J. Phytol. Res. **34**(1): 103-110, 2021 **ISSN 0970-5767**

MEDICINAL PLANT LORE OF KOTRA REGION: A TRIBAL DOMINATED AREA OF UDAIPUR DISTRICT, RAJASTHAN (INDIA)

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People of any caste or community in all villages in India who treat different diseases with local plants or "Jari buttis" are known by different names in different areas. But by different literature in the world they are called as tribal doctors, barefooted doctors, tribal medicine man (TMM), and layman practitioners. WHO recognized them as traditional health practitioners (THPs). The tribal people of the study area are mainly depending on plant based medicine or herbal formulations prepared by these traditional health practitioners to treat their various types of ailments and they have full faith. Still these tribals are away from the modern medicine because they are residing in the remote areas. The traditional techniques of preparation of herbal formulations and their methods of treatment are also unique. Therefore, it is important to document this knowledge of these traditional health practitioners before lost forever. By field survey and personal interviews 43 plant species and their formulations used by tribals residing in the Kotra region of Udaipur district were documented. The collected plant species belonging to 30 families and 42 genera, out of which, 10 were endangered, 8 vulnerable and 15 rare. These plant species were used in the treatment of cough, asthma, rheumatism, arthritis, animal bites, external tumors, fever and to treat other common diseases.

Key words: Ethno-medicine, Ethnic people, Gunies, Herbal formulation, Traditional Health practitioner.

Introduction:

Search for external health longevity and to seek remedy to relieve pain and discomfort promoted man to develop diverse ways and means of health care. The early man explored his immediate natural surroundings and tried many things like plants, animals, minerals and developed a variety of therapeutic agents and tonics. Over millennia that followed the most effective agents among them were selected by the process of trial and error empirical reasoning and even after experimentation.

This effort has given in history by the name of medicine. The knowledge gathered by generations was passed on to the posterity and this practice is generally termed as traditional medicine or ethno medicine.

In many eastern cultures as such those of India, China and Arab world this experience was systematically recorded and incorporated into the regular type left system of medicine that developed and became a part of the *'Materia indica'* of the traditional system of medicine of these countries.

The ancient civilization of India, China, Greece, Arabs and others developed their system of medicine in independent of each other and all of them were predominantly plant based. In fact, unconscious selection of plants for use, as drugs probably began even before the dawn of settled civilizations. The traditional systems of medicine are very much alive even today over large plants of the globe.

In India the world health assembly took note of vital role that traditional medicine play in health service, particularly the remote areas and draw attention to manpower reserve constituted by the traditional practitioners (resolution, WHA 29.72). Since about 80 per-cent of the total world's population reside in developing countries, about 64 per-cent of the total population of world utilize plants as drug i.e. 3.2 billion people[1].

Almost all villages in India we can find people of any cast or community who treat different diseases with local herbal plants or "jari buttis". These practitioners are known by different names at different places such as Ojha (Jharkhand), Vaidia (Bihar), Vaidhyaraj (Gujarat), Gunies (Rajasthan), Gaitas (Central India), Uche (Assam) and Danga Bhagat in Maharashtra. But by different literature in the world they are called as tribal doctors, bare footed doctors, herbal doctors, tribal medicine man (TMM), folk healers, folk and lay man practitioners.

The green waves in the utilization of medicinal plants all over the world resulted in higher consumption. But researchers are engaged to unfold the multiple uses of the plants especially to document the folk knowledge about the plants.

Although good attempts have been made by number of scientists in the field of this emerging branch of the botany especially in Rajasthan [2-13]. But the picture is dismal when we turn our attention towards the ethno-medicinal plants and role of traditional health practitioners (THPs) of Kotra a remote areas of Udaipur district. The main object of present study was to document and conserve the treasure of this knowledge of tribals of study area towards the subject.

Materials and Methods:

Study area and dominated tribal community:

Kotra is a southern part of Udaipur district and major tribal dominated area of this district. It is mainly dominated by Bhil, Meena, Garasia Gameti, Damor and few communities of Kathodia tribe. The main occupation of tribals of this area is agriculture, livestock and to collect forest products. It is located between the latitudes 24° N to 24°6'15" N and longitudes 73°E to75°25'80" with an area of 1195.51 sq/km. It is bounded by on its south by Sabarkantha (Gujarat) on the west by Sirohi and on the south-west by Udaipur. The main income source of tribals this area is agriculture, animal husbandry, labour and work on the forest product. Ethnobotanical studies in Rajasthan.

Climate and vegetation:

Kotra is located in the southern part of Udaipur district having different climatic conditions with great fluctuations in the annual rainfall, humidity and temperature. Climate of this area can be broadly classified into four distinct seasons i.e. pre monsoon, the monsoon, post monsoon and winter.

Average rainfall varies throughout the state. The western part consist of desert, receives an average rainfall of 100mm. The south-eastern part receives annual rainfall of 650mm. The state receives maximum rainfall during the month of July to September in monsoon.

Temperature of the state also varies from 25-48^{0}C. Maximum 25-30^{0}C temperature was recorded in the month of January to March whereas it was maximum from 35-45^{0}C, sometimes even 48^{0}C in the month of May to June. The fertile soil of this area

sustains mixed xerophytic and mesophytic vegetation. Cultivated crops are wheat, maize and mustard of this region. Zinger and Chukandar (*Beta vulgaris*) is the main crop of Rabi season.

Data collection:

Ethno-medico-botanical surveys were conducted in the different areas Kotra region to collect intensive information about the medicinal plants folklore uses (Photo.1). The information on folklore uses of plants were elicited with the "traditional health practitioners (THPs)". The data were collected by interviews, observations and participation with the tribals. On reaching a village or locality, report was established with one or two persons. Thereafter contact was made with other tribals of the locality. Two types of interviews were conducted, firstly of individual and secondly with group of individuals. Persons were selected at random on the way or entering in the hut to find of the knowledge of the persons or Gunis or Sadhu or headman or traditional health practitioners (THPs).

The traditional health practitioners were taken in a group of 4-5 persons who were well known to the location of thick forest and pointed out the herbs they used to cure various ailments. The THPs are then interviewed orally on the spot to disclose their knowledge about "Jari Buttis" (medicinal plants). To gain faith and confidence as well as proper exposure of THPs, 10 days camps were also organized by the authors. We also imparted in group discussions with THPs held during these camps because these people discuss more freely in groups rather than individually.

During survey, give and take method was also adopted i.e. if you will share your own knowledge regarding the medicine then they open their mouth to discuss on a particular herb.

The information collected from THPs were cross checked with that of the other THPs. Similarly, an interval interviews and discussions were also repeated with the same THPs to confirm the data. For plant collection a thorough knowledge of various localities in the areas is quite necessary. Besides this, certain precautions should be taken for the protection of body from scorching sun, poisonous plants, and thorns and prickles etc. These safety measures should be taken during survey and collection of plants.

Results and Discussion

As a result of ethno-medico-botanical investigation attempt has been made to collect and compile the information regarding the herbal formulations used by the THPs for the treatment of various diseases in the study area. In the ethno medicinal survey, 42 plants species belonging to 30 families and 41 genera were reported from the study area (Table-1).

It was also noticed that tribals are very particular about the stage at which the medicinal plants to be collected. They suggested that pre flowers, flowering and post flowering stages of plants bear great significance in relation to their medicinal efficacy and drug value changes with time of growth and maturity. They are also particular about the locality of plants in the forest.

Another interesting feature of the mode of treatment of these traditional health practitioners was that they correlate the shape and structure of plants i.e. roots, stem and leaves. They believe that nature has created different plants according to different body organs to treat them. It was also observed that before collecting the plants, the THPs utter prayer to the "Sun" and also to the plants requesting for its efficacy and quick relieve to patient. Secondly, they also believe in treatment of freshly plucked plants.

It was also reported that these tribal people usually don't disclose their knowledge about

the uses of plant wealth except for the medicinal properties of the plant. In general they maintain the secrecy about the use of certain medicine for e.g. medicine of refractive diseases of women, contraceptive and herbs for causing abortion etc. because there is a believe that the medicine will lose their healing power if too many heads know about it. It was important to note that for the treatment of various human ailments, plant used singly or in the combinations of various plants with the mixture of other substances such as water, salts, minerals and jaggery.

Table1. Botanical name, family, local name habit and habitat, disease and herbal formulations.

S.No.	Botanical name	Family	Local name	Locality	Habit and Habitat	Disease	Formulation
1	*Abrus precatorius* Linn.	Fabaceae	Chirmi	Panarwa-Bironthi road	Climber Terrestrial	**Mouth sores**	Leaves chewed and juice taken orally.
						Toothache	Leaf juice dripped in opposite ear.
						Snake bite	Root paste is applied on affected part of bite.
						Throat infection	Shoot is chewed.
						Skin	Root paste is applied on affected part.
						Syphilis	Leaf juice is applied on affected part.
2	*Achyranthes aspera* Linn.	Amaranthaceae	Andhijara	Cosmopolitan	Herb Terrestrial	**Snake bite**	Leaves paste is applied on affected part and juice is taken orally.
3	*Actinopteris dichotoma* Beld	Polypodiaceae	Morpankhee	Ramkunda	Fern Moist soil slopes/ rocks covered with moist soil	**Toothache**	Paste of whole plant is applied on tooth.
						Jaundice	Plant juice is taken orally.
						Burning	Paste is prepared by mixing plant ash and ghee and is applied on affected part.
						Heal cracks	A.wax-100gm, B. Sesamum oil, C. whole plant powder. Mix A, B, C to obtain ointment and use.
4	*Ailanthes excelsa* Roxb.	Simurubiaceae	Adua or Paba	Som-Panarwa road	Tree Terrestrial	**Constipation**	Leaf juice with grinded Rai seeds are taken orally twice a day.
						Tumor	Bark paste is prepared and used external.
						Snake bite	Kathodia (a tribe) used bark juice orally.
5	*Amorphaphallus companulatus* Planch.	Aracaceae	Jangli suran	Ramkunda	Stout herb	**External tumor**	Tuber paste is applied.
						Skin disease	Tuber paste fried with mustard oil to make ointment and used on affected part.
6	*Ampelocissus arnnottiana* Planch	Vitaceae	Khata limbu	Phulwari ki nal	Climber Terrestrial	**Bone fracture**	Root powder is taken with water or eaten fresh root daily for 15 days.
						Uterus dislocation	Root powder is taken orally with water.
7	*Bacopa monnieri* Linn. Penll.	Scrophulariaceae	Brahmi	Ramkunda nala	Creeping herb	**Asthma**	Juice or decoction of whole plant is taken orally twice a day.
						Improve memory	Plant juice of fresh plant is taken daily twice a day
8	*Baliaspermum*	Euphorbiaceae	Dantrior	Phulwari ki	Erect under	**Constipation**	Root decoction is taken

	montanum muell.Arg.		Bironthi	nal	shrub, Terrestrial		
						Tooth-ache	Root juice drop is dripped in opposite ear.
9	*Barleria prionitis* Linn.	Acanthaceae	Penducha mpa	Sandolmata	Under shrub, Terrestrial	**Tooth-ache**	Leaves powder is used as tooth powder
10	*Ceropegia bulbosa* Roxb.	Asclepiadaceae	Khadula	Lohari ki nal	Twinning perennial herb	**Urinary complaint**	Fresh tuber is eaten.
						Scorpio sting	Paste of tuber is applied on affected part.
11	*Celastrus paniculatus* Wild.	Celastraceae	Mal-kangni	Panarwa-Kotra road	Scandent shrub, Terrestrial	**Arthritis**	Two grinded seeds with milk are taken daily twice a day.
						Asthma	Decoction of roasted seeds powder is taken daily twice a day.
						Joint pain	One drop of seed oil with a glass of milk and massage this on affected part of body.
12	*Centella asiatica* Linn.	Apiaceae	Brahmi	Phulwari kin al, Ramkunda	Prostrate herb	**Mental ability**	Known as mental tonic, 4-5 leaves with milk are eaten daily to improve memory.
						Paralysis	Whole plant powder with milk is taken daily.
13	*Citrulus colocynthis* Schard.	Cucurbitaceae	Adarana	Lohari ki nal	Climber, Terrestril	**Stomatitis**	Root powder with two cup of butter milk or fruit pulp powder with water is taken twice a day
						External tumor	Root paste is applied on tumor.
						Piles	One inch of fresh root is chewed daily.
						Ear-ache	One to two drops of fruit pulp juice are used in ear.
						Dog bite	Fresh root juice is taken orally.
14	*Corallocarpus epigaeus* Benth ex. Hook.	Curbitaceae	Mirchiak and	Kotra-Dewla road	Herb, Terrestrial	**Snake bite**	Root paste is applied on bite place and a piece of root equivalent to size of maize grain is taken orally.
						Rheumatism	Root powder with water is taken orally twice a day.
						Pneumonia	Small piece of fresh root with jaggery is chewed.
						Typhoid/Diabetes	Fresh root pieces are eaten daily. **Note root is poisonous thus use in very small quantity**.
15	*Costus speciosus* (Koen) Sm.	Zingiberaceae	Vailakadi	Ramkun, Phulwari ki nal	Herb with horizontal rootstock	**Rheumatism**	Root powder with milk is taken twice a day daily.
						Jaundice	One teaspoon root powder with milk is taken
16	*Curculigo orchiodes* Gaerth.	Amarylliadaceae	Kali musli	Ramkunda, Phulwari ki nal	Stemless seasonal herb	**Diarrhoea/ Leucorhoea**	Fresh root juice is taken orally.
						Urinary complaint	Decoction of root is taken for 3 days daily.
						Piles	Light cooked root is eaten then drink milk twice a day daily.
						Snake bite	Root paste is applied on bite place and small piece of fresh root is eaten.
17	*Cymbopogon*	Poaceae	Rohish,	Ogna road	Aromatic	**Jaundice**	Flowers are grinded with

	*martini*i (Roxb.) Wats.		Bironthi		grass, Terrestrial		water to prepare flower juice which is taken orally.
						Urinary complaint	Decoction of root is taken twice a day.
18	*Desmodium gangeticum* Dc.	Fabaceae	Shalarparni	Phulwari ki nal	Herb, Terrestrial	**Diarrhoea**	Fresh root juice is taken once a day.
						Cough	Root decoction is taken twice a day.
19	*Dioscorea bulbifera* Linn.	Dioscoreaceae	Areethave	Panarwa-Kotra road	Herb climber with tuberous root	**Jaundice**	Root powder with water is taken daily twice a day.
20	*Dioscorea pentaphylla* Linn.	Dioscoreaceae	Kanda	Bedadhar	Climber with tuberous root.	**Food**	Kathodia tribe eat fresh pieces of boiled tubers as food
21	*Elytraria acaulis* (L.f.) Lindau	Acanthaceae	Sotnuli	Someghata	Herb, Terrestrial	**Diarrhoea**	Fresh root juice is taken once a day.
						Leucorhoea	Whole plant juice is taken daily.
22	*Ensete superbum* (Roxb.) Cheesman	Musaceae	Jangli kelo	Sandol mata, Ramkund	Herb, grows in hilly tracks.	**Birth control**	Two spoon root juice is taken during menstruation.
23	*Enicostemma hyssopyfolium* Linn.	Gentiniaceae	Naami or Navli	Panarwa-Bironthi road	Herb, Terrestrial	**Malaria**	Powder is prepared from whole plant and one teaspoon taken orally with water.
						Irregular menstruation	Decoction of fresh plant is prepared and taken orally once a day.
24	*Eulophia campestris* Wall.	Orchidaceae	Salam misri	Kamalnath	Herb, grows in moist shady places	**Debility**	One teaspoon dry powder of tuber is taken with milk.
						Bone fracture	Tubers paste is applied externally on fractured part of body.
						Leucorrhoea	One teaspoon tubers powder with milk is taken twice a day.
25	*Euphorbia acaulis* Roxb.	Euphorbiaceae	Dudhiya	Ramkunda	Herb, grows in moist shady places in creeping form	**Snake bite**	Root paste is applied on bite place.
26	*Ficus glomerata* Roxb.	Moraceae	Gular	Kamalnath	Tree, Terrestrial	**Urinary complaint**	Pills of latex is prepared with jaggery and use twice a day daily.
27	*Gloriosa superba* Linn.	Liliaceae	Kalihari	Bedathar, Mahad	Herb, Climber with tuberous root stock. Terrestrial	**Snake bite**	Paste of whole plant is applied on bite place.
						Abortion	Tuber paste is applied on navel of women. **Note-Root is highly poisonous**.
28	*Haldina cordifolia*.(Roxb.) Ridsd.	Rubiaceae	Haldu	Phulwari ki nal	Tree, Terrestrial	**Tooth-ache**	Leaves bud juice drop is dripped in opposite ear and paste is applied on tooth.
						Migraine	One drop of freshly prepared juice is dripped in nasal.
29	*Helicteris isora* Linn.	Sterculiaceae	Atedee	Ramkunda	Shrub, Terrestrial	**Stomach-ache**	One teaspoon pods powder is taken orally with water once a day.
30	*Hemidesmus indicus* R.Br.	Asclepiadaceae	Kabri, Dudhee	Lohari ki nal	Climber, Terrestrial	**Migraine**	Freshly prepared root juice is applied in form of a thin layer on forehead once a day and remain for 2 to 3 hrs. then wash.

31	*Heteropogon contortus* Roem. and Schult.	Poaceae	Lapia	Mahad village	Grass, Terrestrial	**Urinary complain**	One teaspoon flower decoction is used once a day daily.
32	*Leea indica* (Burm.f.) Merrill.	Vitaceae	Choti hathni or Morpago	Ramkunda	Shrub, grows in moist shady places.	**Dysentery**	Root juice is taken orally once a day.
33	*Leptadenia reticulata* (Retz.) Wt. & Arn	Asclepiadaceae	Bhatta Dodee	Kamallnath	Twinning shrub, Terrestrial.	**To induce milk in women**	Boiled leaves and pods are eaten as vegetable.
						Leucorrhoea	One teaspoon root powder with water is taken once a day.
34	*Maerua arenaria* Hook.f.&Th.	Cappariadaceae	Jethivela, Bironthi	Ramkunda	Climber, Terrestrial	**Snake bite**	Freshly prepared root paste is applied on bite place and one teaspoon powder is taken orally.
						Cough	Fresh root pieces are chewed.
35	*Ocimum gratissimum* Linn.	Lamiaceae	Damano	Kamalnath	Herb	**Diarrhoea**	One teaspoon seed powder mixed with curd and taken orally once in a day.
36	*Ocimum americanum* Linn.	Lamiacea	Bhut bhangro	Panarwa-Kotra road	Herb	**Leucorrhoea / Urinary complaint**	Seed powder mixed with sugar crystal (mishri) with milk is taken orally.
37	*Oroxylum indicum* Vent.	Bignoniaceae	Farrahor Teetu	Jhadol Som road, Som ghata	Tree, Terrestrial	**Asthma/Sto mach-ache**	One teaspoon stem bark powder with water is taken twice a day.
						Snake bite	Freshly prepared root paste is applied on bite place.
38	*Phyllanthus niruri* Linn.	Euphorbaiceae	Bhui amla	Jadol Som road	Herb, grows in moist open places	**Jaundice**	Whole plant powder is prepared from which one teaspoon powder with milk is taken once in a day daily.
39	*Plumbago zeylanica* Linn.	Plumbaginaceae	Chitraval	Ogna road	Under shrub, Terrestrial	**Ringworm or eczema**	Freshly prepared root paste is applied on affected part.
						Migraine	Thin layer of freshly prepared root paste is applied on fore head.
40	*Pueraria tuberose* Dc.	Fabaceae	Modikan d or Godvelo	Phulwari ki nal	Climbing shrub, grows on moist places	**Sexual debility**	One teaspoon root powder with milk is taken twice a day.
						Rheumatism	Freshly prepared root paste is applied.
41	*Sarcostemma acidum* Voigt.	Asclepiadaceae	Shambha rvel	Gujri ki nal	Scandent climber, grows in crevices of rocks	**Burning sensation of body**	Shoot juice is taken orally twice a day.
42	*Viscum album* Linn.	Loranthaceae	Vaohakal	Phulwari ki nal	Shrub	**One fracture and Arthritis**	One teaspoon whole plant powder with milk is taken twice a day.

Curcuma aromatic

Costus speciousus

Dioscorea bulbifera

Enesete superbum

Threatened ethno-medicinal Plants species of Kotra region: Endangered (E) plant species

Abrus precatorius	*Gloriosa superb*
Centella asiatica	*Hemidesmus indica*
Corallocarpus epigaeus	*Leptadenia reticulata*
Costus speciosus	*Oroxylem indica*
Eulophia campestris	*Plumbago zeylanica*

Vulnerable (V) plant species

Bacopa monnieri	*Helicteris isora*
Barleria prionitis	*Ocimum gratissimum*
Curculigo orchioides	*Sarcostemma acidum*
Euphorbia acaulis	*Viscum album*

Rare (R) plant species

Amorphophallus companulatus	*Dioscoria bubosa*
	Dioscoria pentaphylla
Ampelocissus arnottiana	*Enicostemma hyssopifolium*
Baliospermum montamum	*Emsete superbum*
Ceropegia bulbosa	*Haldina cordifolia*
Celastrus paniculata	*Leea indica*
Citrullus colocynthis	*Maerua arenaria*
Desmodium gagenticum	*Pueraria tuberosa*

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