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BIODIVERSITY AND MANAGEMENT OF BEER FOREST OF JHUNJHUNU DISTRICT

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ABSTRACT

The review paper focuses on the various forms of biological diversity that can be found on ecosystems, as well as the loss of biodiversity and species richness in ecosystems, as well as the various causes of the loss of biological diversity due to anthropogenic as well as natural processes. The paper also mentions the various tools and techniques, as well as advanced sciences and basic sciences interactive studies, for the creation of biodiversity databases, database management, and interpretation for biodiversity conservation and protection. In an effort to evaluate, preserve, and foster the growth of biodiversity in a manner that is ecologically sound, a wide range of establishments and organizations have begun implementing distinct initiatives and are doing so both independently and in tandem with one another. Plant diversity remains essential for human beings, providing numerous modern and traditional remedies to the healthcare system. The vast land of Rajasthan together with its vegetation and flora has a variety of medicinal plants growing in different habitats. The present study aimed to document the preliminary analysis of rare and threatened medicinal plants of Beer Jhunjhunu Conservation Reserve of Rajasthan.

Keywords: *Biodiversity, geo-informatics, Beer Forest*

INTRODUCTION

India is one of the twelve mega bio-diversity countries of the world. Its unique geographical position led to diversity in climate, soil, flora and fauna. Though the geographical area cover of the country represents about 2.4% of the world's total landmass, it harbours a total of 47513 plant species representing as much as 11.4% of world flora (Singh and Dash, 2014). India is host to about 17,500 angiosperms, 64 gymnosperms 1100 pteridophytes, 2850 bryophytes, 6500 algae, 14500 fungi and 2000 lichens (Anonymous, 1999). This figure highlights the richness of flora of our country. Rajasthan, the largest state in the country in terms of geographical area, is treasured with a wide range of physiographic and climatic conditions. It has unique rich diversity of plants with different habitats. Floristic diversity of Rajasthan has been reviewed and documented earlier by many workers etc. have also documented. Jhunjhunu district, a part of Shekhawati region of the state is covering 5,928 sq km total geographic area. The district is poor in forest resources as the total area under forest including hills is reported to be 39,680 hectares, which is 6.65% of the total geographical area of the district.A lot of work has been done on the exploration of floristic diversity of different places of Rajasthan, but references for taxonomic description about district Jhunjhunu are less documented and understood

(Bakshi,1954; Nair 1956, 1961; Joshi,1958). Therefore, the present study was designed to record the floristic composition of Beer Jhunjhunu Conservation Reserve of Rajasthan.

OBJECTIVE

1. Provide an explanation of the idea of biodiversity.
2. Provide justification for the preservation of biodiversity.

MATERIAL AND METHODS

Study area

jhunjhunu District is situated between 27° 38′ and 28° 31′ North latitudes and 75° 02′ and 76° 06′ East longitudes and includes 5928 Km² of geographical area (Fig. 1). It is characterised by arid climate with the hot season slightly milder than in the surrounding territory to the North and North-west of the state. The highest temperature is 48ºC and it goes below the freezing mark in winter. Total yearly rainfall is 300–400 mm. Jhunjhunu Beer is bordered by Desusur village in the north; Samaspur village in the south; Charanwas village in the east; surrounding agricultural terrain and Jhunjhunu city in the west. In the rainy season, the forest is becoming sumptuous and rich in greenery and enriched numerous medicinal, uncommon, indigenous and vulnerable plants. The entire area of Jhunjhunu Beer is 1047.48 Hectare. It has been proclaimed a conservation desert by the state Government's wild notification vide F3 (47) VAN/2008 Date 09-03-2012. This reserve area is the heart of Jhunjhunu The due to having a neighbouring proximity to city headquarter (Anonymous 2015).

Figure 1. Location map of Jhunjhunu and Jhujhunu Beer of Rajasthan, India

Data collection

During the field expeditions that were carried out, the interior region of Beer Jhunjhunu was explored with the assistance of local residents and Vaidya. In addition, visits were made to rural areas, where conversations were held on the curative powers possessed by a certain species of plant, and where traditional healers provided a great deal of knowledge regarding these powers. The medical applications of one portion of a plant belonging to a given species are described in the relevant literature, however the traditional healers divulged the medical applications of other parts of the plant that were not included in the relevant literature. Within modern culture, those who practise traditional medicine can be divided into two distinct types. The first type of people to be considered is those who have some primary understanding of medicinal plants in terms of their social history and traditional use. And the second category includes those who have both a bachelor's and a master's degree in Ayurvedic medicine. In our community, there are a number of people known as 'Vaidya' and 'Hakims' who have adequate knowledge of medicinal plants. These people typically prescribe the medicine on behalf of their traditional as well as parental usage of Ayurvedic medicine. The 'villagers' and the 'country folks' are the second type of folk healers, and the majority of those who fall into this group are the 'elderly man and woman.' However, over the course of the field study, meetings were also held with younger folk practitioners who lived in the hamlet. They also have a solid understanding of the ways in which medicinal plants may be used in their region. They are also known as "Daie" in rural areas specifically, where they execute the role of "birth–attendants" on behalf of their paternal knowledge. The women who practise traditional medicine also do this task. The species was determined to be what it was with the assistance of reputable literature (Shetty & Singh 1987, Shetty & Singh 1991, Shetty & Singh 1993, Bhandari 1995). Herbarium at the Department of Botany, University of Rajasthan, Jaipur, is where the plant specimens were stored after being brought there.

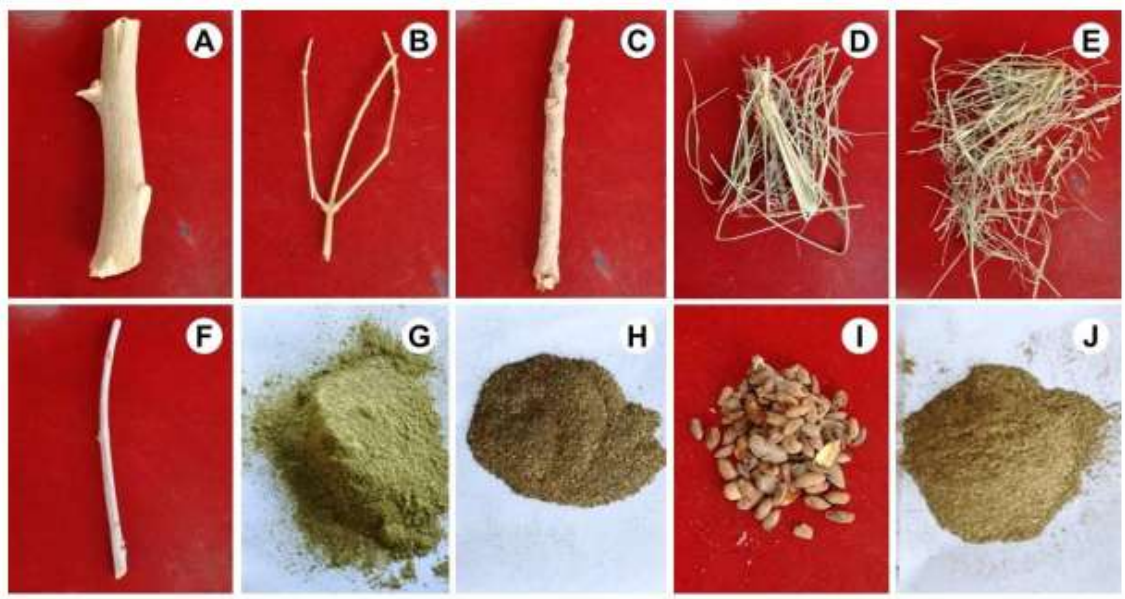

Figure 2. A, Dry stem of Acacia catechu (L.f.) Willd.; B, Dry stem of Achyranthrus aspera L.; C, Dry Stem of Ficus religiosa L.; D, Dry Whole plant of Desmostachya bipinnata (L.) Stapf; E, Dry Whole plant of Cynodon dactylon (L.) Pers; F, Dry Stem of Calotropis procera (Ait) Ait.; G, Dry powder of Euphorbia hirta L.; H, Dry Powdder of Barleria prionitis L.; I, Dry Fruit of Azadirachta indica A. Juss.; J, Dry Pod powder of Acacia nilotica (L.) Delile; K. Dry fruit of Prosopis cineraria (L.) Druce L. Dry Bark powder of Acacia nilotica (L.) Delile; M, Dry Gum of Acacia senegal willd.; N, Dry whole plant Fagonia indica L.; O, Dry whole plant of Ocimum sanctum L.; P, Dry Aloe vera (L.) Burm. f.; Q, Dry Tuber of Asparagus racemosus Willd.; R, Dry Fruits of Abrus precatorius L.; S, Dry Seed of Datura stramonium L.; T, Dry Bark of Tecomella undulate (Sm.) Seem; U, Dry Stem of Tinospora cordifolia (Willd.) Miers; V, Dry Fruit of Pedalium murex L.; W, Dry Root of Withania somnifera Dunal; X, Dried fruits of Emblica officinales Gaert.

RESULT AND DISCUSSION

In this work, the focus was solely on lesser-known ethno uses of plants, each of which had a unique form of application. Although the applications of a large number of plants were documented, only 53 plant species belonging to 35 families were chosen to examine from the surrounding region (Table 1). Throughout the course of the survey, participants of varying ages and from a variety of locations in the study regions had

conversations about the medical benefits of plants. People between the ages of 50 and 60 have a deeper understanding of the traditional uses of medicinal herbs. Emblica officinals Gaertn, Boerhavia diffusa L., Acacia nilotica (L.) Delile, Achyranthus asper L., Cassia occidentalis L., Chenopodium album L., Citrullus colocynthis (L.) Schard, Pedalium murex L., Tribulus terrestris L., Tinospora cordifolia L. were utilised in this study to determine (Willd.) In the treatment of diabetes, Miers and other plants such as Azadirachta indica are utilised. A. Juss., Cassia occidentalis L., Calotropis procera (Ait) Ait. F., Ficus benghalensis L., Acacia senegal willd, Leptadenia pyrotechnica (Farssk.) Decne., Momordica balsamina L., Solanum nigrum L., Tecomella undulata (Sm.) Seem. There are numerous plant species that have the ability to treat jaundice, including Abrus precatorius L., Barleria prionitis L., Cassia occidentalis L., Chenopodium album L., Citrullus colocynthis (L.) Schard., Cynodon dactylon (L.) Pers., Leucas aspera (Willd.) Link, Ricinus communis L., Tecomella undulata Leprosy treatment often involves the use of Abrus precatorius L., Calotropis procera (Ait) Ait. F., Leucas aspera (Willd.) Link, and Fagonia indica L. While the species of some plants, such as Aloe vera L., Abrus precatorius L., and Azadirachta indica, are employed in the treatment of arthritic disorders, skin diseases, and old fever, respectively; A. Juss., Achyranthus asper L., Cassia occidentalis L., Cynodon dactylon (L.) Pers., Fagonia indica L., Ocimum sanctum L., Tecomella undulata (Sm.) Seem, Withania somnifera Dunal. Other plants of ethnological significance that can be found in Jhunjhunu Beer have the ability to treat a wide variety of diseases and conditions, including those associated with the respiratory system, liver, leprosy, animal bites, parasites, rheumatism, dysentery, diseases of the eye, ear, and teeth, amongst others (Table 1). A variety of illnesses can be treated with the help of certain ethnopharmaceutical plants. The local traditional practitioners dry the ethnomedicinal plants and conserve their valuable portions so that they might utilise them in the future (Fig. 2). The findings of this study indicate that there is a significant amount of ethno plant variety in the flora of Jhunjhunu Beer. & Kotschy ex Boiss., Ceropegia bulbosa L., Leptadaenia reticulate (Retz.) Wight & Arn, Abutilon fruticosum Guill. & Perr., and Tecomella undulate (Sm.) Seem. have also been recorded at a few places in the Jhunjhunu Beer. These plants are rare and threatened, but they have been found there. On the other hand, the residents of the area reported some time ago that their extensive presence in the region had been spotted in a number of different spots. The continued survival of these animals is under jeopardy as a direct result of excessive human activity. Authorities from the government are moving quickly to put measures in place to ensure their safety and ensure that they may be used sustainably. (Jeph & Khan 2019). Among the recorded species, the majority of the plants were native to the area, but there were also some exotic plants present in the region. For example, Prosopis juliflora (Sw) DC was purposefully introduced into the region as a highly invasive species; however, it poses a serious risk to the ethno medicinal flora because it has outcompeted native species. Because the ethno plant may be used as a source of medicine, it is imperative that it be preserved for the sake of human welfare and because it is essential for future generations. The results of this investigation might give helpful hints not only for the medical field but also for people in general. The purpose of the current study is to raise awareness about the ethno value of the plants that are being studied.

Table 1. List of ethnomedicinal plant species

S.N.	Botanical Name	Family	Local Name	Parts Use	Ethnomedicinal uses
1	*Abrus precatorius* L.	Fabaceae	Chirmi/ Ratti	Leaves, seed, root	Joint pain, paralysis, skin disease, tetanus, rabies, fever, cough, cold, jaundice, nerve tonic, leprosy, anti-allergic
2	*Abutilon indicum* (L.) Sweet	Malvaceae	Kanghi	Root, bark, leaf, seed	Uterine haemorrhagic discharges, febrifuge, anthelmintic, diuretic, alexiteric. toothache, boils, lumbago, chest troubles, bronchitis, piles, gonorrhoea
3	*Acacia catechu* (L. f.) Willd.	Mimosaceae	Katha	Leaves, stem, bark, root	Tumours, gonorrhoea, asthma, menorrhea, vomiting
4	*Acacia nilotica* (L.) Delile	Fabaceae	Babul	Bark, latex, gum, pods, leaves and seeds	Cholera, on burn, urine-genital diseases, toothache, colic pain, scorpion sting, ulcers.
5	*Acacia senegal* willd	Fabaceae	Kumbat	Bark, flower, gum	Demulcent, emollient, inflammation, haemorrhage, intestinal mucous, diabetes
6	*Achyranthus asper* L.	Amaranthaceae	Chirchita/ Latjira	Leaves, root, seed, whole plant	Diuretic, astringent. laxative, skin diseases. astringent, dropsy, piles, eruption, colic, gonorrhoea, pneumonia, hydrophobia, urinary problems, stomach ache, rheumatic pain, stones of bladder
7	*Aegle marmelos* (L.) Corr.	Rutaceae	Beal	Bark, leaf, fruit	Abdominal pain, heart palpitation, urinary troubles, hypochondriasis, laxative, febrifuge, ophthalmic, dysentery, diarrhoea, deafness
8	*Aerva javanica* (Burm. f.) Shult	Amaranthaceae	Bui	Whole plant	Decoction for swelling, digestive disorders, promote urination
9	*Agave americana* L.	Agavaceae	--	Root, Leaf, gum	Diuretic, diaphoretic, anti- syphilitic
10	*Aloe vera* (L.) Burm. f.	Liliaceae	Gheeganwar	Whole plant	Digestive disorders, arthritis, rheumatism, skin disorder, asthma and chronic bronchitis
11	*Amaranthus spinosus* L.	Amaranthaceae	Choulai	Leaves, roots	Laxative, abort faint, constipation, stomach ache, wounds, boils, diarrhoea, diuretic, gonorrhoea, eczema, leucorrhoea
12	*Argemome mexicana* L.	Papavaraceae	Satyanasi	Whole plant	Diuretic, purgative, aphrodisiac, strangury, leucoderma, cure piles, ring worm, eczema, scorpion bite, constipation flatulence, abdominal colic pain, respiratory diseases, blood purifier, joint pain

13	*Asparagus adscendens* Roxb.	Liliaceae	Safed musli	Rhizome	Rejuvenate, blood vitalising disorder, burning sensation properties
14	*Asparagus racemosus* Willd.	Asparagaceae	Satavari	Tuber	Rejuvenate, cold, tonic, galactogogue, anaemia, weakness, aging debility, dysentery, tuberculosis, burring micturition, joint pain, epilepsy, tuberculosis, cure piles
15	*Azadirachta indica* A. Juss.	Meliaceae	Neem	Leaf, flower, fruit, bark, seed, oil	Blood purifier, antitoxin, antibacterial, antiviral herb, skin diseases, blood disorder, rheumatism, diabetes, scabies, malarial fever
16	*Barleria prionitis* L.	Acanthaceae	Bajradanti	Leaf, root, Whole plant	Cust, rat poisoning, nervous system, diuretic, fever, rheumatism, liver disease, indigestion, constipation, jaundice, toothache, joint pain, toothache
17	*Boerhavia diffusa* L.	Nyctaginaceae	Sata/ Punarnava	Whole Plant	Astringent, biliousness, anaemia, leucorrhoea, inflammation, blood purifier, scorpion bite, kidney troubles, promote urination, diarrhoea, diarrhoea, vomiting, night blindness
18	*Calotropis procera* (Ait) Ait. F.	Asclepidaceae	Aak	Roots, bark, flowers, latex, leaf	Malarial fever, tuberculosis, asthma, cough, abdomen pain, antitode, diabetes, malaria fever, destroy guinea worm in intestine, rheumatic joints, cure migraine, cure leprosy, scorpion sting, cure deafness, indigestion
19	*Capparis decidua* (Farssk.) Edgew	Capparidaceae	Kair	Root, bark, flowers, fruit	Rheumatism, toothache, cardiac complaints, cure piles, improve digestive system, toothbrush, anti-cholesterol, joint pain, cough, asthma, respiratory problems
20	*Cassia occidentalis* L.	Caesalpiniaceae	Kesundo	Root, Bark	Skin diseases, astringent. anthelmintic, diabetes and urinary disorders, ophthalmic, conjunctivitis, heart disease, jaundice, cure filariasis
21	*Chenopodium album* L.	Chenopodiaceae	Bathua	Seeds	Skin diseases, urinary trouble, colic worms, cardiac disorders, jaundice, anaemia
22	*Citrullus colocynthis* (L.) Schard.	Cucurbitaceae	Gartoomba/ Tumba	Roots, fruits	Jaundice, purgative, cure scrotal enlargement, cure warts, premature ejaculation, cure osteo-arthritis, earache, constipation, stomach-ace, cure scrotal enlargement, kidney pain, cure jaundice, relive mastalsia
23	*Cleome gynandra* L.	Capparidaceae	Safed hulhul	Leaves, seeds, root	Typhus fever, cough, headache, skin disease, scorpion sting, cure earache
24	*Commelina benghalensis* L.	Commelinaceae	Moriya bati	Whole plant	Leprosy, liver complaints, sunstroke, malarial fever
25	*Cucumis melo* L.	Cucurbitaceae	Kachri	Fruits, seeds	Digestive, increase immunity, ophthalmic, bronchitis, chronic fever, burning sensation
26	*Cynodon dactylon* (L.) Pers.	Poaceae	Dubghas	Whole plant, roots	Piles, Chronic gleet, stomach-ache, Menstrual disorders, dysentery. skin disease, jaundice, astringent

27	*Cyperus rotundus* L.	Cyperaceae	Nagarmoth	Tuber	Menstruation, problem, scabies, eczema, dyspepsia, in worms, Fragrant, astringent, diuretic, fever, cough, diarrhoea, galactagogue, stimulant, diuretic, stomach complaints
28	*Cyperus triceps* (Rottb) Endl.	Cyperaceae	Chuhe ki Dadi	Roots	Liver stimulation, decoction for fever
29	*Datura stramonium* L.	Solanaceae	Kantawala-datura	Leaf, Flower, Seed	Asthma, in ophthalmology, snake bite, fever, worms, cure rabies, breast pain
30	*Desmostachya bipinnata* (L.) Stapf	Poaceae	Dab/Kusha	Whole plant, Root	Dysentery, menorrhagia, diuretic
31	*Emblica officinales* Gaertn	Phyllanthaceae	Amalaki	Dried fruit	Hyperacidity, bleeding disorder, urinary ailments, anaemia, antioxidants which contain vitamin-C, rejuvenator
32	*Euphorbia hirta* L.	Euphorbiaceae	Laldhudi	Aerial part	Worms, asthma, bronchial infection, typhoid, vomiting, ulcers, eczema, scabies, pimples, galactagogue
33	*Evolvulus alsinoides* L.	Convolvulaceae	Vishnukranta	Whole plant	Febrifuge, enhance memory, asthma, brain tonic, psychosomatic disorder, epilepsy, hysteria, fever, syphilis, cooling properties, intestinal amoebiasis, leucorrhoea, enlargement of spleen
34	*Fagonia indica* L.	Zygophyllaceae	Dhamaso	Whole plant	Anti-oxidant, anti-microbial, astringent, anti-tumor, wound healing, analgesic, anti-allergic, skin disease, sores, leprosy, fever
35	*Ficus benghalensis* L.	Moraceae	Bargad	Tender ends of the aerial roots, latex fruits, buds leaves, bark	Obstinate vomiting, piles, boils and blisters, sexual debility, spermatarrhoea, diarrhoea, cough, toxaemia, diabetes, rheumatism, lumbago, eye tonic, fractured bone, vomiting, leucorrhoea, gonorrhoea, skin diseases, wound, female infertility, astringent, ophthalmic
36	*Ficus religiosa* L.	Moraceae	Pipal	Bark, fruit, latex, tender leaf	Typhoid, pneumonia, carbuncles, toothache, arthritis, wounds, burns, laxatives, female sterility, astringent, skin disease, asthma, refrigerant, haematuria, bleeding piles
37	*Leptadenia pyrotechnica* (Farssk.) Decne	Asclepidaceae	Khimp	Whole plant	Wound healing, skin disease, rheumatoid arthritis, diabetes, gastric problems, constipation
38	*Leucas aspera* (Willd.) Link	Lamiaceae	Paniharin	Leaves, flowers	Jaundice, fevers, ulcers, intestinal, painful swelling, eczema, warts, headache, migraine, abdominal pain, gastric complaints, leprosy, chicken pox, cough, colds
39	*Momordica balsamina* L.	Cucurbitaceae	Karela	Fruits	Cathartic, diabetes
40	*Ocimum sanctum* L.	Lamiaceae	Tulsi	Whole plant	Cough, cold, fever, burns, wounds, skin disease, forehead, ringworm, respiratory tracts infection, indigestion, wound, earache, conjunctivitis, anti-poisoning

41	*Pedalium murex* L.	Pedaliaceae	Bada Gokhru	Fruits, leaves, root	Gonorrhoea, dysuria, renal calculi, haematuria, growth of hair, rheumatoid arthritis, sexual debility, lumbago, dysuria, tonic, urinary disorders, burning micturition
42	*Phyllanthus niruri*	Euphorbiaceae	Bhui-anwla	Whole plant	Urine-genital disease, gonorrhoea, dropsy
43	*Prosopis cineraria* (L.) Druce	Feabaceae	Khejri/janti	Inflorescence, flowers, bark, fruit	Rheumatism, miscarriage, fruits in pregnancy, piles, increase memory power, infertility, against abortion, injury
44	*Ricinus communis* L.	Euphorbiaceae	Erand	Leaves, seeds, carbuncle, oil, root	Rheumatism, healing properties, cure paralysis, rheumatism, joint pain, backache, jaundice, cure piles, wounds, eczemas, contraceptive
45	*Salvadora persica* L.	Salvadoraceae	Jhal/ Chotapilu	Roots, bark, seed, leaf, fruit	Asthma, gonorrhoea, gastric problems, rheumatism, scurvy, blisters, constipation, stomach-ache, piles, tumours, ascites, joint pain, indigestion, pyorrhoea, protect sunlight
46	*Solanum indicum* L.	Baigan Kateli	Seeds		Toothache, anorexia, dysuria, alopecia, digestion, cough
47	*Solanum nigrum* L.	Solanaceae	Makoy	Whole plant	Dysentery, fever, narcotic, psoriasis, blood purifier, cure fever, cure vomiting, cough, cold, skin disease, greying hair, rejuvenator, swelling, body pain, liver and spleen, enlargement, antiseptic, diuretic, anti-diabetic, cough, eye, ear and nose disease, throat burning, liver inflammation, chronic fever
48	*Tecomella undulata* (Sm.) Seem	Bignoniaceae	Rohida	Bark	Syphilis and leucorrhoea, jaundice, eye disease, cough, cold, fever, skin disease, eczema, abscesses, tooth brush, fever
49	*Tinospora cordifolia* (Willd.) Miers	Menispermeaceae	Guduchi	Stem	Most versatile Rejuvenate, herb, diabetes, malaria fever,vomiting, urinary problems, gout, leucorrhoea, chronic fever, gastritis disorder, pneumonia, rheumatism, jaundice
50	*Tribulus terrestris* L.	Zygophyllaceae	Bhankari	Roots, leaves, fruits	Stomach-ache, tonic, urinary complaints, diuretic, anti-gout properties, dysuria, anuria, urinary stones, increase sexual power, gonorrhoea, haematuria, growth of hair, rheumatoid arthritis, diuretic, tonic, cough, scabies, stomachic problems, diabetes

51	*Withania somnifera* Dunal	Solanaceae	Ashawgandha	Roots, leaves	Sexual weakness, cough, dropsy, diuretic, inflammatory, anti- arthritis, rejuvenator, tonic, analgesic and trauma, anxiety, heart disease, diabetes, asthma, bronchitis, swelling, boils eczema, rheumatic pain, skin disease, leucorrhoea, rickets, tumours, anti-bacterial, respiratory, urino-genital disorders, diuretic, blood purifier, promote urination, ulcers
52	*Ziziphus mauritiana* Lam.	Rhamnaceae	Ber/ bordi	Whole plant	Pain, wound healing, blood purifier, constipation, pyorrhoea, fever, skin disease, cold, dysentery, cough inflammation in gums, indigestion
53	*Ziziphus nummularia* (Burm.f.) Wt. Arn	Rhamnaceae	Jhadi-ber	Leaves, fruits	Biliousness, astringent, cooling, vigour, asthma, eye disease, bone joining, toothache, cold, cough, paralysis, pyorrhoea, dysentery, hair fall, skin disease, regularize menstruation., rodents

CONCLUSION

Medicinal plants are recognized as a major but increasingly threatened global resource. The present observation showed that the many plant species e.g. Ceropegia bulbosa, Enicostemma hyssopifolium, Sarcostemma viminale and Salvadora persica are heavily exploited in the study area for the local medicine. These species need to be conserved along with their habitats. This is an important realization for them to make given that fragments represent the sole opportunity of utilizing forest resources in the region. According to the findings of our research, the potential of the set of pieces that is still present in this area for the preservation of the local biodiversity should not be discounted. The natural ecosystem is dependent on a wide diversity of living organisms in order to maintain its equilibrium, get nourishment, and continue to develop. In order to do this, we need to protect and nurture the earth's diverse ecosystems. It is essential that we collect and disseminate fundamental awareness that can inspire individuals, companies, and authorities that can aid them to coexist in harmony with the natural world.

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