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An ethnobotanical study of important medicinal plants in Hisar District of Haryana, India

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Abstract--India is one of the world's largest mega-biodiversity hotspots, with a wide range of ethno-medicinal vegetation, which are being used in treatment of minor to major health problems by local people. In the present ethnobotanical study, in the district of Hisar, Haryana, data were recorded in the form of botanical names, local names, families, and plant parts used with their medicinal characteristics of 41 medicinally important indigenous plant species belonging to 27 families. For it, nine villages were selected randomly of district Hisar and documentation of ethno-medicinal plant species was done through direct and indirect approach. In direct approach; Ayurvedic Doctors, Vaidyas, Hakims, Herbal Healers, Ojhas and related Ethnic Groups of the selected rural areas of the region were interviewed to get reliable knowledge regarding medicinal uses of indigenous plants. Ethno-medicinal information were correlated with available ancient literature and published research articles. The majority of medicinal plants, according to reports, belong to Cucurbitaceae, Liliaceae, Fabaceae, Amaranthaceae, Euphorbiaceae, Asteraceae, Chenopodiaceae, Solanaceae and Lamiaceae families. Leaves in most of the plants have got the maximum ethno-medicinal values. Information generally transmits from one generation to next generation in oral manner in rural ethnic groups and several valuable information are lost without proper documentation. Using modern tools such as bioinformatics, the current work is significant in documenting the valuable traditional knowledge of indigenous medicinally important plants and it is important to conserve the local herbal bio-wealth for sustainable use of future generations through in-situ and ex-situ methods.

Keywords--ethno-medicinal, indigenous, diversity, information, bioinformatics, traditional.

Introduction

In 1895, American taxonomist John W. Harshberger coined the term Ethnobotany. He defined Ethnobotany as 'botanical applications are included in the study of the utilitarian interaction between humans and their environment's plants.' Plants are investigated for their traditional therapeutic uses by local people in a particular region. It studies the natural relationship between indigenous plants and the local communities (Jones, 1941). Indigenous plant species have been used for food, medicines and other ecological uses by rural tribes since ancient times (Meena, 2012). Richard Evans Shultes (1915-2001) has conducted research in Amazon (USA) to explore the importance of indigenous plants in America and he has been considered as father of Ethnobotany.

Ethnobotany has emerged as major thrust area in many countries like USA, France, UK and several other countries. In India, Dr. S.K. Jain took the initiative to establish ethnobotanical research work to cure the diseases by using herbs in local areas. Plants of Indian subcontinent have been explored and they have many beneficial phytochemicals like alkaloids, flavonoids, amino acids, steroids, peptides etc. (Gupta et al., 2009). Several plant species were reported with traditional medicinal properties in different parts of the country (Parkash and Agrawal, 2010; Yadav and Bhandoria, 2013). According to an estimation, out of total 8000 ethno-medicinal plant species in the world, around 2500 have been reported in India (Bhatia et al., 2014).

Haryana has rich biodiversity of medicinal plants, though a little traditional medicinal flora has been investigated (Kumar S., 2001). Proper documentation of local herbs is necessary to conserve the knowledge and transmit it to the offspring (Janak Raj and Kumar S., 2021). Few researchers have conducted survey of medicinal plants in Haryana and have documented their ethno-medicinal uses among local people of the villages. Kumar and Singh (2013) explored 277 plant species from Karnal district with medicinal importance. Ethno-medicinal survey of 159 plants species from 130 genera and 68 families was done to cure 33 types of ailments among people of Una and Hamirpur districts of Himachal Pradesh (Ram Chand et al., 2016). Total 78 medicinal plants have been identified in Hansi region of Hisar district by Palria and Vasishtha (2017), while Redhal in 2017 reported 17 medicinal plants useful in curing of rheumatism in Hisar and Fatehabad districts of Haryana. Jyotsana et al. (2020) studied the floral diversity of Hisar district and found 79 plants of 45 families with ethno-medicinal properties. Though, some extensive studies have been reported on ethno-medicinal survey of indigenous medicinal plants in Haryana, but there is need of more plant species to be explored for their traditional medicinal importance for benefit of local communities. The current research focuses on the therapeutic properties of native plant species in Haryana, India.

Description of Study Area

Hisar is one of the largest districts of the 22 districts of Haryana with total 3983 km² area. Administratively, the district has been divided into eight Tehsils, Adampur, Narnaund, Barwala, Bass, Hisar, Balsamand, Uklana Mandi and Agroha. It is located at 29°06' North latitude and 75°43' East longitude with average height of 215 meter above sea level. Hisar district lie in the region of Ghaggar-Yamuna plain, where alluvial fertile soil is in Doab tract but sandy soil is spread in Bangar tract. Climate is of tropical semi-desert type with hot summers (40°C to 46°C) and chilly winters (1.5°C to 4°C) and average annual rainfall is reported 429 mm with maximum precipitation in July-August months (Sudesh and Mamta, 2018). The major castes in the district are Jats, Chamars, Aroras, Bishnois, Brahmins, Baniyas, Agarwals, Ahirs, Kumhars and Balmikis. Different types of flora, including trees, herbs, and shrubs are found in the region of the district.

Materials and Methods

There is a huge diversity of medicinal plants in district Hisar, Haryana and it was explored by visiting and collecting plant species from nine villages of all the eight Tehsils following randomized design. For documentation and ethno-medicinal survey, nine villages were selected namely; Arya Nagar, Behbalpur, Balawas, Chaudhariwas, Chikanwas, Daulatpur, Dhansu, Kallar Bhaini and Mayyar. Selection of the suitable and knowledgeable informants is necessary for success of the ethnobotanical studies (Given and Harris 1994). To gather useful information about indigenous medicinal plants; local informants like Ayurvedic doctors, hakims, vaidyas, herbal healers, gardeners and local ethnic groups were interviewed in their local language and information were noted in the notebook. Information about medicinal plant species were also recorded from ancient literature, herbaria, plant collectors etc. With the help of the Haryana Flora, the collected plant species were taxonomically recognised (Kumar S., 2001).

Data in respect of botanical name, vernacular name, family, plant part used and medicinal uses to cure or control a disease or disorder were recorded using modern techniques of bio-informatics. All the information collected were discussed with local people and the final database was prepared of ethno-medicinal uses of plants of district Hisar.

Results and Discussion

In the present study, 41 species from 27 families have been documented from Hisar district in Haryana, India. Most of the species with ethno-medicinal importance belong to Cucurbitaceae, Amaranthaceae, Euphorbiaceae, Liliaceae, Fabaceae, Asteraceae, Solanaceae and Lamiaceae families. The locals primarily employed leaves and fruits to treat various diseases like fever, diarrhea, skin diseases, diabetes, nasal bleedings, asthma, snakebite and respiratory problems. Local vaidyas and herbal healers use these plant species as traditional indigenous medicines. Seeds, flowers and bark of some plants also have been reported as an effective remedy against several minor and major health problems by local people of the district. The complete documentation of indigenous medicinal plants is done in the form of botanical names, vernacular names, families and plant part used to cure or control the diseases or disorders (Table-I). Though, traditional knowledge of medicinal uses of local plant species transmits from one generation to next generation through oral manner, the documentation of the indigenous medicinal plant species has secured the efficient and sustainable utilization of plant resources.

Conclusion

India has rich biodiversity of indigenous medicinal plant species which are being utilized by local people to cure several minor to major ailments. The ethno- medicinal information passes from generation to generation without proper record in rural communities. The valuable bio-wealth resources must be conserved for its sustainable use of the future generation. The indigenous plants with medicinal properties of district Hisar should be conserved through both traditional and scientific methods. Local people of the district primarily use herbal medicines in form of indigenous plant products. So, the present study with proper documentation is very useful in natural health care, and it will trigger the possibility of formation of new and safer herbal combinations for future generations.

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Table-I: List of indigenous plants (Alphabetically) used in various ethno-medicinal practices in district Hisar (Haryana, India).

S.No.	Botanical Name Vernacular Name	Family	Plant part and its ethnomedicinal use
01	Acacia arabica Kikar, Babool	Fabaceae	Gum: Dysentery, Diarrhea Leaves: Mumps, Swelling
02	Achyranthesaspera Ola Kanta, Latjira	Amaranthaceae	Whole Plant: Cold, Toothache, Dropsy, Skin Disorders
03	Aeglemarmelos Belpatar	Rutaceae	Leaves: Fever, Stomach Pain Fruits: Abdominal Disorders
04	Ageratum conyzoides Dochuntry	Asteraceae	Plant: Skin Allergies, Diarrhea Leaves: Fever, Abdominal Problems
05	Allium sativum Lahsun	Liliaceae	Bulb: Cough, Cold, Ear Ache, Skin Problems
06	Aloe vera Guar Patha	Liliaceae	Leaves: Piles, Stomach Disorders
07	Amaranthusviridis JangliChoulai	Amaranthaceae	Leaves: Nose Bleeding, Constipation, Scorpion Bite
08	Argemonemaxicana Kateli, Satyanashi	Papaveraceae	Latex: Eye Problems, Mental Disorders, Female Sex Problems, Jaundice
09	Asparagus racemosus Satawari	Liliaceae	Roots: Cough, Cold, Fever, Diarrhoea
10	Azadirakhtaindica Neem	Meliaceae	Leaves: Skin Allergies, Ulcers, Snake Bite Bark: Intestinal Worms, Abdominal Pain, Ear Ache
11	Boerhaaviadiffusa Santa	Nyctaginaceae	Leaves: Fever, Cold, Jaundice Roots: Boils, Wounds
12	Brassica campestris Sarson	Brassicaceae	Seed: Cold, Muscular Pain Leaves: Abdominal Problems
13	Calotropisprocera Aak	Asclepiadaceae	Leaves: Swellings, Boils, Rheumatism, Skin Diseases, Snake Bite Flowers: Cough, Cold, Stomach Disorders
14	Cannabis sativa Bhang	Cannabinaceae	Leaves: Fever, Dysentery, Scorpion Bite, Mental Problems
15	Cassia fistula Amaltas	Fabaceae	Leaves: Snake Bite, Skin Diseases Flowers & Fruits: Constipation, Stomach Pain, Tonsillitis
16	Chenopodium album Bathua	Chenopodiaceae	Leaves: Laxative, Anti-helminthic, Stomach Pain

17	<i>Citrulluscolocynthis</i> Gartumba	Cucurbitaceae	Fruits: Constipation, Stomach Pain, Diabetes, Anti-helminthic
18	<i>Clerodendronphlomis</i> Arni	Verbenaceae	Twig: Anti-helminthic, Abdominal Pain Root: Asthma, Measles
19	<i>Cordiadihotoma</i> Leshwa	Boraginaceae	Leaves: Indigestion, Piles, Dysentery, Fever
20	<i>Cucumismelo</i> Kachari	Cucurbitaceae	Fruits: Stomach Problems, Urinary Diseases, Dysentery
21	<i>Cyanodondactylon</i> Doob, DoobGhas	Poaceae	Roots: Laxative Leaves: Urinary Problems, Nostril Bleeding
22	<i>Cyperusrotundus</i> Motha, Nagar Motha	Cyperaceae	Tuber: Urinary Problems, Bloody Dysentery, Diuretic, Fever
23	<i>Dalbergiasissoo</i> Shisham	Fabaceae	Leaves: Boils, Vomiting Roots: Leprosy
24	<i>Daturametel</i> Dhatura	Solanaceae	Leaves: Asthma, Hydrophobia, Whooping Cough Seeds: Male Sex Disorders, Mental Problems
25	<i>Emblicoefficialis</i> Amla	Euphorbiaceae	Fruits: Jaundice, Eye Diseases, Skin Diseases, Diabetes, Blood Purification
26	<i>Euphorbia birta</i> Dudhi	Euphorbiaceae	Leaf & Latex: Asthma, Ringworm, Less Appetite
27	<i>Ficusbenghalensis</i> Bar, Bargad	Moraceae	Leaves: Diabetes, Jaundice, Diarrhea Fruits: Male Sterility, Tooth Ache
28	<i>Ficusreligiosa</i> Pipal	Moraceae	Leaves: Fever, Jaundice, Wound
29	<i>Hibiscus rosa-</i> <i>sinensis</i> ChiniGulab	Malvaceae	Flowers: Weakness, Less Eye Sight
30	<i>Launeaprocumbens</i> JungliGobhi	Asteraceae	Leaves: Fever, Body Ache
31	<i>Meliaazedarch</i> Bakain	Meliaceae	Leaves: Diabetes, Skin Disease, Blood Purification
32	<i>Memordicacharantia</i> Karela	Cucurbitaceae	Fruits: Diabetes, Anti-helminthic, Blood Purification
33	<i>Moringaoleifera</i> Sainjana	Moringaceae	Leaves & Fruits: Fever, Constipation, Vomiting
34	<i>Neriumindicum</i> Kaner	Apocyanaceae	Leaves: Wound Healing
35	<i>Ocimumbasilicum</i> Marua	Lamiaceae	Leaves: Fever, Cold, Cholera, Tooth Ache
36	<i>Ocimum sanctum</i> Tulsi	Lamiaceae	Leaves: Cough, Cold, Malaria, Body Ache
37	<i>Prosopis cineraria</i> Khejri, Jandi	Mimosaceae	Leaves: Cataract, Pneumonia, Sore Throat
38	<i>Ricinuscommunis</i> Arandi	Euphorbiaceae	Leaves: Rheumatic Pain, Swelling, Joint Pain Seeds: Jaundice, Laxative
39	<i>Solanumnigrum</i> Makoy	Solanaceae	Plant: Dropsy, Spleen Problems
40	<i>Spinaceaoleracea</i> Palak	Chenopodiaceae	Leaves: Anemia, Indigestion, Less Appetite
41	<i>Tinosporacordifolia</i> Giloy	Menispermaceae	Leaves: Diabetes, Stomach Pain, Ulcers, Immunity