

Research Article

Biodiversity and Indigenous Uses of Medicinal Plant in the Chandra Prabha Wildlife Sanctuary, Chandauli District, Uttar Pradesh

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Conventional medicines are very important part of Indian culture. In this study the outcome of two-year study of ethnomedicinal uses of plants in Chandra Prabha Wildlife Sanctuary (CPWLS) and nearby area is reported. Information related to different plants which are used by local community in the treatment of many common diseases and well-being in the area was collected. Data on the use of medicinal plants were collected using structured interview of about 122 participants and thorough observations and conversations with local communities. Approximately 100 plants belonging to 43 families used by the local healers were reported in this study. The plant species with the highest fidelity level (Fl) were *Holarrhena antidysenterica*, *Lawsonia inermis*, *Gymnema sylvestre*, *Dalbergia sissoo*, *Cassia fistula* Linn., *Butea monosperma* (Lam.) Kuntze., *Boerhaavia diffusa* Linn., *Albizia lebbek* Benth., *Aegle marmelos* Correa., *Sphaeranthus indicus* Linn., and *Solanum surattense* Burm. f. The most frequent ailments reported were hepatitis, jaundice, constipation, and skin and urinary problems. The parts of the plants most frequently used were fruit, roots, and whole plants (17%) followed by leaves (16%) and bark (15%). This study presents new research efforts and perspectives on the search for new drugs based on local uses of medicinal plants.

1. Introduction

Plants are always considered as a primary source of drugs in traditional and alternative system of medicine in various forms such as crude form, juice, decoction, and crude extracts. About 80% people of the world, particularly in the rural areas of developing countries, continue using traditional resources in healthcare [1]. Indian subcontinent is renowned for its cultural and plant biodiversity where large numbers of people are still living in tribes. These tribal people possess a pool of undisclosed, ethnomedicinal, and ethnopharmacological information regarding the flora of their surroundings, which may prove to be very helpful in rural community with its advantage. Natural wealth as well as the undisclosed ethnopharmacological information and the tribal cultures have been decreased remarkably at a disturbing rate due to change in life style, unintentional developmental programs, and mounting recent civilization. Negligence by the youth

also influences the traditional knowledge [2, 3]. Therefore, it is necessary to discover and document this exceptional, original, and conventional information of the ethnic population, before it disappears with the knowledgeable persons. It is also for the establishment of these conventional principles at the national and international level realizing the recent global trends [4]. There is inadequate data on ethnomedicinal uses of plant in eastern Uttar Pradesh [1, 5–8] as compared to northern and western Uttar Pradesh [9–14]. Further, ethnobotanical survey centered on Purvanchal region of eastern Uttar Pradesh is enormously deficient [15–18]. Some of the reported surveys are available for potential effectiveness of the traditional healthcare practices, alive in native and local communities nearby wildlife sanctuaries [19–24]. Chandra Prabha Wildlife Sanctuary previously has rich forest wealth and traditional knowledge, but, after disappearance of Asiatic Lion, people from nearby utilized the forest for their livelihood as well as medicinal requirements. These people



FIGURE 1: Area of study.

explore the medicinal prosperity of the area. Therefore, the present study was proposed to document the ethnomedicinal information of Chandra Prabha Wildlife Sanctuary (CPWLS) and nearby area.

2. Aim and Objectives

The primary aim of this research work was to assess the richness of ethnomedicinal plant species used by the local tribes in forest areas and to provide an initial picture of the ethnomedicinal plants in the CPWLS, which was not studied before from this viewpoint. So the present study was planned keeping in view the following goals:

- (1) assessing the diversity, distribution, and utilization patterns of medicinal plants;
- (2) identification and documentation of plant species used for the treatment and prevention of various diseases and ailments in the study area.

3. Study Area

The Chandauli district contributes to the Indian GDP by providing a range of cereals including paddy and wheat. It is popularly known as the “Dhaan Ka Katora of Uttar Pradesh” because of tremendous productive lands of the Gangetic Plain. The Sanctuary is situated in Chandauli district, in the south eastern division of Uttar Pradesh, between Chakia and Naugarh, having rich vegetation spread over an area of 78 square kilometers and lying between the latitude $24^{\circ}54'43''\text{N}$ and longitude $83^{\circ}10'41''\text{E}$ about 70 Km from the famous city of Varanasi (Figure 1). The place has been gifted with attractive picnic spots, intense forest, and beautiful waterfalls

like Rajdari and Devdari and a dam nearby area known as Chandra Prabha Dam. The Sanctuary was recognized in 1957 and spread in more than 9,600 hect. The center area of the place covers over 2,686 hect. It was famous for the Asiatic Lion during 1957–1970. It provides a natural and ideal habitat for grasslands, many caves in Vindhya region, and waterfalls for a crowd of animals and plants. There is an enormous possibility for tourism development in the Sanctuary where people can take pleasure in natural attractiveness and biodiversity. There is broad range of lovely colorful birds and creeping animals (poisonous and nonpoisonous) in the sanctuary. Rajdari and Devdari are two main waterfalls in this area which is enclosed by the forest area. The height of Rajdari is more than 65 meters which is a stepped waterfall and a major spot of attraction for the tourists. Devdari is about 500 m downwards the watercourse underneath Rajdari waterfall. The temperature in the region varies from 38°C (summer) to 14°C (winter). Rainy season lasts from mid of June to September. The forest had been the main resource for natives, but their dependence on forest resources continued to decrease gradually due to deforestation. The Sanctuary is typically dry deciduous forest and also has a huge diversity of natural shrubbery.

During the course of exploration of ethnomedicinal plants the information has been gathered from the healers inhabiting the forest areas who have sound knowledge of herbal remedies. For many decades, the tribal community has a traditionally self-managed system of folk medicine and primary healthcare mainly based on herbal remedies.

4. Methodology

The survey was spread across the seasons during 2012–2013 to get maximum information following the typical protocols for the collection of ethnobotanical facts [25–27]. The study was undertaken by carrying out ethnobotanical survey with the people living in the area under study. The aims and objectives of the research were first explained to the local employees of the Sanctuary and consulted for the recognition of knowledgeable persons (informants). These informants frequently recommended other potential informants. Few traditional healers and some religious leaders such as temple priests who are involved in the practice and prescription of medicinal plants were also interviewed. We attempted to interview peoples from all age groups (Table 1), sex, and socioeconomic and ethnic community so that informants include legislature of the entire community. Total 122 informants in the age group of 17–70 years were identified from CPWLS and surrounding areas. Out of the various informants there were 8 traditional healers and 7 temple priests. The data was gathered involving a planned survey utilizing questionnaire with literate people and interview with the rest in local language by using interpreters.

Local name of plants, taxonomic diversity, parts of the plant used, indication, method and forms of preparation, and route of administration were recorded and documented by successive visit to villages (Table 2). Status in the humanity concerning their familiarity about herbs and traditional uses are the basic criteria for the selection for the interview

TABLE 1: Informants.

Variables	Frequency	%
Gender		
Male	79	64.75
Female	43	40.16
Age in years		
≤20	5	4.10
20–30	21	17.21
31–40	31	25.41
41–50	52	42.62
51–60	6	4.92
≥60	7	5.74

of informant. The collected data from these informants represent the whole community, because they are recognized healers, villagers, elder people, teachers, social workers, and so forth.

5. Identification of Plants

Prior to survey, a questionnaire was designed and pretested with five informants. Processing of voucher specimens for herbarium preparation was done following standard procedures [28]. The photographs of the plants were taken at their locality. Identification was carried out with the help of available floras [29–31] and by the professional experts. Plant names were checked according to the International Plant Name Index [32].

6. Results and Discussion

A discussion of human being existence on this planet would not be complete without a look at the role of plants, because plants have been an integral part of human culture since the start of civilization. Ethnobotany is the learning of different methods by which communities of a particular province utilize native plants for their daily routine works, diet, outfits, medication, and other activities [33]. For the protection and consumption of natural wealth its documentation is required [34]. Several ethnobotanical studies were carried out to take record of the species used by the residents contiguous in the different area for health care. It is believed that there are still undisclosed species of plants in the rainforests and these species must be identified and explored for their undiscovered potentials and biological activities. Traditional medicine is practical application of the local therapeutically important plants as well as minerals. With every specialist that dies without an apprentice, the great medical knowledge base of their culture dies with them. Documentation of this undisclosed and traditional information is very much helpful in understanding the biodiversity [35], making of policies for conservation of medicinal plants [36], and also the development of researches.

The documented medicinal plants and all relevant data of the present study are summarized in Table 2. Altogether 100 medicinal plants belonging to 43 families and 82 genera were documented from the study area (Table 2). Fabaceae (11%),

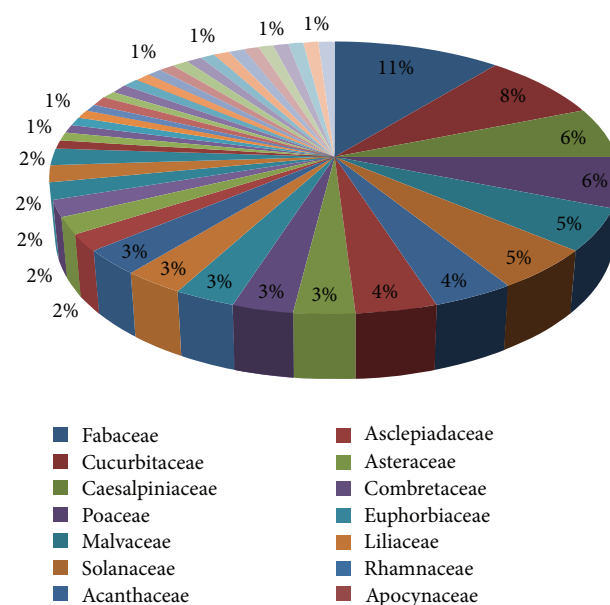


FIGURE 2: Distribution of families.

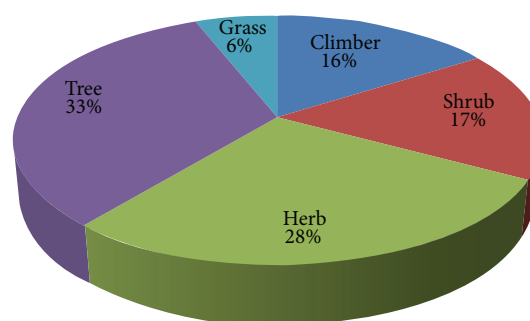


FIGURE 3: Distribution of habit.

Cucurbitaceae (8%), Caesalpiniaceae and Poaceae (6%), and Malvaceae and Solanaceae (5%) were the dominant families (Figure 2). Among the genera, *Cassia* (6 spp.), *Ziziphus*, *Trichosanthes*, *Terminalia*, *Solanum*, *Sida*, and *Luffa* (3 spp. each) and *Calotropis*, *Desmodium*, and *Eclipta* (2 spp. each) were dominant genera. Medicinal value of plants of Vindhya region belonging to Fabaceae family was previously reported by Chaudhary [37].

Among the 100 recognized medicinal plants, 33% are trees. Other species used belong to herbs (28%), followed by shrubs (17%), vine/climber (16%), and grass (6%) (Figure 3). Some of the plants are also available in residential area, estate, wayside, riversides, and the tropical forest. Availability of trees and herbs is common in the forest. Therefore, it is easy for the local healers to use these plants [38].

The common sicknesses for the people living in tribes in the study area are bronchitis, constipation diarrhea, dysentery, gastric troubles, cuts, wounds, urinary problems, jaundice, and so forth. Amongst the parts used, fruit, roots, and whole plants (17%) followed by leaves (16%) and bark (15%) were the major parts (Figure 4). Exact doses and duration of treatment are considered as intellectual property

TABLE 2: Name of medicinal plants with detailed description used by the Chandra Prabha Wildlife Sanctuary, Chandauli, Uttar Pradesh, India.

Serial number	Plant name	Local name	Family	Habit	Part used	Preparation	Route of administration	Ailments / uses
1	<i>Abutilon indicum</i> (Linn.) Sweet (DD001)	Kanghi	Malvaceae	[Sh]	[RT]	[D]	[O]	Diuretic
2	<i>Acacia catechu</i> Willd. (DD002)	Khadir	Caesalpinaceae	[T]	[Br]	[D]	[O]	Jaundice
3	<i>Adhatoda vasica</i> Nees. (DD003)	Adusha	Acanthaceae	[Sh]	[Lf], [Fl]	[D]	[O]	Chronic bronchitis, asthma, and antispasmodic
4	<i>Aegle marmelos</i> Correa. (DD004)	Bael	Rutaceae	[T]	[Rt Br], [Br]	[D], [RW]	[O]	Diuretic, jaundice
5	<i>Ailanthus excelsa</i> Roxb. (DD005)	Mahanimba	Simaroubaceae	[T]	[Br]	[D]	[O]	Febrifuge, laxative, hepatitis, bronchitis, constipation, and antitoxic in rat bite
6	<i>Albizia lebeck</i> Benth. (DD006)	Shirisha	Caesalpinaceae	[T]	[Br]	[D]	[O]	Antitoxic and antiallergic
7	<i>Aloe vera</i> Tourn. ex Linn. (DD007)	Kumari	Liliaceae	[Sh]	[Lf]	[J], [Pt]	[O], [LA]	Hepatoprotective and anti-inflammatory
8	<i>Alstonia scholaris</i> R. Br. (DD008)*	Sataparna	Apocynaceae	[T]	[Br]	[D]	[O]	Febrifuge, skin diseases, purgative, tumours suppressor
9	<i>Amaranthus spinosus</i> Linn. (DD009)	Cholai	Amaranthaceae	[H]	[WP]	[D]	[O]	Boils, burns, snakebite, skin diseases, laxative, eruptive fevers
10	<i>Amorphophallus campanulatus</i> Bl. ex Decne. (DD010)	Surana	Araceae	[H]	[Rh]	[RW], [Pw]	[O]	Laxative, digestive disorders, piles, skin disorders, and aphrodisiac
11	<i>Andrographis paniculata</i> Nees. (DD011)	Kalmegha	Acanthaceae	[H]	[WP]	[D]	[O]	Fever, malaria, amoebic dysentery, dyspepsia
12	<i>Andropogon invaraneusa</i> Jones. (DD012)	Khas	Poaceae	[Gr]	[Lf], [RT]	[D]	[O]	Fever, diuretic, viral fevers
13	<i>Aristolochia indica</i> Linn. (DD013)	Isharmul	Aristolochiaceae	[Cl]	[Lf]	[J], [D]	[O], [LA]	Antitoxic and jaundice
14	<i>Artocarpus heterophyllus</i> Lamk. (DD014)	Katahala	Liliaceae	[T]	[Lf]	[Pt]	[LA]	Fever, boils, wounds, and skin diseases
15	<i>Asparagus racemosus</i> Willd. (DD015)	Shatavari	Liliaceae	[H]	[Rh]	[Pw], [D]	[O]	Diuretic, anti-inflammatory
16	<i>Asteracantha longifolia</i> Nees. (DD016)*	Talmakhana	Acanthaceae	[H]	[WP]	[D]	[O]	Diuretic
17	<i>Hygrophila auriculata</i> (DD016)*	Neem	Meliaceae	[T]	[Lf]	[D]	[O]	Viral hepatitis
18	<i>Azadirachta indica</i> A. Juss. (DD017)	Bans	Poaceae	[H]	[Lf], [St]	[D]	[O]	Hepatitis, jaundice
19	<i>Bamboo manna</i> (DD018)	Vajradanti	Acanthaceae	[Sh]	[WP]	[D]	[O]	Laxative, hemorrhoids, cirrhosis of liver, varicose veins, and jaundice
20	<i>Barleria prionitis</i> Linn. (DD019)	Hijjala	Lecythidaceae	[T]	[Fr]	[D], [RW]	[O]	Snake bite
21	<i>Barringtonia acutangula</i> (Linn.) Gaertn. (DD020)	Petha	Cucurbitaceae	[Cl]	[Fr]	[J], [RW]	[O]	Jaundice
22	<i>Benincasa hispida</i> (Thunb.) Cogn. (DD021)	Gadahpurna	Nyctaginaceae	[Cl]	[RT]	[D]	[O]	Diuretic

TABLE 2: Continued.

Serial number	Plant name	Local name	Family	Habit	Part used	Preparation	Route of administration	Ailments /uses
23	<i>Butea monosperma</i> (Lam.) Kuntze. (DD023)	Dhak	Fabaceae	[T]	[Br]	[D]	[O]	Enlargement of liver in hepatitis
24	<i>Calotropis gigantea</i> (Linn.) R. Br. ex Ait. (DD024)	Madar	Asclepiadaceae	[Sh]	[Lt], [Lf]	[D], [RW]	[O]	Hepatitis, counterirritant, laxative, and syphilitic affection
25	<i>Calotropis procera</i> (Ait.) R. Br. (DD025)	Madar	Asclepiadaceae	[Sh]	[Lt], [Lf]	[D], [RW]	[O]	Similar to <i>C. gigantea</i>
26	<i>Capparis decidua</i> Edgew. (DD026)	Kair	Capparidaceae	[Sh]	[Br]	[D]	[O]	Purgative and hepatitis
27	<i>Capsicum frutescens</i> L. (DD027)	Mirch	Solanaceae	[Sh]	[Fr]	[Pt], [RW]	[O], [LA]	Skin itches; the fruit is used to treat discomforts and common ailments associated with pregnancy
28	<i>Carica papaya</i> L. (DD028)	Papita	Caricaceae	[T]	[Fr], [Lf]	[RW]	[O]	Digestant, anthelmintic, laxative, tonic, nutritive, aphrodisiac, wormicidal activity, cough, and diuretic properties
29	<i>Cassia alata</i> L. (DD029)	Dadmari	Fabaceae	[H]	[Lf]	[Pt]	[LA]	Ringworm and scabies, stomach-aches, laxative effect
30	<i>Cassia fistula</i> Linn. (DD030)	Amaltas	Caesalpinaceae	[T]	[FrP]	[Pw]	[O]	Laxative, hepatitis
31	<i>Cassia occidentalis</i> Linn. (DD031)	Kasamarda	Caesalpinaceae	[Sh]	[SD], [Lf]	[Pw]	[O]	Laxative, cough
32	<i>Cassia tora</i> Linn. (DD032)	Chakramarda	Caesalpinaceae	[H]	[SD]	[Pw]	[O]	Digestive upsets
33	<i>Cissampelos pareira</i> Linn. (DD033)	Bichhukand	Menispermaceae	[Cl]	[RT]	[D]	[O]	Hepatitis, antitoxic, correcting the digestive system
34	<i>Clerodendrum philomidis</i> Linn. f. (DD034)	Tarkari	Verbenaceae	[T]	[Br]	[D]	[O]	Antibacterial and anti-inflammatory
35	<i>Crataeva nurvala</i> Buch. Ham. (DD035)	Varuna	Capparidaceae	[T]	[Br]	[D]	[O]	Laxative, diuretic, anti-inflammatory, and antitoxic
36	<i>Curculigo orchiooides</i> Gaertn. (DD036)	Safed musli	Hypoxidaceae	[H]	[RT]	[D]	[O]	Jaundice, antibacterial, antifungal, and leucorrhoea
37	<i>Cynodon dactylon</i> (Linn.) Pers. (DD037)	Doob	Poaceae	[Gr]	[WP]	[D]	[O]	Ascites, general anasarca, antiviral agent, and chicken pox
38	<i>Cyperus rotundus</i> Linn. (DD038)*	Motha	Cyperaceae	[Gr]	[RT]	[D]	[O]	Scariosus, amoebic dysentery, anti-inflammatory, antibacterial
39	<i>Dalbergia sissoo</i> Roxb. (DD039)	Shisham	Fabaceae	[T]	[HtW]	[D]	[O]	Chronic fevers, diuretic, antibacterial, used for repair of damage of the tissues
40	<i>Desmodium gangeticum</i> DC. (DD040)	Sharivan	Fabaceae	[H]	[WP]	[D]	[O]	Diuretic, antitoxic, vomiting, and diarrhoea
41	<i>Desmodium triflorum</i> DC. (DD041)	Teenpatti	Fabaceae	[H]	[WP]	[D]	[O]	Laxative, diuretic, and carminative
42	<i>Desmostachya bipinnata</i> Stapf. (DD042)*	Kusha	Poaceae	[Gr]	[RT]	[D]	[O]	Stopping bleeding, anti-inflammatory, antitoxic, and diuretic, and correcting the tissues

TABLE 2: Continued.

Serial number	Plant name	Local name	Family	Habit	Part used	Preparation	Route of administration	Ailments /uses
43	<i>Diospyros peregrina</i> (Gaertn.) Gurke. (DD043)	Tendu	Ebenaceae	[T]	[Fr], [Br]	[D], [RW]	[O]	Rheumatism and ulcers
44	<i>Dolichos biflorus</i> Linn. (DD044)	Kulathi	Fabaceae	[Cl]	[SD]	[Pw]	[O]	Diuretic, jaundice, and gall stones
45	<i>Eclipta alba</i> (Linn.) Hassk. (DD045)*	Bhingaraja	Asteraceae	[H]	[WP]	[D]	[O]	Anaemia, jaundice, laxative and stimulant, diuretic, emetic, and stimulant of bone marrow
46	<i>Eclipta prostrata</i> Linn. (DD046)	Bhringraj	Asteraceae	[H]	[WP]	[D]	[O]	Anaemia, jaundice, laxative and stimulant, diuretic, emetic, and stimulant of bone marrow
47	<i>Embllica officinalis</i> Gaertn. (DD047)	Amala	Euphorbiaceae	[T]	[Fr]	[D], [RW]	[O]	Metabolic disorders, laxative, rejuvenation, and hepatitis
48	<i>Eucalyptus globulus</i> Labill. (DD048)	Safeda	Myrtaceae	[T]	[Lf], [RT]	Oil, [D]	[O], inhalation	Antiseptic, upper respiratory tract infection, skin diseases, and purgative
49	<i>Ficus racemosa</i> Linn. (DD049)	Gular	Moraceae	[T]	[Br]	[D]	[O]	Hepatitis
50	<i>Gmelina arborea</i> Roxb. (DD050)	Gambhari	Verbenaceae	[T]	[Br]	[D]	[O]	Laxative, antitoxic, diuretic, and healing
51	<i>Gymnema sylvestre</i> Schult. (DD051)	Gudmar	Asclepiadaceae;	[Cl]	[RT]	[D]	[O]	Rheumatism, cough, dyspnoea, ulcers, and eye pains
52	<i>Hemidesmus indicus</i> R. Br. (DD052)	Anantamul	Asclepiadaceae	[Cl]	[RT]	[D]	[O]	Jaundice and antitoxic
53	<i>Hibiscus rosa-sinensis</i> L. (DD053)	Gurhal	Malvaceae	[Sh]	Sap, [Lf]	[D], [Pt]	[O], [LA]	Boils and sprains, asthma, wounds, and swelling
54	<i>Holarhena antidiysenterica</i> (Linn.) Wall. (DD054)	Indrajau	Apocynaceae	[T]	[Br]	[D]	[O]	Antibacterial, amoebic dysentery, laxative, and jaundice
55	<i>Indigofera tinctoria</i> Linn. (DD055)	Neel	Fabaceae	[H]	[WP]	[D]	[O]	Purgative, diuretic, antitoxic, used in epilepsy, nervous disorders, dysuria, hepatitis
56	<i>Ipomoea digitata</i> Linn. (DD056)	Vidari	Convolvulaceae	[H]	[RT]	[D]	[O]	Laxative, stimulant, anti-inflammatory
57	<i>Jasminum officinale</i> f. affine (DD057)	Chameli	Oleaceae	[Sh]	[Lf]	[D], [RW]	[O]	Antitoxic and antibacterial
58	<i>Jatropha curcas</i> Linn. (DD058)	Ratanjot	Euphorbiaceae	[T]	Oil, [Lf]	Oil	[LA]	Purgative, eczema, herpes, itch, sores, bleeding wounds, piles, scabies, ringworm, and decaying teeth
59	<i>Juniperus communis</i> Linn. (DD059)*	Kaiphall	Cupressaceae	[Sh]	[Fr]	[D], [RW]	[O]	Diuretic, antibacterial, gonorrhoea, dropsy, anti-inflammatory, and antimicrobial
60	<i>Lawsonia inermis</i> Linn. (DD060)	Mehndi	Lythraceae	[Sh]	[Lf][Br]	[D], [Pt]	[O], [LA]	Jaundice, epilepsy, and asthma, reducing burning, small pox, anti-inflammatory, and gonorrhoea
61	<i>Luffa acutangula</i> (Linn.) Roxb. (DD061)	Turai	Cucurbitaceae	[Cl]	[Fl], [Fr]	[D], snuff	[O], nasal	Laxative, diuretic, purgative jaundice

TABLE 2: Continued.

Serial number	Plant name	Local name	Family	Habit	Part used	Preparation	Route of administration	Ailments /uses
62	<i>Luffia cylindrica</i> (Linn.) M. J. Roem. (DD062)	Ghiatarui	Cucurbitaceae	[Cl]	[WP], [Fr]	[D]	[O]	Laxative, diuretic
63	<i>Luffia echinata</i> Roxb. (DD063)	Bindal	Cucurbitaceae	[Cl]	[WP], [Fr]	[D]	[O]	Purgative, diuretic, and anti-inflammatory
64	<i>Momordica charantia</i> Linn. (DD064)	Karela	Cucurbitaceae	[Cl]	[Fr]	[RW]	[O]	Hepatitis, laxative
65	<i>Moringa oleifera</i> Lam. (DD065)	Sahijana	Moringaceae	[T]	[Fr], [Br]	[D], [RW]	[O]	Anti-inflammatory, healing, diuretic, laxative, antipyretic, antirheumatic, tonic, diuretic, cholagogenic
66	<i>Musa paradisiaca</i> Linn. (DD066)	Kela	Musaceae	[Sh]	[Fr], [Lt]	[RW]	[O]	Laxative, used to alter secretion tumours, blocked vessels
67	<i>Nyctanthes arbor-tristis</i> Linn. (DD067)	Harsingar	Oleaceae	[T]	[Lf]	[D]	[O]	Diabetes, laxative, diuretic cholagogue, jaundice
68	<i>Oroxylum indicum</i> Vent. (DD068)	Saunapatha	Bignoniaceae	[T]	[Br]	[D]	[O]	Amoebic dysentery, jaundice, and antibacterial
69	<i>Physalis minima</i> L. (DD069)	Chirpoti	Solanaceae	[H]	[RT], [Lf], [Fr]	[D]	[O]	Hypertension, diabetes, and malaria
70	<i>Pongamia pinnata</i> (Linn.) Pierre. (DD070)*	Karanj	Fabaceae	[T]	[SD]	[Pw], [RW]	[O]	Herpes, antibacterial, antimicrobial, antifungal, and antiviral, liver disorders extensively; it is laxative
71	<i>Pterocarpus marsupium</i> Roxb. (DD071)**	Bijayasar	Fabaceae	[T]	[HtW]	[D]	[O]	Jaundice, elephantiasis, leucoderma, diarrhoea, dysentery, rectalgia, cough, and greyness of hair
72	<i>Punica granatum</i> Linn. (DD072)*	Anar	Punicaceae	[Sh]	[Fr]	[D], [RW]	[O]	Jaundice and vomiting
73	<i>Raphanus sativum</i> Linn. (DD073)	Muli	Brassicaceae	[H]	[RT]	[D]	[O]	Jaundice, intestinal disorders
74	<i>Ricinus communis</i> Linn. (DD074)	Rendi	Euphorbiaceae	[H]	[SD], [Rt]	[D]	[O]	Jaundice, viral hepatitis
75	<i>Rosa centifolia</i> Linn. (DD075)	Gulab	Rosaceae	[Sh]	Buds	[D]	[O]	Antitoxic, liver disorder, hyperacidity, laxative, tonic, antitoxic, correcting the digestive system
76	<i>Saccharum spontaneum</i> Linn. (DD076)*	Kasha	Poaceae	[Gr]	[RT]	[D]	[O]	Diuretic, bleeding disorders
77	<i>Sida acuta</i> Burm. f. (DD077)	Bariara	Malvaceae	[H]	[WP]	[D]	[O]	Diuretic, jaundice, and tonic
78	<i>Sida cordifolia</i> Linn. (DD078)	Bala	Malvaceae	[H]	[WP]	[D]	[O]	Diuretic, jaundice, and tonic
79	<i>Sida rhombifolia</i> Linn. (DD079)	Mahabala	Malvaceae	[H]	[WP]	[D]	[O]	Diuretic, jaundice, and tonic
80	<i>Solanum nigrum</i> Linn. (DD080)	Makoi	Solanaceae	[H]	[WP]	[D]	[O]	Used in liver disorders and hydrophobia
81	<i>Solanum surattense</i> Burm. f. (DD081)	Choti Bhatkattaiya	Solanaceae	[H]	[WP]	[D]	[O]	Diuretic, febrifuge, anti-inflammatory

TABLE 2: Continued.

Serial number	Plant name	Local name	Family	Habit	Part used	Preparation	Route of administration	Ailments /uses
82	<i>Solanum torvum</i> Sw. (DD082)	Choti Bhatkattaiya	Solanaceae	[H]	[WP], [RT]	[D]	[O]	Diuretic, digestive liver, and spleen enlargement
83	<i>Sphaeranthus indicus</i> Linn. (DD083)*	Gorakhmundi	Asteraceae	[H]	[WP]	[D]	[O]	Laxative, diuretic
84	<i>Tamarindus indica</i> Linn. (DD084)	Email	Caesalpiniaceae	[T]	[Lf]	[D], [J]	[O]	Jaundice, anti-inflammatory
85	<i>Tephrosia purpurea</i> (Linn.) Pers. (DD085)	Sharpunkha	Fabaceae	[H]	[WP]	[D]	[O]	Viral hepatitis
86	<i>Terminalia arjuna</i> (Roxb.) W. and A. (DD086)	Arjuna	Combretaceae	[T]	[Fr], [Br]	[D], [RW]	[O]	Diuretic, jaundice
87	<i>Terminalia bellirica</i> Roxb. (DD087)	Baheda	Combretaceae	[T]	[Fr]	[D], [Pw]	[O]	Hepatitis
88	<i>Terminalia chebula</i> Retz. (DD088)	Harre	Combretaceae	[T]	[Fr]	[D], [Pw]	[O]	Hepatitis
89	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. and Thoms. (DD089)	Giloy	Menispermaceae	[Cl]	[St]	[D]	[O]	Hepatitis, anticancerous
90	<i>Tribulus terrestris</i> Linn. (DD090)	Gokhru	Zygophyllaceae	[H]	[RT]	[D]	[O]	Diuretic and anti-inflammatory
91	<i>Trichosanthes anguina</i> Linn. (DD091)	Purwul	Cucurbitaceae	[Cl]	[RT]	[D]	[O]	Hepatitis
92	<i>Trichosanthes cordata</i> Roxb. (DD092)	Ilaru	Cucurbitaceae	[Cl]	[RT]	[D]	[O]	Hepatitis and abdominal disorders
93	<i>Trichosanthes cucumerina</i> L. (DD093)	Jangali Parvala	Cucurbitaceae	[Cl]	[RT]	[D]	[O]	Antiviral, alopecia, antipyretic, and liver tonic
94	<i>Uraria picta</i> Desv. (DD094)*	Shankaraja	Fabaceae	[H]	[RT]	[D]	[O]	Enhances healing, cough, cold, fevers, laxative, and diuretic
95	<i>Vetiveria zizanioides</i> (Linn.) Nash. (DD095)	Khus Khus	Poaceae	[Gr]	[Lf]	Oil	[O]	Perfumery, anthelmintic agent, and analgesic
96	<i>Vitis quadrangularis</i> (DD096)	Hathjod	Vitaceae	[Cl]	[WP]	[J]	[O]	Wound healing
97	<i>Woodfordia fruticosa</i> Kurz. (DD097)*	Dhataki	Lythraceae	[Sh]	[Fl], [Br]	[D]	[O]	Antitoxic
98	<i>Ziziphus nummularia</i> (Burm. f.) W. and A. (DD098)	Jharber	Rhamnaceae	[T]	[Fr]	[RW]	[O]	Laxative and skin disorders
99	<i>Ziziphus sativa</i> (DD099)	Beri	Rhamnaceae	[T]	[Fr]	[RW]	[O]	Laxative and antipyretic
100	<i>Zizyphus jujuba</i> Lamk. (DD100)	Beri	Rhamnaceae	[T]	[Fr]	[RW]	[O]	Diarrhea, fever, and blood purifier

[Cl]: climber; [Gr]: grass; [H]: herb; [Sh]: shrub; [T]: tree; [Br]: bark; [Fl]: flower; [Fr]: fruit; [Lf]: leaf; [Rh]: rhizome; [RT]: root; [SD]: seed; [WP]: whole plant; [Lt]: latex; [FrP]: fruit Pulp; [Rt Br]: root bark; [HtW]: heart wood; [D]: decoction; [RW]: raw; [J]: juice; [Pt]: paste; [Pw]: powder; [LA]: local application; [O]: oral route. (The images of important plants were provided as Supplementary Material available online at <http://dx.doi.org/10.1155/2015/394307>.)

*Least concern plant.

**Vulnerable plant.

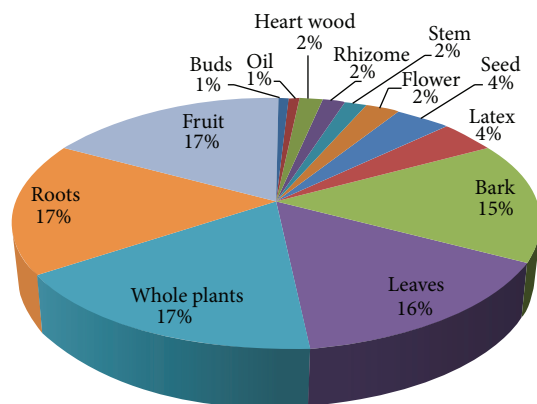


FIGURE 4: Distribution of part used.

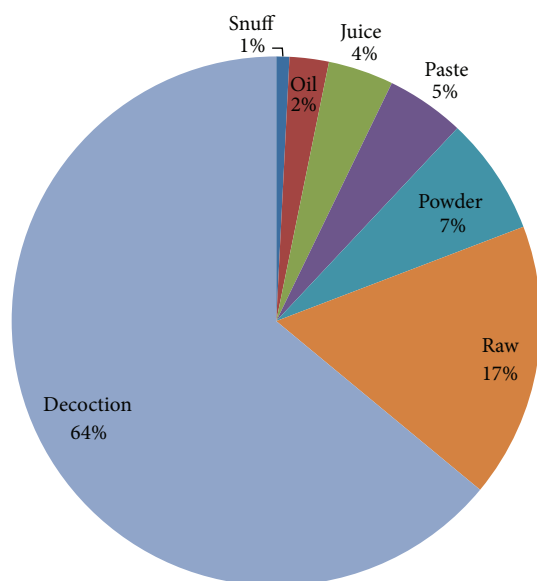


FIGURE 5: Distribution of mode of preparation.

of informants, so as per their request this information is not included in the present paper.

The majority of informant reported that decoction (64%) is the first choice for administration as it can be given with sugar. Another common method of preparation was raw (17%) followed by powder (7%), paste (5%), juice (4%), and oil (1%) (Figure 5). The decoction was obtained by boiling the plant material with water and reduced to one-fourth amount. Most of the drugs are given by oral route (91%). Direct application of paste (with oil) or medicated oil (7%) (Figure 6) is generally done for skin diseases and wounds. Most of the medicines were taken orally which is in conformity with some other studies conducted somewhere else [1, 6, 39].

There are about 13 species which were found to be under red list but out of thirteen only one plant is under vulnerable category and the rest are of the least concern [40].

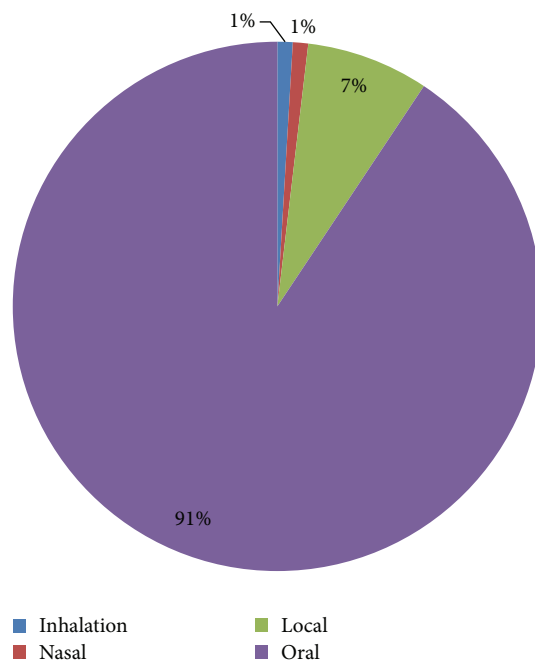


FIGURE 6: Distribution of route of administration.

7. Conclusion

Herbs are always considered as a very important source of medicine especially for the population of the rural areas and tribes because of the high cost and difficult accessibility to modern medicine. This study was conducted in Chandra Prabha Wildlife Sanctuary of Chandauli district, in the south eastern division of Uttar Pradesh, where inadequate ethnobotanical surveys on medicinal plants were conducted. Our findings demonstrated that the area is rich in biodiversity and ethnobotanical tradition. About 100 plants belonging to 43 families are used by the local communities including the tribal and local healers. The plant species with the highest fidelity level (F1) were *Holarrhena antidysenterica*, *Lawsonia inermis*, *Gymnema sylvestre*, *Dalbergia sissoo*, *Cassia fistula* Linn., *Butea monosperma* (Lam.) Kuntze., *Boerhaavia diffusa* Linn., *Albizia lebbbeck* Benth., *Aegle marmelos* Correa., *Sphaeranthus indicus* Linn., and *Solanum surattense* Burm. f. The most frequent ailments reported were hepatitis, jaundice, constipation, and skin and urinary problems. The parts of the plants most frequently used were fruit, roots, and whole plants (17%) followed by leaves (16%) and bark (15%).

Traditional knowledge of the area is greatly affected due to modernization and other factors and there is an urgent need to protect the cultural heritage and traditional knowledge of the natives by justifying the therapeutic potential and biological activities of the plants with reported scientific methods. Also there is a need for special attention to the potential plants of the area which are on the verge of extinction by excessive deforestation and development.

Conflict of Interests

The authors have no conflict of interests to declare.

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