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## An ethnobotanical study of medicinal plants in Bhiwani district of Haryana, India

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### Abstract

This study deals about the uses of medicinal plants by the people of Bhiwani district of Haryana, India. An ethnobotanical study was conducted from August 2014 to October 2015 through personal interviews of local people. The study was focused on identifying medicinal plants, disease treated, part of the plant used, methods of preparation, route of administration, ingredients added etc. The data were collected through a series of fieldworks. Random and systematic sampling methods were employed to select the study sites as well as the informants. Ethnobotanical methods using semistructured interviews were employed and a total of 30 species of medicinal plants belonging to 20 families were recorded.

**Keywords:** Ethnobotany, Medicinal Plant, Indigenous Knowledge, In situ and Ex situ Conservation, Bhiwani, Haryana.

### 1. Introduction

The term Ethnobotany comes from two Greek words: *Ethnos* and *Botane*. *Ethnos* means 'people', and *Botane* means 'herb', so literally it would be considered as 'the study of people and herbs' or we can say as 'the study of people and plants (tree, shrubs and herbs)'. The term was coined by American taxonomic botanist John W. Harshberger in 1895. According to Harshberger, Ethnobotany is 'the study of the utilitarian relationship between human beings and vegetation in their environment, including medicinal uses. Ethnobotany can also be defined as 'the study of the interaction between plants and people with a particular emphasis on traditional tribal cultures'.

Richard Evans Schultes (1915-2001) is considered as the founding father of Ethnobotany. Schultes, an Harvard trained botanist and director emeritus of the Harvard Botanical Museum, spent years for conducting research in the field of indigenous use of plants in the America especially in the Amazon and was the mentor of many other scholars who have since contributed to the discipline. Ethnobotany is part of an ancient tradition of seeking information about beneficial plants from other cultures. Ethnobotany studies the complete information about plants and their medicinal uses.

Today ethnobotany is a well-established branch of science. It has recently received much attention in the USA, UK, France, Mexico and in several other parts of the world and is receiving wide recognition by several international bodies and authorities. Till about sixth decade of the last century there was little work on ethnobotany for any part of the country except some causal or indirect information in account.

In India, much literature relevant to ethnobotany can be traced in the vedic literature, Charak and Shusruta and Charak samhita appeared as the most important works. A large portion of this country was covered with forests which yielded a number of medicinal plants. These plants were initiated extensively in Ayurvedic system of medicine since many centuries. India is a vast country of rich plant resources, including considerable number of medicinal plants. Local communities in different parts of the country have developed a deep knowledge of various uses of plants during their old history. Traditional medicine and medicinal plants usage have been investigated in some parts of the country (Jain and Borthakar, 1980; Choudhary, Singh and Pillai, 2008; Parkash and Aggarwal, 2010; Jain *et al.*, 2011; Khongsai *et al.*, 2011; Singh and Singh, 2011; Yadav and Bhandoria, 2013). In Haryana, a little work is done in this field (Jain and Verma, 1981, 1987; Jain *et al.*, 1982; Lal and Yadav, 1983; Jain, 1987; Sharma and Ahmad, 1995; Yadav *et al.*, 2004, 2006, 2010). However, regarding the vast surface, richness of biodiversity of the country and remarkable divergence of culture and traditional customs distributed throughout this area, it is clear that a high number of ethnobotanical

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investigations should be conducted to help in efficiently documenting and conserving this knowledge [9]. Therefore, documentation of medicinal plants and their usage by indigenous inhabitants of the district is an important matter. The objectives of this study were to collect and document information about the medicinal plants used by local people and traditional healers of Bhiwani district of Haryana (India). Plants are the backbone of all life on Earth and an essential resource for human well-being. Utilization of plants for medicinal purposes in India has been documented long back in ancient literature because they are essential to human survival [22, 23]. The local uses of plants as a cure are common, particularly, in those areas, which have little or no access to modern health services, such as the innumerable villages and hamlets in India [24].

## 2. Materials and Methods

District Bhiwani was formed on 22 December 1972. Administratively, the district has six tehsils, namely, Bhiwani, Dadri, Loharu, Siwani, Bawani Khera, Tosham and ten blocks, namely, Bhiwani, Dadri I, Dadri II, Badhra, Loharu, Siwani, Tosham, Bawani Khera, Kairu, and Behal. It is having 442 villages with 458 village panchayat. District Bhiwani is situated between 28°19' and 29°05' N latitude and between 75°26' and 76°28' E longitude. It is located in south-western part of Haryana state at an altitude of 237 meter, covering an area of 5099 sq.km. It is surrounded by Hissar district on its north, Mahendergarh and Jhunjunu district on its south, district Rohtak on east and some area of Jhunjunu & Churu district of Rajasthan on west. In north region of the district, there are alluvial plains and in south, there is semi-desert with remnants of aravali Range Mountains. The Soil is loom in the north region and sandy in the southwest region of Bhiwani district. The Groundwater is mainly saline with some of small pockets of fresh water in southwest. The groundwater level of the district is decreasing fastly. Lack of any drainage system is the main cause of salinity of ground water.

It is under western agroclimatic zone of Haryana. The climate of Bhiwani district can be classified as tropical steppe, semi-arid and hot which is mainly dry with very hot summer and cold winter except during monsoon season when moist air of oceanic origin penetrates into the district. Physiographically the district consists of flat and level plain interrupted from place to place by clusters of sand dunes, isolated hillocks and rocky ridges. The normal annual rainfall of the district is 420 mm which is unevenly distributed over the area. The south west monsoon sets in from last week of June and withdraws in end of September contributed about 85% of annual rainfall. July and August are the wet test months. Rest 15% rainfall is received during non-monsoon period in the wake of western disturbances and thunder storms. Generally rainfall in the district increases from southwest to northeast.

Many types of medicinal plants (Tree, Herb, & Shrub) are found in Bhiwani district. Before starting the field work on medicinal uses of plants and the study area, general information about that area was collected from the local people of Bhiwani district. The success of ethnobotanical documentation depends on the cooperative relationship between the researcher and local informants. It is very important to locate knowledgeable informants for the study of ethnobotany [13]. The discussions contain the details of

medicinal plants and their medicinal uses. The collected plants were identified taxonomically using the Indian medicinal plant literature to ascertain the nomenclature. Techniques are tools, and the choice of using one over the other depends on the aims and theoretical approach of the study, field conditions and expertise of the researcher [14].

The standard methods of ethnobotanical studies were followed [16-18]. These plants were identified from Botanical Survey of India, Northern Circle, Dehradun, Uttaranchal and also by available literature and flora [19-21]. The absence of any ethnobotanical study in this region led us to conduct an ethnobotanical survey to explore and document the ethnobotanical potential of this district. Two broad approaches of ethnobotanical studies were taken under considerations. In direct approach, the extensive and intensive fieldwork in the rustic villages was done. This is usually carried out by direct contacts with local people and firsthand information was collected from all the study sites. In Indirect approach, information was obtained in different ways i.e. through ancient literature, personal diaries of for- esters, traditional local doctors/hermits, plant collectors etc. In the present investigation, both direct and indirect approaches were employed to get the proper understanding of ethnomedicinal uses of plants. In- formation about the plants were recorded with regards to their vernacular names, plant part used, process of preparation of medicine either individually or in combination with other plant parts, and mode of application and doses for the treatment. The collected information was analyzed for different genera and species of the medicinal plants in order to understand the pattern in medicinal plant uses and occurrences.

## 3. Results and Discussion

The present study revealed the ethnobotanical knowledge of people in Bhiwani district of Haryana. A total of 30 species in 26 genera under 20 families have been documented. Mostly plants are belonging to different families viz- Caesalpiniaceae, Euphorbiaceae, Fabaceae, Rhamnaceae, Chenopodiaceae, Cyperaceae, Malvaceae, Meliaceae, Mimosaceae, Moraceae, Poaceae, Rutaceae, Amaranthaceae, Liliaceae, Papaveraceae, Apocyanaceae, Solanaceae and Cannabinaceae. Among different plant parts used by these people, the leaves are used most frequently to cure wounds and they applied mostly on the external surface of the body. Generally fresh part of the plant can be used for the preparation of medicine.

By analyzing the present ethnobotanical data, it is observed that local people used different plants or plant parts as medicine for the treatment of several diseases/illness. Most of the utilized plant part is leaf, along with other plant parts. Most of the plant species are reported to be quite effective remedies for different diseases, such as fever, diarrhea, dysentery, diabetes, jaundice, backache, stomachache, ulcers, cold, cough, etc. These plants are also used by the local herbal healers as traditional medicines. The local people use these plants to cure various minor to major diseases. Medicine form these plants is prepared in many ways and different parts of plants are used in different maladies. Extract of the whole plant followed by root, stem bark, fruit, latex, and fruits are used frequently for drug preparation. Panghal *et al.* (2010) has reported similar results from the Sapera community of the Hajar District of the State.

**Table 1:** Traditional use of some ethno medicinal plants of Bhiwani district (Haryana)

Sr No	Plant Name	Local Name	Family	Part(s) used	Medicinal Property
1	<i>Acacia arabica</i> (Lam.) Willd.	Kikar/ Babool	Fabaceae	Leaves Fruits	Cough, dysentery
2	<i>Acacia catechu</i> (L.f.) Willd.	Khair	Fabaceae	Bark	Fever, leucorrhoea, piles, haemoptysis, gonorrhoea and chest infection and arresting excessive mucous discharges.
3	<i>Achyranthes aspera</i> L.	Ola Kanta	Amaranthaceae	Leaves Roots Stem	Snake bite, toothache, diuretic, dropsy, piles, skin eruptions
4	<i>Aegle marmelos</i> (L.) Correa Ex. Schultz	Bael Patthar	Rutaceae	Leaves Roots Fruits	Abdomen disorders, diabetes
5	<i>Aloe vera</i> (L.) Burm. f.	Guarka- patha	Liliaceae	Leaves	Abdomen disorders, piles
6	<i>Argemone mexicana</i> L.	Kateli	Papaveraceae	Latex	Female sex disorders, eye diseases, mental disorders, skin diseases, tooth ache, wound healing
7	<i>Amaranthus viridis</i> L.	Chaulai	Amaranthaceae	Leaves	Emollient, snake and scorpion bite
8	<i>Asparagus racemosus</i> Willd.	Arra Kanta	Liliaceae	Roots	Fever
9	<i>Azadirachta indica</i> A. Juss	Neem	Meliaceae	Bark Leaves	Allergy, skin diseases, snake bite
10	<i>Brassica campestris</i> L.	Kali sarson	Brassicaceae	Roots Leaves	Abdomen disorders, allergy
11	<i>Calotropis procera</i> (Ait) R. Br.	Aak	Asclepiadaceae	Leaves	Abdomen disorders, allergy, cough, fever, fistula, eye diseases, male fertility, cholera disorders, skin diseases, snake bite, wound healing.
12	<i>Cannabis sativa</i> L.	Bhang	Cannabinaceae	Leaves Stem	Mental disorders, snake bite.
13	<i>Cassia fistula</i> L.	Amaltas	Fabaceae	Leaves Bark	Skin diseases, snake bite
14	<i>Chenopodium album</i> Linn.	Bathua	Chenopodiaceae	Leaves	Wound healing, laxative and anti-helminthic.
15	<i>Cynodon dactylon</i> (L.) Pers	Dub ghas	Poaceae	Roots	Diuretic and laxative
16	<i>Cyperus rotundus</i> L.	Motha	Cyperaceae	Tuber	Microbial contaminations, anti-helminthic, stimulant, diuretic
17	<i>Dalbergia sissoo</i> Roxb.	Shisham	Fabaceae	Leaves Roots Wood	Leprosy, boils, eruptions and stop vomiting
18	<i>Datura metel</i> L. Miller	Dhatura	Solanaceae	Leave, Seeds	Cough, male fertility disorders, mental disorders, respiratory problems.
19	<i>Embllica officinalis</i> Gaertn.	Amla	Euphorbiaceae	Fruits Leaves	Eye diseases, jaundice, skin disorders, respiratory infections, anti-bacterial.
20	<i>Eucalyptus globulus</i> Sm.	Safeda	Myrtaceae	Seeds Leaves	Malaria, antibacterial and antiseptic
21	<i>Ficus benghalensis</i> L.	Badd	Moraceae	Leaves	Cough, diabetes fistula, jaundice, male fertility disorders, snake bite, tooth ache, wound healing
22	<i>Ficus religiosa</i> L.	Pipal	Moraceae	Seeds Fruits	Laxative, cooling and alterative
23	<i>Nerium indicum</i> Mill.	Kaner	Apocyanaceae	Leaves	Wound healing
24	<i>Prosopis cineraria</i> (L) Druce	Khejri	Mimosaceae	Bark	Asthma, bronchitis, dysentery, leucoderma, leprosy, muscle tremors and piles.
25	<i>Ricinus communis</i> Linn.	Arandi	Euphorbiaceae	Seeds, Leaves Bark	Boils, swelling, laxative and to start labour pain
26	<i>Solanum nigrum</i> Miller.	Makoy	Solanaceae	Whole plant	Phthisis, dropsy, for enlargement of spleen
27	<i>Spinacea oleracea</i> L.	Palak	Chenopodiaceae	Leaves, Stem	Anemia, bone's tonic and produce fresh blood
28	<i>Tinospora cordifolia</i> (L.) Merr.	Giloy	Menispermaceae	Leaves, Stem	Diabetes, mouth ulcers, stomach disorders
29	<i>Zizyphus jujuba</i> Lamk.	Ber	Rhamnaceae	Leave, Dried fruits	Blood sugar, diarrhoea
30	<i>Zizyphus nummularia</i> (Burm.f.) Wight	Jhar-Beri	Rhamnaceae	Fruit, Leaves Roots	Jaundice

#### 4. Conclusion

The local people of the study area are knowledgeable about the plants that provide remedies to humans and livestock health problems. However, the area is losing its natural vegetation cover together with the medicinally valuable species rapidly. Most of the medicinal plants are getting very rare as confirmed by elders and as observed during the field work too. Deforestation, soil erosion, overgrazing and drought are the major factors that affect different medicinal plants in the study area. So the community should work incorporates with governmental and nongovernmental organizations in order to sustainable the traditional knowledge and the medicinal plant species for further generation. If the present trend continues unchecked, it will not be too long before some of them will head to local extermination. It is therefore, very crucial that awareness creation be undertaken so that the community is actively involved in conservation and sustainable utilization of the traditional medicinal plants; as part of the entire plant biodiversity of the area. *In situ* and *ex situ* conservation measures are required to be taken on medicinal plants which are found to be scarce in the study area, but still they are harvested from the wild only. Conservation priority should also be given to multipurpose plants (plants with more diversified medicinal uses) as this could indicate high intensity of harvest, which could lead to overexploitation. Encouraging the community to grow different medicinal plants in their home gardens by mixing with different crops and protected the medicinal plants found in the wild is principal important. Special attention needs to be accorded to the medicinal plants in order to amplify the role that they play in health care delivery, poverty alleviation, and environmental protection. Further, in depth studies to document and substantiate the indigenous knowledge on medicinal and other useful plants would help to draw serious attention to the valuation of the biological diversity of the study area. More studies like this one and those quoted in the introduction are necessary to gather ethnobotanical knowledge, including all kinds of useful plants, in the various parts of Haryana state.

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