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Research article

STATUS AND DIVERSITY OF ETHNO-MEDICINAL PLANTS OF DHINODHAR HILL, KACHCHH DISTRICT, GUJARAT

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ABSTRACT: Some plants are uses by human community to cure diseases and health related problems from long period of time are called ethno-medicinal plants. Dhinodar Hill is located in Kachchh district under arid zone of India; in spite of this many medicinal plants are found in the various parts of this district. These medicinal plants and their ethnic uses are losing day by day due to loss of traditional knowledge and habitat destruction so; this study was carried out to document the medicinal plants and its associated traditional knowledge. A total of 220 plants recorded from this hilly tract, out of which 35 medicinal plants identified. These medicinal plants are used by the local community in curing 53 types of disease and health related problems. This study recorded some plant species viz; *Commiphora wightii, Capparis cartilaginea, Sterculia urens, Sarcocostemma acidum, Tinospora cordifolia,* having high medicinal values. It was found that *Fagonia schweienfurthii* (1850.65Density/ha) and *Achyranthes aspera* var. *argentea* (1331.17 Density/ha) were most dense medicinal plants of the Hill, and the diversity of medicinal plant were high in mixed vegetation habitat. In conclusion, the medicinal species require special attention to conserve and documentation of their medicinal uses for local people and future commercial production.

Key words: Flora, Ethno-medicine, Traditional Knowledge, Diversity, Dhinodar Hill, Kachchh

INTRODUCTION

India is one of the 12 megadiversity country of the world having rich diversity of habitat, flora and fauna. Kachchh is rich in floral diversity distributed in various forest and non-forest areas which also holds rich natural wealth of medicinal plants. Kachchh is fall under arid and semi-arid region of India [1], in spite of about 768 plant species have been recorded from this region so far, which constitutes about 18% flora of the Gujarat state [2]. A total of 48 species of vascular plants, typical of Indian Deserts are found in the Kachchh region [3-5]. The people of this region have using wide range of traditional ethno-botanical practices from time immemorial, and presence of many species of plant used in ayurvedic pharmaceuticals reveal the evidence of the rich medicinal flora of Gujarat [6]. Now a day, the continuous deforestation and degradation of the habitat of flora in Kachchh along with many parts of country leads to depletion of medicinal plants and associated ethno-medicinal knowledge. Dhinodhar hill range is situated in the Kachchh district of Gujarat and covered with typical tropical thorn forest [7]. Along with the thorn forest some part of this hilly range is mixed with dry deciduous species and invasion of *Prosopis juliflora* in this area. In present, different factors like exploitation of plant by means of fuel and construction material and overgrazing by increasing livestock population declining the forest cover of this hilly range in a rapid pace. The degradation of forest and hilly habitat many medicinal species are facing threats for their existence. Along with the medicinal species of plants, the knowledge of ethno-medicinal practices is also losing in the local community. The documentation and integration of local indigenous knowledge receives recognition to sustainable management and conservation of natural resources. So, this study was made to document the medicinal plants of this hilly range and its associated knowledge for developing future conservation measures.

MATERIALS AND METHODS

Study Area:

Dhinodhar hill (23^0 08'to $23^0$11' north latitude and 69^0 36' to 69^0 45' east longitude) is situated in Nakhatrana taluka, Kuchchh district of Gujarat State. The area is fall under desert bio-geographic region of India. The forest type of this hilly range is characterized by mixed thorn forest. The foothill of this hilly range is now dominated by an invasive plant species, Mesqiute (*Prosopis juliflora*), locally known as 'Gando Bawal'. The hill ranges shared its south and east part with with Bhuj taluka of Kachchh district, especially the fringe areas of scattered hillocks. The topmost range is about 1300 feet high from the Mean Sea Level. This hill is very famous for the devotees by the presence of Guru Gorakhnath temple, located at the top of this hill. Dhinodhar hill is distributed in a vast area and is the largest hilly tract of this district. The climate of Dhinodhar hill is arid and semi-arid type therefore, the temperature is high during most of the time and it reaches a maximum of 42.6 ^{0}C during May-June (the hottest months). The winter temperature goes down to 9^0 C with January and February being the coldest months. The rainfall in this district is scanty; occurring through south-west monsoon between June and September, with an average annual rainfall is about 319 mm.

METHODOLOGY

Reconnaissance survey will be conducted to understand the biological attributes of the proposed study area. This survey would also facilitate to determine the sampling locations, numbers and techniques to be adopted to quantify the parameter specific to the scope of works. Status of floral species will be assessed in the representative habitats covering wetland, forest, grassland, scrubland and wastelands around project site. Quantitative data will be collected using Standard Quadrate Sampling Methods followed by Mueller-Dombois and Ellenberg [8], Kershaw and Wright [9]. Status of tree, shrub, grass, creepers and herbs will be quantified using square shaped plot of size 10m, 1m, 25cm respectively. Plant density was calculated according to Misra [10]. A total of 134 quadrates were laid to enumerate for trees, shrubs, climbers and twiners, and 268 quadrates were laid within major quadrates to enumerate herbaceous species. Study area was divided into six habitats for intensive survey which are; A. *Senegal* dominant, *P. juliflora* dominant, mixed forest, mixed thorn forest, mixed scrub and riverine. Habitats were classified based on dominant vegetative characters followed by Champion and Seth [7]. The regular field survey was conducted in seven villages (Moti Virani, Moti Aral, Dador, Bhimsar, Devisar, Nani Aral and Than) adjoining to Dhinodhar hill areas during November 2007 to June 2009. To carry out enumeration of the plants, a simple, systematic and predetermine technique will be employed. A questionnaire survey, interviews and focus group discussion were made to collect information on present and past status of medicinal plants and their traditional uses by the community. A total 30 local informants belonging to age group of 25-80 yrs were interviewed during the survey. Information on ethno-medicinally significant plants used in various diseases was collected from 14 maldharies, 7 farmers and 9 local inhabitants. At the end of each interview, specimens of plants mentioned for their medicinal uses were collected and identified. The whole plant specimens collected during the survey were deposited in the Herbaria of Gujarat Institute of Desert Ecology (GUIDE), Bhuj, Kachchh, Gujarat. The identification of the plants was made from flora of Gujarat state [2], The Flora of Indian Desert [11] and Flora of the Presidency of Bombay [12].

RESULT AND DISCUSSION

Taxonomical Status of Flora:

A total of 220 plant species (including one gymnosperm) belonging to 159 genera under 55 families were identified and recorded in the study area. Among the recorded species of plants, 187 and 33 were dicot and monocot respectively. Herbs were the most dominant plant form in the study area represented by 98 species. It was followed by shrubs (47 species), trees (30), grasses (26) and climbers (17).

Poaceae was the most dominant family with 25 species from the area. This was followed by Fabaceae (15), Asteraceae (14), Convolvulaceae (13), Acanthaceae and Mimosaceae (11 each). *Acacia, Grewia* and *Ipomoea* are most dominant genera belonging to the families; Mimosaceae, Tiliaceae and Convolvulaceae, respectively from the area, and each of these genera represented by five species. Other dominant genera of the study area includes; *Cassia, Convolvulus* and *Indigofera* represented by four species each.

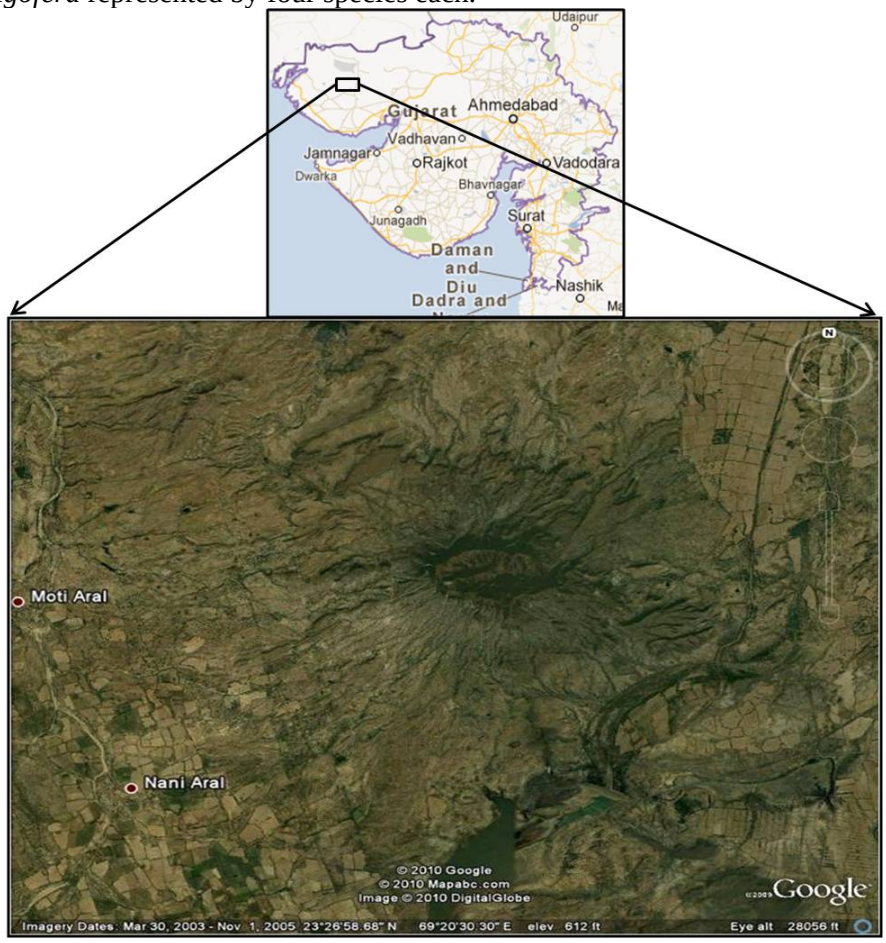

Fig.1. Location of Dhinodar Hill in Kachchh district of Gujarat (Image redrawn from Google Earth)

The only Gymnosperm, *Ephedra foliata* was recorded in associated with the species like; *Capparis deciduas, Euphorbia cadusifolia* and *Accaia Senegal* species. Among the recorded plant species, two parasite species namely; *Striga angustifolia* and *Cuscuta reflexa* were found in the study area. The area supports a good population of *Commiphora wightii,* locally called Guggal, a threatened species. The common species from the area includes; *Euphorbia caducifolia, Corida perrottetii, Grewia tenax, Premna resinosa, Grewia villosa* and *Prosopis juliflora* in the lower reaches, while species like *Sterculia urens, Butea monosperma, Lannea coromandelica, Moringa concanensis, Crateva nurvala* var. *nurvala*, and *Bombax malabaricum* were dominated in the upper reaches and valley areas.

Status of Ethno-medicinal plants

A total of 35 species of medicinal plant recorded from the areas which are commonly used by the local inhabitant for treatment of diseases and other health related problems (Table 1). The recorded medicinal plants were belonging to 33 genera under 24 families. Among the total recorded medicinal plants of this area, 13 species were shrub, 10 species were herb, 7 species were trees, 3 were climbers and 2 were twine.

The most dominant families of medicinal plants found in this area was Capparaceae and Asclepiadaceae, and were represented by 3 species followed by Caesalpiniaceae (2), Fabaceae (2), Nyctaginaceae (2), Salvadoraceae (2), Solanaceae (2), Verbenaceae (2) and Zygophyllaceae (2). The total recorded 35 medicinal plants are used in curing 53 deceases and health problems includes; arthritis, asthma, bile, blood purification, body pain, rheumatoid, semen enrichment, foot and mouth disease, gastric troubles, headache, hiccup, skin diseases, snake bite, stomache ache, hypothermia, indigestion problem, boil, jaundice, swelling, bone fracture, bronchitis, cold, leucoderma, nervous diseases, piles, toothache, poisonous stings, reducing body weight, urine problem, weakness, tuberculosis, ulcers, healing wounds, cough, diabetes, diarrhea, dysentery, urinary disorders, erythropenia, filariasis, fever, dropsy and fistula. The study also recorded the parts of plant species commonly used in the treatment of disease were leaves (18 species), stem (10), root (10), whole plant (8), bark (8), entire plant material (8), fruits (7), flower (5), seed (3) and gum (1). The local people normally used these ethno-medicines in a fresh condition. The plant parts or product are uses by the local community after various types of preparation and application in different types of diseases. Most of the preparations of these medicinal plants are in powder, pest, and juice. The data collected on the use of medicinal plants showed that majority of the preparations of curing disease are made from single plant, and mixture of plants product are uses rarely.

Table 1: Important plant species and their medicinal uses by local people recorded from Dhinodhar hill, Kachchh, Gujarat

Sr. No.	Species Name	Local Name	Family	Habit	Medicinal Uses
1	*Abutilon indicum* (L.) Sw. subsp. *indicum*	Khapato, Dabaliar	Malvaceae	Under Shrub	• Leave paste used to cure ulcers • Used as topological applicants on swelling • Used on overhead to cure headache. • Boiling water of young leaves used to cure diabetes. • Seed powder boiled mixed with oil used to cure earache problem. • Leaves paste with cow milk used to cure toothache. • Entire plant sap with milk and sugar used to cure hyper urea.
2	*Achyranthes aspera* L. var. *argentea* Hook. f.	Agado, Kandhero, Aandhado	Amaranthaceae	Herb	• Entire plant materials used to cure erythraemia. • Plant ash boiled with water used to cure asthma. • Tablets form of leaves and root bark mixed with piper and sugar used to cure local fever during summer season. • Plant ash mixed with milk and sugar used to cure diabetes. • Entire plant materials used in dropsy, piles and snakebite. • Ripe seeds powder used to cure cough. Root used to cure earache.
3	*Asparagus racemosus* Willd. *var. javanicus* (Kunth) Baker	Akal Kandha Ni Val, Chini Ji val	Liliaceae	Sarmentose Shrub	• Green twigs are used to cure stomach ache, dysentery and cooling. • Crushed roots are tied on the body for any kind of swelling in human beings. • The paste of the fasciculate root is applied externally in snakebite. • Root also used to cure urinary disorders, discharges of blood in urine, and to treat headache due to sunstroke.
4	*Balanites aegyptiaca (L.)*	Hingor, Hingod	Balanitaceae	Small Tree	• Fruit pulp is taken once a day for a month to cure tuberculosis.
5	*Bauhinia racemosa* Lam.	Zinj, Zanj, Zinji	Caesalpiniaceae	Tree	• Leaves and young twigs are boiled and eaten as vegetable. • Seeds and bark extract used as insecticide.
6	*Boerhavia diffusa* L.	Rafadi, Satodi,	Nyctaginaceae	Herb	• Root paste used to cure boils and to cure dropsy and fistula. • Root juice used for healing wounds.

7	*Calotropis procera* (Ait.) R. Br.	Akado, Aak	Asclepiadaceae	Shrub	• Powder of roots and flowers used to cure rheumatoid arthritis and paste used to cure leucoderma. • Powder of leaves and flowers used to cure dysentery. • Boiling water of roots mixed with wheat flour, butter and sugar used to cure gastric troubles.
8	*Capparis cartilaginea* Decne.	Kawari, Karpatrai, Parvati Rai	Capparaceae	Under Shrub	• Root barks used to cure dropsy and fistula • Leaves and fruits used against to cure cough and cold • Sap of plant used against to cure ulcers, earache, gastric troubles • Petals of flower or buds used to cure toothache.
9	*Capparis decidua* (Forsk.) Edgew.	Kerado, Dora kera, Kar Jo Zad	Capparaceae	Under Shrub	• Fruits prickles used as tonic, strengthen, and used to cure gastric trouble. • Green stem paste used to cure boils. • Root barks used to cure cough and cold.
10	*Cardiospermum halicacabum* L.	Bkan Fofti, Tridhari Val, Popti	Sapindaceae	Herb	• Entire plant paste with cow milk applied on swelling and the juice of entire plant applied for relieving bone fracture. • Leaves paste used to cure filariasis. • Leaves paste boiling in oil used to cure sty. • Leaves juice used to cure earache.
11	*Cassia auriculata*L.	Avar	Caesalpiniaceae	Shrub	• Leaves used as tannins and the crushed sample applied on head in for common cold. • Leaves paste applies externally on hooves and infusion of leaves given internally to treat foot-and-mouth disease. • Leaves and jiggery is given to cure tympanities.
12	*Citrullus colocynthis* (L.) Soland.	Truja Val, Tru Val, Tru Deda	Cucurbitaceae	Climber	• Roots and fruits powder used to cure gastric troubles. • Roots and fruits powder with sugar used to cure jaundice. • Boiling water of fruit powder inhaler to cure toothache.
13	*Clerodendrum phlomidis* L.	Tankaro, Arani	Verbenaceae	Small Tree	• Leaves sap used with sugar powder to cure boils and swelling. • Flowers powder used to cure cough and cold.
14	*Commicarpus verticillatus* (Poir.) Standl.	Dhokariyar	Nyctaginaceae	Herb	• Root paste used to cure boils and to cure dropsy and fistula and used on topological applicant against swelling. • Root paste and entire plant sap used to cure in poisonous stings.
15	*Commiphora wightii* (Arn.) Bhandari	Gugar, Gugariya, Gugar Jo Zadvo	Burseraceae	Small Tree	• Stem gum applied with milk to cure of dysentery, diabetes, arthritis, topological applicants and applied individually to cure in skin diseases, blood purification and hypothermia; especially useful in nervous diseases. • Gum resin has been traditionally used in reducing body weight.
16	*Enicostema axillare* (Lamk.) Roynal	MameCho, Mamej, Kadvi Bhaji	Gentianaceae	Herb	• Plant powder used against to cure diabetes, cough and cold; used with piper to cure fever and in indigestion problem. • Entire plant infusion is given to treat intestinal worms.
17	*Fagonia schweienfurthii* (Hadidi) Hadidi	Dhramau, Dhamaso, Kandhera	Zygophyllaceae	Herb	• Boiling water of plant used to cure bile and used on topological applicants and • Leaves paste with boiled water used to cure diarrhoea.
18	*Grewia tenax* (Forsk.) Fiori	Gangati, Gangi, Gangni	Tiliaceae	Under Shrub	• Fruit pulp used as topological applicants on swelling. • Boiling water of root bark powder used to cure dysentery
19	*Indigofera oblongifolia* Forsk.	Zeel, Zeel Jo Zad	Fabaceae	Shrub	• Flower paste is used to cure stomach pain in children
20	*Indoneesiella echioides* (L.) Sreem.	Kariyatu	Acanthaceae	Herb	• Entire plant materials (powder or tablets form) used as in tonic and strengthens medicines. • Boiling water of entire plant used to cure flue fever. • Leaves and root used to cure dysentery, diarrhoea and to cure gastric troubles.

21	*Lycium barbarum L.*	Garothi, Gerati, Khareti	Solanaceae	Shrub	• Fruits powder used with cow milk for semen enrichment. • Leaves ash used to cure boils. • Leaves paste with coconut oil used for curing skin diseases.
22	*Maerua oblongifolia* (Foeak.) A. Rich.	Gharo Pinjoro, Acchi Katkiaul,	Capparaceae	Woody Twiner	• Stem paste used to apply on skin diseases. • Entire plant sap used in blood purification and used to enrich of semen. • Stem a pest used to cure leucorrhoea.
23	*Maytenus emarginata* (Willd.) D. Hou	Vikalo, Vigo	Celastreceae	Tree	• Bark powder used with cow milk against weakness. • Leaves used against on bile control and to cure jaundice. • Young branches used as toothbrush.
24	*Moringa concanensis* Nimmo	Kharo Saragvo, Dungar Jo Sargave	Moringaceae	Tree	• Boiling water of bark mixed with oil used against to cure of rheumatoid arthritis. • Boiling water of leaves, barks and flowers used to cure gastric troubles.
25	*Pentatropis spiralis* (Forsk.) Decne	Dhodiyal, Dhodh Val	Asclepiadaceae	Twiner	• Root powder used to cure local fever during the summer season and to cure dysentery as well as against indigestion.
26	*Premna resinosa* Schau	Nidhi Kundher	Verbenaceae	Under Shrub	• Young leave's sap with honey used to cure bronchitis. • Stem paste used to cure swelling and used to cure body pain.
27	*Rivea hypocrateriformis* Choisy	Fang val	Convolvulaceae	Climber	• Leaves used as vegetables to purify blood. • Boiling water of entire plant used to cure misconception in cattle.
28	*Salvadora oleoides* Decne.	Mithi Zar, Mithi Pilujo Zad	Salvadoraceae	Shrub	• Leaves sap used to cure bronchitis. • Leaves paste used as topological applicants to cure swelling. • Fruits used to cure bile.
29	*Salvadora persica* L.	Khari Zar, Pailu	Salvadoraceae	Shrub	• Powder of young branches and leaves with honey used to cure bronchitis. • Fresh powder of root bark used to cure arthritis. • Young roots used as toothbrush to cure toothache. • Boiling water of young branches and leaves used to cure seasonal cough and cold.
30	*Sarcostemma acidum* (Roxb.) Voigt	Chhirval, Chirval, Karadval,	Asclepiadaceae	Climbing Shrub	• Decoction of plant used to cure asthma, bronchitis, whooping cough and fever. • Plant sap directly applies on ticks and mites in animals. • Boiling water used to cure swelling.
31	*Solanum surattense* Burm. f.	Jangali Ringani, Pat Ringani	Solanaceae	Herb	• Roots used to cure bronchitis. • Entire plant sap used to cure uneasiness and hiccup. • Seeds paste with honey used to cure tuberculosis in primary stage and used to cure asthma.
32	*Sterculia urens* Roxb.	Karai jo zad, Kadai, Kadiyo	Sterculiaceae	Tree	• Bark sap with piper used to cure bronchitis and • Paste of stem and leaves used for topological applicants.
33	*Taverniera cuneifolia* (Roth).	Jathi madh	Fabaceae	Herb	• Underground stem used to cure bronchitis.
34	*Tinospora cordifolia* Roxb.	Guddaval, Gadu, Gaduji Val	Menispermaceae	Climber	• Useful in skin diseases and the juice of the stem is useful in diabetes and low fevers. • Plant extract taken when blood passes through urine. Also useful to cure cough.
35	*Tribulus terrestris* L.	Akanthi, Mitha Gokharu	Zygophyllaceae	Herb	• Decoction or powder of the whole plant is used as a general health tonic. • Plant boiled in water given to cattle for more lactation.

Diversity of Medicinal plants

The data collected from the surveying various quadrates in the study area and the plants density and diversity were calculated in each type of habitat of the study area. The calculated values of density and diversity of medicinal plants were shown in table 2. The data showed that maximum number of medicinal species recorded from mixed vegetation (31 species) habitat and less number of medicinal species recorded from mixed scrub habitat (14 species). On analysis of plants density, it was found that *Fagonia schweienfurthii* (1850.65Density/ha) and *Achyranthes aspera* var. *argentea* (1331.17 Density/ha) were most dense medicinal plants of the Dhinodar Hill which were recorded from mixed vegetation and riverine habitat respectively. The most densed species in the six types of habitat found in Dhinodar Hill were *Achyranthes aspera, Fagonia schweienfurthii, Enicostema axillare, Fagonia schweienfurthii, Enicostema axillare* and *Achyranthes aspera* respectively from A. *Senegal* dominant, *P. juliflora* dominant, mixed forest, mixed thorn forest, mixed scrub and riverine habitats. The species diversity of medicinal plants was more or less similar in all six types of habitat with most diverse habitat was mixed forest (2.94) while least diverse habitat was A. Senegal dominant (2.31).

Table 2: Density (per ha) and diversity of Medicinal plant species recorded from Dinodhar hill.

Sl No	Medicinal plant species	*A. senegal* dominant	Mixed Thorn	Mixed scrub	Mixed forest	*Prosopis* dominant	Riverine
1.	*Abutilon indicum*	26.38	19.28	0.00	2.03	2.03	0.00
2.	*Achyranthes aspera*	584.42	0.00	0.00	97.40	292.21	1331.17
3.	*Asparagus racemosus*	35.51	4.06	1.01	25.37	0.00	0.00
4.	*Balanites aegyptiaca*	0.00	3.46	0.00	2.02	0.00	0.00
5.	*Bauhinia racemosa*	0.00	0.00	0.00	0.29	0.00	0.29
6.	*Boerhavia diffusa*	0.00	227.27	0.00	519.48	0.00	0.00
7.	*Calotropis procera*	0.00	2.03	0.00	9.13	19.28	0.00
8.	*Capparis cartilaginea*	0.00	6.09	0.00	0.00	0.00	6.09
9.	*Capparis deciduas*	5.07	12.18	2.03	19.28	4.06	0.00
10.	*Cardiospermum halicacabum*	40.58	10.15	15.22	10.15	2.03	4.06
11.	*Cassia auriculata*	6.09	0.00	11.16	26.38	0.00	0.00
12.	*Citrullus colocynthis*	0.00	2.03	0.00	0.00	4.06	0.00
13.	*Clerodendrum phlomidis.*	0.00	0.00	3.04	4.06	0.00	0.00
14.	*Commicarpus verticillatus*	454.55	551.95	324.68	551.95	454.55	324.68
15.	*Commiphora wightii*	8.37	25.97	4.04	14.43	2.31	6.93
16.	*Enicostema axillare*	0.00	292.21	359.12	974.03	551.95	227.27
17.	*Fagonia schweienfurthii*	389.61	616.88	357.14	1850.65	194.81	454.55
18.	*Grewia tenax*	29.42	52.76	15.22	36.53	29.42	8.12
19.	*Indigofera oblongifolia*	0.00	0.00	0.00	8.12	4.06	0.00
20.	*Indoneesiella echioides*	0.00	0.00	0.00	0.00	0.00	162.34
21.	*Lycium barbarum .*	1.01	18.26	0.00	19.28	8.12	5.07
22.	*Maerua oblongifolia*	7.10	10.15	0.00	3.04	5.07	1.01
23.	*Maytenus emarginata*	1.73	0.58	0.00	0.87	0.00	0.00
24.	*Moringa concanensis*	0.00	1.15	0.00	1.73	0.00	4.62
25.	*Pentatropis spiralis*	5.07	20.29	3.04	30.44	16.23	10.15
26.	*Premna resinosa*	63.92	70.01	22.32	41.60	32.47	40.58
27.	*Rivea hypocrateriformis*	0.00	5.07	0.00	6.09	0.00	0.00
28.	*Salvadora oleoides*	6.93	17.89	6.35	12.12	10.10	6.35
29.	*Salvadora persica*	0.00	0.00	0.00	0.00	0.87	1.15
30.	*Sarcostemma acidum*	0.00	0.00	0.00	3.04	0.00	0.00
31.	*Solanum surattense*	0.00	0.00	0.00	64.94	97.40	129.87
32.	*Sterculia urens*	0.00	0.00	0.00	4.33	0.00	1.73
33.	*Taverniera cuneifolia*	0.00	0.00	259.74	129.87	0.00	0.00
34.	*Tinospora cordifolia*	3.04	2.03	0.00	3.04	0.00	9.13
35.	*Tribulus terrestris*	0.00	389.61	844.16	844.16	129.87	259.74
	Total No. of Species	17	24	14	31	20	21
	Shannon Diversity Index	2.31	2.47	2.46	2.94	2.61	2.68

DISCUSSION

Some major works on floristic and ethno-botanical studies carried out by various researcher showed Kachchh district is a rich area in term of floral diversity. Notably, Sabnis and Rao [13] recorded 700 species of flowering plants from the Kachchh region, Rao [14] reported 574 flowering plants from southeastern Kachchh, Bhatt [15] documented 518 flowering plants from western Kachchh, and Shah [2] reported 768 species of flowering plants from the district. The present study recorded 251 species of plants from the study area which is less than one percent of the district geographical area. Many of the plant species were used by people from long period of time of human history for medicinal purpose which was documented in Vedic literature includes; Charak Samhita and Sushruta Samhita [16]. A large number of portions of the country were covered with forests which yielded a number of medicinal plants and these plants were extensively used in Aurvedic system of medicine since many centuries [16]. Some of the scattered work on ethno-medicine of wild plant resource had been done in various parts of Gujarat. Thaker [17] worked on the useful plants of Kachchh and recorded a total of 511 plant species. Apart from the useful plants, many of the medicinal plants from Gujarat and Kachchh district [18-19] and also reported by some workers includes; Vyas [20] documented 46 plant species of medicinal values belonging to 26 families in Kachchh district, Seliya and Patel [21] recorded a total of 30 climbers used as medicinal values from the rural areas of Saraswati river basin of Patan district in North Gujarat, 37 ethno-medicinal plants species documented in Tapkeshwari hill, kachchh [22]. Similar to that, the present study recorded 35 species of ethno-medicinal plant from the Dhinodar Hill situated in the fringe area of Rann of Kachchh. The medicinal plants along with other natural plants of Kachchh district are under threats by various kinds of habitat degradation and exploitation [23].

CONCLUSIONS

The total number of plant species and medicinal species recorded from this study showed that Dhinodhar hill area is a rich area in term of floral diversity and medicinal plant species in spite of being located in an arid zone of the country. This study also recorded one angiosperm plant and two parasitic species showed the importance of the area. This study also recorded some plant species viz; *Commiphora wightii, Capparis cartilaginea, Sterculia urens, Sarcocostemma acidum, Tinospora cordifolia,* having high medicinal values. These species require special attention to conserve for medicinal use of the local community and for commercial exploitation in future. The study reflects that local people using these medicinal plants from long time and they have rich ethno-medicinal knowledge passed down from generation to generation only by oral communications. During the study it was also found that the traditional knowledge regarding to ethno-medicinal are declining day by day due to lack of proper documentation. Therefore, this study highly recommended conservation of medicinal species of this area and documentation of ethno-medicinal knowledge of the local people surrounding the Dhinodar Hill.

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