary healthcare system. High Use-Value indices reflect strong cultural reliance, particularly on *Aloe barbadensis*, *Allium cepa*, *Berberis aristata*, and *Azadirachta indica*.

Nevertheless, unsustainable harvesting practices, particularly of root- and bark-yielding species, pose a serious conservation threat. The lack of both *in situ* and *ex situ* conservation strategies underscores the urgent need for Community-based conservation programmes, promotion of cultivation practices for high-UV species, establishment of herbal gardens and nurseries, policy interventions integrating traditional knowledge with biodiversity management. Sustainable utilization strategies are critical to preserve ethnomedicinal heritage and ensure long-term availability of these valuable species.

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