

Ethnobotanical study in Aterna, Jakholi, Manoli, Pabsara and Rai villages of Sonipat

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Abstract

The study of ethnobotany in India is one of the prosperous cultural traditions connected to the variety of medicinal plants uses, and it is as old as man's culture. The current study emphasizes the significance of traditional plant medicines from five villages *i.e.*, Aterna, Jakholi, Manoli, Pabsara and Rai of Sonipat tehsil. In this study, traditional medicinal plants utilized by local people for the treatment of several human illnesses were the focus of an ethnobotanical investigation. During the study, twenty-nine plants which have medicinal properties belonging to twenty-one families were reported. Information of ethnobotanical study were gathered through face-to-face interactions, semi structured questionnaires and interviews.

Key words : Ethnobotany, investigation, medicinal, illnesses.

Ethnobotany may alternatively be a combination of the words “ethano” this term stands for study of plants culture and “botany” stands for study of plants⁴. An area of study called Ethnobotany, examines how people and plants interact. The interaction or coo-relation between people traditions and flora is not only limited to the use of plants for fodder, shelter, food and ornamentation but also used them for the preparation of home-made remedies. Humans have looked at all of the different ways that they could be used. The local residents have been forced to reconnect with nature in order to maintain their health as a result of the decade's fast paced civilization, expanding urbanization and industries in our surrounds². These indigenous medicines have

been used since past and which is totally different from allopathic medicine which has based upon theories and experiments. Ethnobotany is described as the study of interaction of indigenous people with natural surroundings or with plants, how they categorize, maintain and use them^{9,10,17}. Since the dawn of time, people have used herbal remedies in medicine. The Rigveda (4500-1600 BC) and Ayurveda (2500-600 BC) are where the earliest ethnomedicinal plants were first documented^{5,14}. Ayurvedic medicine, which originated in India, is gaining popularity throughout the world since it is based on natural items, has lesser side effects on health and eve strengthens and enhances the body's immune system⁷. Humans have relied on wild

plants as food for thousands of years. To survive in tough environmental conditions, tribal peoples used these plants to make textiles and to make remedies. The practice of utilizing plants or plant components such as roots, stems, leaves, flowers and seeds for the curation of ailments is known as “herbal medicine”^{11,12}. They give medication and essential raw materials for the development of both traditional and novel herbal and allopathic drugs^{13,19}. Due to their conventional and efficient healing abilities, medicinal plants have gained widespread recognition in alternative medicinal system¹⁸. A wide range of disorders can be treated with the help of herbal plants, which have powerful therapeutic characteristics and a long history of use¹⁶. The traditional knowledge on the selection, utilization and preparation of herbal medicine from medicinal plants is a crucial element in defining the cultural identities of groups or society and providing proof of connections to their history^{1,21}. Plants have great Numerous illnesses, including wounds, skin conditions, constipation, pimples, swelling, asthma, jaundice, cough, piles and boils, are treated with their traditional preparations. In under-developed nations like India, a large portion of the family’s income goes into purchasing necessary medical supplies and services²⁰. The effective application of knowledge about these plants from conventional medicine and ethnomedicine can help improve family well-being and strengthen the country.

Study site description :

One of the 21 districts that make up the northern Indian state of Haryana is Sonipat. The present study was conducted in the five

villages, they are Aterna, Jakholi, Manoli, Pabsara and Rai of Sonipat Tehsil, Sonipat District, Haryana. Sonipat is around 44 kilometers from New Delhi and is part of the NCR (figure 1). Moreover, Chandigarh, the state capital, lies around 214 km to the southwest of it. Sonipat is situated at 28.98 N and 77.02 E. Its soil is considered to be a fine loam with a deep color. While some regions have sandy soil and others have kallar. This area’s plain gently slopes to the east and south. The topography of Sonipat district is roughly categorized into three regions *i.e.*, the Khadar, the Upland plain and the Sandy region. Sonipat tehsil, which is situated to the west of khadar, makes up the majority of upland plain. Among the three regions, upland plain is most widespread. If the area is adequately irrigated, the old alluvium that covers it, is very fertile. In this region of Sonipat, there is substantial farming of horticultural plants, vegetables, flowers and oil seeds. The Sonipat region has an arid environment with scorching summers and chilly winters. The monsoon season, which lasts from July through September, brings pleasant weather.

Data collection and organization :

The collected information is based on medicinal plants used for the preparation of remedies for the curation of several diseases. Informants were selected non randomly from study site. Information was collected through gardeners, nurseries owners, local peoples, medicine practitioners, teachers, vaidyas and hakims. Data were collected through informants’ interviews, face to face interactions and observations of the informants. A proper semi-structured questionnaire is used for collection of data from informants. Informants



Figure 1. Study site map.

Table-1. Demographic representation of informants

Sr. No.	Factors	Classification	Number of participants	Percentage
1.	Gender of informants	Male	29	64.5%
		Female	16	35.5%
2.	Age groups	Below 60	27	60%
		Above 60	18	40%
3.	Educational status	Literate	33	73%
		Illiterate	12	26%

were selected on the basis on their recognition as knowledgeable members who have the proper knowledge about ethnobotanical medicinal plants employed for the curation of human's illness. The interviewers were chosen non randomly from a variety of places, including schools, universities, nurseries, gardens, temples and fields. Their traditional knowledge about medicinal plants plays a crucial role of their living and they never charge to medicines obtained from medicinal plants. During the course of study, several attempts were made to conduct interviews in

regional languages. The data that was gathered categorized into botanical names, local names, family, plant part used, disease treated and mode of administration. A semi structured questionnaires was prepared for the collection of data about informants and their knowledge about ethnobotanical plants. Questionnaire consists of name of the informant, age, sex, occupation, qualification, address, data about medicinal plants used for the treatment of several diseases. All informants were very polite and supportive who helps me in providing proper knowledge about medicinal plants used

to treat ailments during the survey conducted in 2021-2022.

Socioeconomic background :

The forty-five informants who were interviewed had a variety of ethnobotanical knowledge and came from several sectors of society. The interviewers were chosen non randomly from a variety of places, including schools, universities, nurseries, gardens, temples and fields. The majority of informants interviewed were men and the forty to sixty age range saw the highest participation rates.

Diversity of medicinal plants :

The present study reported twenty-

nine ethnobotanical medicinal plants belonged to twenty-one families. List of ethnobotanical medicinal plants found in five villages i.e., Aterna, Jakholi, Manoli, Pabsara and Rai of Sonipat Tehsil are reported in (Table-2). The different types of families having number of plant species (Figure 2). The plant part used for medical applications. (Figure 3).

Utilization of these medicinal plants for the curation of several diseases like fever, cough, cold, abdominal pain, skin diseases, constipation, earache, headache, insect bite, jaundice, gout, eye diseases, diarrhoea, lactation, avoid miscarriage, vomiting, paralysis, indigestion, pyorrhea, releases phlegm, maintain blood pressure, anorexia, etc.

Table-2. List of medicinal plants of the study site.

Sr. no.	Botanical name	Common name	Family	Plant Part Used	Diseases treated	Method of preparation
1.	<i>Achyranthes aspera</i> L.	Prickly chaff flower or ulta katta	<i>Amaranthaceae</i>	Seeds, root and leaves	Eye diseases Earache Scorpion and snake bite Gout Remove phlegm in cough Asthma Gall stone	Root is rubbed in honey and applied. Oil is used. Applied paste on the bitten area and grind the root in black pepper and given. Grind the leaves and applied or tied the paste. Lick its alkali with honey twice a day. Roots are used or 7-8 dried leaves put in hookah and smoke it. Take <i>Achyranthus aspera</i> 's alkali with cold water or grind roots in water and drink it
2.	<i>Adhatoda vasica</i> Nees	Ardusi or Malabar nut	<i>Acanthaceae</i>	Leaves	Kill external worms Calms down the fast breathing, fever	Juice of leaves is used. Mix datura leaves in the powder of its leaves and smoking it

3.	<i>Asparagus racemosus</i> Willd.	Satavari	<i>Liliaceae</i>	Roots	Increase fertility, lactation, maintain blood pressure, prevent miscarriage, hyperacidity, unconsciousness, Headache disorders.	Powder is taken with milk Extract the juice of roots and add equal amount of sesame oil to it and boil it. Massage with this oil.
4.	<i>Benincasa hispida</i> (Thunb.)	Petha or kushmand	<i>Cucurbitaceae</i>	Seed, fruit, seed oil	Headache Burns and inflammation Kill nematodes Stop the blood which comes from mouth, calms cough and fever	Applied seed oil. Applied paste of fruit pith and juice of leaves. Giving 20-30 gm seed caulk orally. Oral administration of decoction.
5.	<i>Brassica campestris</i> L.	Mustard	<i>Cruciferae</i>	Seeds, oil	Leprosy Pyorrhea Spleen enlargement Worm disease Amenorrhoea	Massage with oil and applied paste of seeds. Applied it in teeth with rock salt. Oil is used. Oil is used externally. Powder of seeds is used.
6.	<i>Brassica juncea</i> Czern & Coss	Indian mustard	<i>Cruciferae</i>	Seed, oil	Paralysis, rheumatism Amenorrhoea, Poisoning Worm disease Sore throat, toothache	Applied paste of seeds externally and massage of seed oil. Sit in the quay of mustard till waist. 3-4 gm mustard with little amount of rock salt and taken with warm water at regular intervals. Applied oil externally. Gargle with its decoction.

7.	<i>Calotropis procera</i> (Aiton) Dryand.	Madar	<i>Asclepiadaceae</i>	Latex (milk), leaves, root, bark and flower	Rheumatism Earache, deafness Ulcers Vomiting, diarrhoea Cough Typhoid Cancer Snake venom	Extracts are tied after heating Oil is put into ears. Sprinkled the powder of leaves or applied paste of root extract. Latex is given. Bark and flowers are used. Give root extract. Decoction of Roots and leaves are given. Juice of roots is given with black pepper.
8.	<i>Cassia fistula</i> L.	Golden shower tree	<i>Leguminosae</i>	Flower, fruit, leaves	Arthritis, gout, rheumatism Throat diseases Dry cough, releases phlegm and lubricates the palate.	Applied paste of fruit pith and leaves. Gargle with its decoction. Decoction of Flowers are used.
9.	<i>Citrus limon</i> L.	Nimbu	<i>Rutaceae</i>	Fruit	Cough, anorexia, indigestion, provide vitamin C.	Drinking a glass of water with lemon juice Juice is given
10.	<i>Coriandrum sativum</i> L.	Dhania	<i>Apiaceae</i>	Green coriander leaves	Headache Mouth or throat diseases, Inflammation In case of bleeding from bile, especially from nostrils Eye sight.	Grind coriander leaves and applied paste. Gargle with the juice of green coriander. Juice is given with sugar. Put juice into nostrils. Eat fresh green leaves.
11.	<i>Curcuma longa</i> L.	Haldi	<i>Zingiberaceae</i>	Rhizome, powder	Fainting, cough and shortness of breath Diabetes	Turmeric pieces kept on coals, the smoke that comes out, breathe it. Juice or powder is taken.

					Healing wounds, general weakness and traumatic pain	Applied paste on wounds externally and mix the powder in milk and drink it.
12.	<i>Datura metel</i> L.	Thorn apple or datura	<i>Solanaceae</i>	Leaves, flowers, seeds.	Hemorrhoids Kill lice and nits Arthritis Dilate the retina in eye diseases	Burn flowers and leaves and produce smoke and fomenting warts with its smoke. Juice of leaves with mustard oil boil it at low flame and when its one fourth part is left then it is used. Paste of leaves or foment with the bundle of leaves or extract the juice and cook it with sesame oil, when some oil is left then massage with this oil. Put the juice of ripe datura leaves.
13.	<i>Desmostachya bipinnata</i> Stapf.	Kush or doob	<i>Poaceae</i>	Root	Flatulence Diarrhea Leucorrhoea, dysmenorrhoea Increase lactation	Powder is taken. Decoction of root is given. Cold infusion prepared from roots. Powder of roots is boiled in milk.
14.	<i>Foeniculum vulgare</i> Mill.	Common fennel or saunf	<i>Apiaceae</i>	Seeds, leaves.	Indigestion, reduce cramps Cough and cold Increase eye sight Itching in eyes Increase lactation Asthma.	Decoction of seeds is given. Decoction of seeds and seeds of saunf with anjeer is taken to cure dry cough. 1gm saunf powder mixed with posat increase eye sight. Cotton is dipped into and the juice of leaves and put on eyes. Mixed juice of leaves in milk. Juice of leaves.

15.	<i>Gossypium herbaceum</i> L.	Cotton	<i>Malvaceae</i>	Seeds, root, leaves	Earache Wounds, ulcers, Breast augmentation, After delivery causes contraction of uterus, stops bleeding Fever and snake venom.	Juice of leaves is put in ears. Applied seed paste or cotton is burnt and placed on wounds and ulcers. Cotton seeds are used. Prepare a decoction by Mixing soya, kalonji and old jaggery and powder of root. Seeds are used.
16.	<i>Jasminum officinale</i> L.	Jasmine	<i>Oleaceae</i>	Root, leaves, oil, flowers	Oral diseases Toothache Improves complexion Headache, unconsciousness, Earache, Eye diseases	Gargle with decoction of leaves. Leaves are chewed. Root of jasmine is mixed in ubtan or applied alone. Massage of oil is given. Put Leaves oil in ear. Juice of flower is put in eyes.
17.	<i>Lawsonia inermis</i> L.	Mehandi or Heena	<i>Lythraceae</i>	Leaves and flowers	Headache, burning sensation of hands and feet, wounds, stop bleeding Syphilis Clarifies urine, reduces burning sensation.	Applied paste of leaves. Decoction of leaves. Juice of leaves with sugar or mishri is given.
18.	<i>Luffa cylindrica</i> Mill.	Sponge gourd or tori	<i>Cucurbitaceae</i>	Fruit	Cold, arthritis pain, restore absent menstrual periods	Fruit is taken.
19.	<i>Majorana hortensis</i> L.	Sweet marjoram or maruwak	<i>Lamiaceae</i>	Leaves	Headache, Worms in child's stomach,	Grind the Fresh leaves and applied paste on head. 4-5 gm leaves and seed powder and make chatni

					abdominal pain, cough, Painful menstruation, Fever	and given twice a day. 3-4 ml leaves juice mixed with equal amount of honey. Consume 15-20 ml juice.
20.	<i>Mentha spicata</i> L.	Pudina or garden mint	<i>Lami- aceae</i>	Leaves	Foul smelling ulcers Deodorization of mouth Indigestion, diarrhoea, worm diseases, cough, heart failure, amenorrhoea, obstetric fever, dysmenorrhoea.	Paste is used. Gargle with its juice. Grind leaves or make chatni.
21.	<i>Papaver somniferum</i> L.	Opium poppy or afim	<i>Papaver- aceae</i>	Seeds, fruit	Inflammatory diseases of eye and ear Internal bleeding, whooping cough, acute pneumonia, Avoid miscarriages, post-partum pain, fever.	Applied paste externally. Taken fruit extract orally.
22.	<i>Phyllanthus emblica</i> L.	Amla	<i>Phyllan- thaceae</i>	Fruit, pulp, leaves	Cough, cold, Diabetes Jaundice Wounds Headache Nasal bleeding Increase blood count	Powder of fruit and mulethi taken with water. Grind the dried fruit and seeds of jamun and prepare a paste. Crush the amla fruit with black pepper, saunth, turmeric and taken with honey. Applied paste of leaves. Fruit is taken with warm milk. Powder mix in the ghee and applied on head. Decoction of fruit.

23.	<i>Punica granatum</i> L.	Anar	<i>Puni-aceae</i>	Fruit, bud, root	Children's Diarrhoea, Worm diseases, blood bile, Anemia Fever	Grind its bud in goat's milk and given to child. 10-15gms of root extract is given empty stomach and purgation is given on second day after fasting. Eat fruit. Used in dietary form, increase strength of patient
24.	<i>Senna occidentalis</i> L.	Negro coffee	<i>Caesalpinioideae</i>	Leaves, root, seeds	Dog cough Scorpion poison Leprosy Convulsions	Juice of leaves with honey. Applied paste of root. Seeds are used. Decoction of root is given.
25.	<i>Solanum nigrum</i> L.	Makoi or black nightshade	<i>Solanaceae</i>	Leaves, fruit, roots	Stomach ache Nasal bleeding Mouth ulcer Cough, jaundice, Earache	Leaves are fried in mustard oil and mix the salt in it. Fruit is boiled in mustard oil and when one fourth part is left then filtered it and applied on forehead. Chew the leaves or gargle with its decoction. Extract the juice of roots. Juice is used.
26.	<i>Solanum surattense</i> Burm. f.	Kantakari (choti Kateri)	<i>Solanaceae</i>	Flowers, fruits, seeds	Toothache Chronic cough of children Menopause, labor pains, Impregnation.	Fumigation of seeds. Powder of its fruit is given with honey. Seeds are given. White flowering Kantakari is used.
27.	<i>Tinospora cordifolia</i> (Willd.) Miers	Giloy	<i>Menispermaceae</i>	Leaves, stem, whole plant.	Diabetes Migraine Jaundice	Take one fourth spoon of leaves powder. Boiled the stem in water with green gram and sesame oil till one fourth of decoction left and then massage with this oil. Juice of plant is given.

					Rheumatism Chronic fever Stomach disorder, Diarrhoea Increase immunity and dengue and to fight with corona virus.	Soaked the plant with saunth and sesame oil in water whole night and in next morning filtered it and drink it. Soaked the whole plant with tulsi leaves whole night and filtered it in next morning and given with honey. Powder of plant is taken with honey. Decoction of plant. Decoction prepared from plant, tulsi leaves, papaya leaves, laung, elaichi, ginger with jaggery is taken.
28.	<i>Trachyspermum ammi</i> (L.)	Ajowan	<i>Apiaceae</i>	Fruit	Inflammatory and painful disorders Ulcers Stop the growth of hookworms Flatulence Indigestion Destroy phlegm and cough Dysmenorrhea and after delivery	Ajowan paste or its oil infusion is used. Mix the seeds in hot water, washes the ulcers with it. Sat ajwain is given. Applied paste on stomach or foment by making potli. Decoction is given. Powder is given. Mix ghee in Ajwain powder and given to females to get rid of unwanted waste from stomach after delivery.
29.	<i>Zingiber officinale</i> Rosc.	Saunth	<i>Zingiberaceae</i>	Rhizome	Rheumatic disorders Anorexia, flatulence Cough, Typhoid.	Grind and hot paste are applied. Eat ginger and salt before meals. Ginger Juice with Laung and honey is taken. Ginger juice is given.

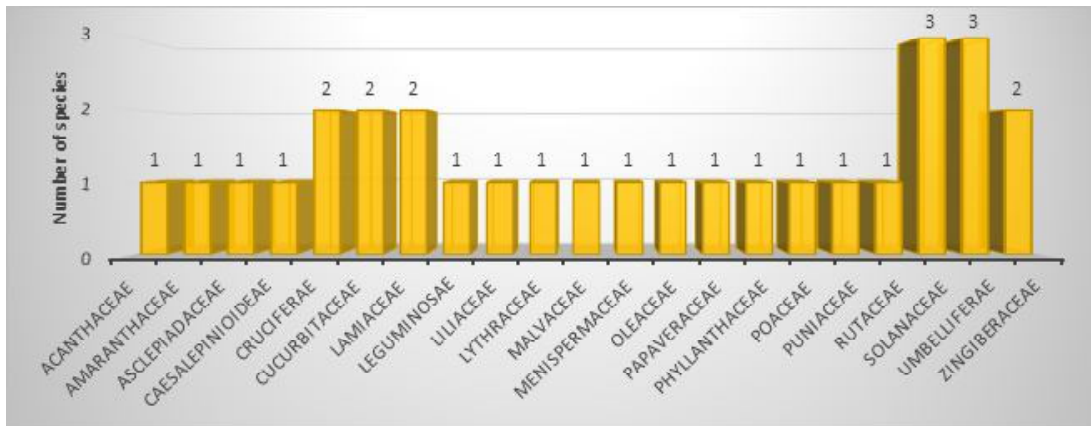


Figure 2. Distribution of families of ethnobotanical plants from study site.

Solanaceae and *Apiaceae* was dominant and achieved the highest rank among families with three species each followed by *Cucurbitaceae*, *Cruciferae*, *Zingiberaceae* and *Lamiaceae* having two species each while rest other families *Acanthaceae*, *Amaranthaceae*, *Asclepiadaceae*, *Leguminosae*, *Liliaceae*, *Lythraceae*, *Malvaceae*, *Menispermaceae*, *Oleaceae*, *Papaveraceae*, *Phyllanthaceae*, *Poaceae*, *Punicaceae* and *Rutaceae* having one species each.

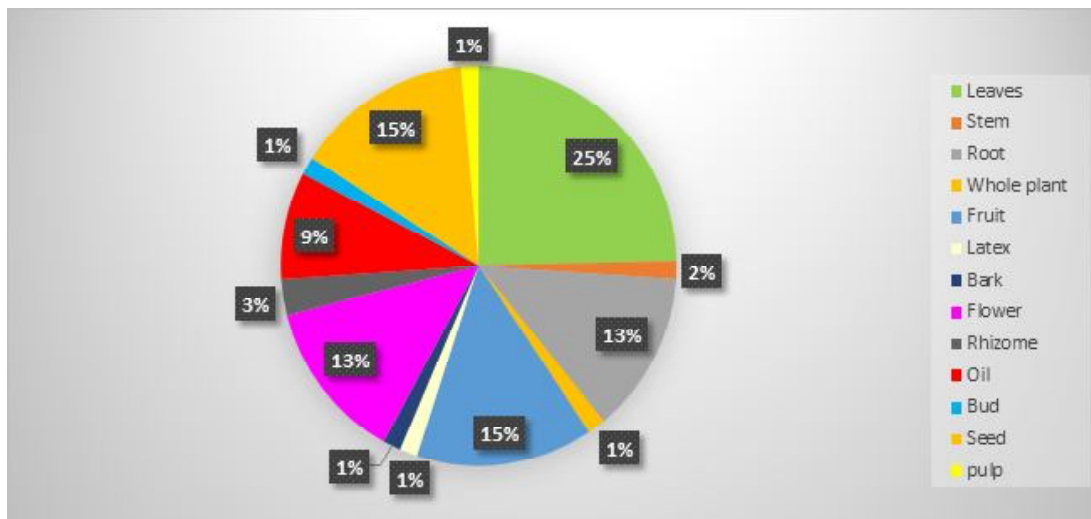


Figure 3. The plant part used for medicinal applications.

Natural remedies were prepared using a variety of techniques including powder, juice, infusion, paste, latex, tea, decoction, etc. These were either used alone or in conjunction with other plants. The most popular form of administration was oral applications. Different types of plant parts were used for the formation of herbal medicines shown in (Figure 3). Leaves were highly used part of plant (17), followed by fruit and seed (10 each), flower and roots (9 each), oil (6), rhizome (2) and rest others such as whole plant, stem, bud, pulp, bark and latex (1 each).

The present study covers five villages of Sonipat tehsil. A total twenty-nine medicinal plants were documented which were used by native people for the treatment of several diseases. Vaidyas, hakims, herbalists and other peoples who have the proper knowledge about ethnobotanical medicinal plants employed for the curation of human's illness. The present study revealed with plant species alphabetically arranged with their botanical names which is followed by local name, family, plant part used and their detailed uses. *Solanaceae* and *Apiaceae* was dominant and achieved the highest rank among families with three species each followed by *Cucurbitaceae*, *Cruciferae*, *Zingiberaceae* and *Lamiaceae* having two species each while rest other families having a single species each. Documented plant species were used to treat various diseases like cough, cold, fever, stomach ache, nasal bleeding, toothache, earache, arthritis, jaundice, labor pain, menopause, ulcer, rheumatism, immunity booster, diarrhoea and several other ailments. The most frequently used plant parts were leaves of plant used in 17 species followed by fruit and seeds (10 species each), roots and flowers (9 species each), oil (6 species), rhizome (2 species), latex,

bark, pulp, bud, stem and whole plant (1 species each). Phytochemicals of all kinds are abundant in leaves⁸. *Achyranthus aspera*, *Coriandrum sativum*, *Datura metel*, *Foeniculum vulgare* and *Jasminum officinale* are used for the treatment of eye diseases. Present study for the treatment of eye problems was analogous to the study done by Behera and Mahalik³ for the treatment of eye problems. For the curation of headache there are seven plant species are used like *Asparagus racemosus*, *Benincasa hispida*, *Coriandrum sativum*, *Jasminum officinale*, *Lawsonia inermis*, *Majorana hortensis* and *Phyllanthus emblica*. *Achyranthus aspera*, *Phyllanthus emblica*, *Solanum nigrum* and *Tinospora cordifolia* are used to cure jaundice¹⁵. There are seventeen species that are used for the treatment of cough, they are *Achyranthus aspera*, *Benincasa hispida*, *Calotropis procera*, *Cassia fistula*, *Citrus limon*, *Curcuma longa*, *Foeniculum vulgare*, *Luffa cylindrica*, *Majorana hortensis*, *Mentha spicata*, *Papaver somniferum*, *Phyllanthus emblica*, *Senna occidentalis*, *Solanum nigrum*, *Solanum surattense*, *Trachyspermum ammi* and *Zingiber officinale*. Medicinal properties of *Curcuma longa* are found to be similar as suggested by Fuloria *et. al.*⁶.

From the present study, it revealed that there is a huge amount of knowledge on medicinal plants used for ethnobotanical purpose and this indigenous knowledge plays an essential role for the curation of human diseases. The use of ethnobotanical medicine is favored as a valuable and cost effective, easily accessible with lesser side reaction in comparison to chemical drugs. It is observed

that older persons have vast knowledge of medicinal plants than younger generation. Most of the people learnt knowledge of traditional medicines from their parents and grandparents or ancestors. The Ethnobotanical study of five villages of Sonipat Tehsil revealed that this region is diversified in flora and most of the plant species recommended as medicinal plants, used for the curation of various illnesses in humans as well as in animals. Further, information of ethnobotany is in danger of extinction, under threat of development of urbanization, increasing demands of agriculture and deforestation. Because most communities or indigenous people in the nation heavily rely on agriculture as their primary economic activity due to limited landholding and increase in population, agricultural expansion is the primary cause of the loss of medicinal plants used in herbal medicine. If this continues then one day these medicinal plants will be lost. Hence, public awareness is very important towards wild medicinal plants and their appropriate use. Therefore, documentation of indigenous knowledge of ethnobotany is of great importance in searching incredible medicine for the remedies of various human ailments.

We are thankful to all the informants such as gardeners, nurseries owners, local peoples, medicine practitioners, teachers, vaidyas and hakims for revealing their beneficial information and supportive during the survey.

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