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## Ethnobotanical studies on medicinal plants in Hadoti region of Rajasthan

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### Abstract

The present study highlights the importance of ethno-medicinal plants from different regions of Rajasthan. Detailed survey had been conducted in four districts (Kota, Bindi, Jhalawar and Baran) of Rajasthan mostly Hadauti region and the information regarding the use of medicine were collected on the basis of frequent interviews with local physicians practicing indigenous system of medicine, villagers, priests and tribal folks. The plants were identified by using standard monographs and flora. Some past researchers also quoted uses of ethano-botanical plants in diseases sever curing like cancer, diabetes, AIDS, skin disease and depression etc. This study is focused to provide an effective knowledge of medicinal properties of selected plants, so that this will be a pave way to cure diseases by herbal medicines without any side effect. Medicinal plants have great importance in providing health care to about 80% of the population in India. Plants have been an important source of precursors and products used in a variety of industries, including those of pharmaceuticals, food, cosmetics and agrochemicals. Gradually the folk medicines led to the rise of traditional system of medicine like Ayurveda in India. In Rajasthan (India), tribals are using herbal medicine for long time.

**Keywords:** Ethnobotany, tribals, indigenous system, folk medicinal plants, folklore

### Introduction

Rajasthan is one of the largest states of India. About 12.44% of the population belongs to tribes such as the Bhil, Bhil-Meena, Damor, Dhanka, Garasia, Kathodi, Kokna, Kolidhor, Naikara, Patelia, Meena, and Seharja and reside in remote areas devoid of basic infra-structure facilities. Nomadic tribes (Banjara, Gadolia- Lohar, Kalbelia, Sikligar, Kanjar, Sansi, and Bagri) further enrich the ethnic heritage of Rajasthan. These ethnic groups are widely distributed throughout the state and have considerable communication with each other. As a result, most of the ethnobotanical information is passed by one group to the other. Sharma (1968-69) [20] enlisted 248 botanical drugs which are mentioned mainly in Atharvaveda and Rigveda. Published a glossary of such medicinal plants, which have been mentioned in Charak Samhita, Sushurta Samhita and Ashtanga Hridayam. In ayurvedic system of medicines a large number of plants are employed for the treatment of several diseases like Alzheimer's disease, AIDS, cancer, depression, nervous disorders, diabetes, rheumatism, leprosy, skin disease, urinary stone track. Rajasthan has rich biodiversity consisting of a large number of plants, some of which are used for their medicinal value. The herbal medicines used in Rajasthan (India) *Datura metel* L., *Eclipta alba* L., *Embllica officinalis* Gaertn, *Eugenia jambolana* Lam., *Ficus benghalensis* L., *Gloriosa superba* L. and *Kyllinga Monocephala* Rottb.

Although, flora of Rajasthan has been compiled by Bhandari (1990) [2] and Sharma (1993) [14] but detailed information about their medicinal properties are lacking. The present review highlights the importance of ethno medicinal plants from four districts of Hadoti (Bundi, Baran, Kota and Jhalawar) with following objectives:

### Objective

1. To conduct floristic survey of ethno-medicinal plants used by tribal community of *Hadoti region* of Rajasthan.
2. To study cultivation practice of ethno-medicinal plants used by tribal community.

### Materials and Methods

The survey was conducted in four districts in Rajasthan mostly hadauti region and the information regarding the use of medicine. The plants were identified by using standard monographs and flora (Bhandari, 1990; Sharma, 1993) [2, 14] Ethno medicinal information about the plants was collected on the basis of frequent interviews with local physicians practicing indigenous system of medicine, villagers, priests and tribal folks.

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Though ethnobotany provides several approaches in plant researches, here only the resources which help in aspect of medicinal plant-research are mentioned.

### Archaeological resources

India has a rich treasure of archaeological sculptures of antiquity, which can be of great value in tracing the plants which were used during early civilization. Sithole (1976) described about 40 such plants from bas relief's on the gateways of the Great Stupa at Sanchi and the railing of Bharhut tupa, belonging to the first and second century B.C., respectively.

### Literature resources

Our ancient literature can also be tapped for information on medicinal plants. No authentic record of any kind except a few archaeological sculptures of Mohenjo-Daro is available from the prevedic period in this country. But, Rigveda and Atharvaveda, which date back to 2000 to 1000 B.C. which are our oldest Vedic literature resources, contain valuable information regarding medicinal plants of that period. Sharma (1968-69) <sup>[20]</sup> enlisted 248 botanical drugs which are mentioned mainly in Atharvaveda and Rigveda. Utilization of plants for medicinal purposes in India has been documented in ancient literature mainly in Atharvaveda and Rigveda also enlisted by Sharma (1968-69) <sup>[20]</sup> because they are essential to human survival (Panghal *et al.*, 2010) <sup>[22]</sup>. Plants and their products have also been systematically used in other Asian countries like Sri Lanka for treating illnesses for over a thousand years (Napagoda *et al.*, 2018) <sup>[21]</sup>.

### Herbarium resources

Herbarium sheets and field notes have also proved to be a good source of ethnobotanical data. The most outstanding example of this type of research is of Dr. Altschul, who searched about 2.5 million plant specimens in Harvard University Herbarium and from these 5, 178 useful notes of drugs and food value were recorded (Altschul, 1973) <sup>[1]</sup>.

### Field resources

(Write about Questionnaire) The plants have become the

never ending source for new biodynamic compounds of potential therapeutic value. Ethnobotanist brings out from the field the suggestion as to which raw plant material may be tapped and for this, he gets clues from the tribals. A number of medicinal plants employed in common ailments are listed in Table 1.

### Ethnobotanical studies on some important herbal medicines of Rajasthan (India)

The term "Ethnobotany" is not new even to India, Kirtikar and Basu (1935) <sup>[9]</sup> stated", the ancient Hindus should be given the credit for cultivating what is now called ethnobotany". According to Schultes (1962) <sup>[13]</sup>, ethnobotany is "the study of the relationship which exists between people of primitive societies and their plant environment". There are several methods of ethnobotanical research and those relevant to medicinal plants are archaeological search in literature, herbaria and the field studies. "Man, ever desirous of knowledge, has already explored many things, but more and greater still remains concealed; perhaps reserved for far distant generations, who shall prosecute the examination of their creator's work in remote countries and make many discoveries for the pleasure and convenience of life."

The above quotation of Linneaus is the most appropriate to this review which deals with the relationship between medicinal plants and the total filed of ethnobotany. Ethnobotany, is totality, is virtually a new field of research, and if this field is investigated thoroughly and systematically, it will yield results of great value to the ethnologists, archaeologists, anthropologists, plant-geographers and pharmacologists etc. Basic quantitative and experimental ethnobotany includes basic documentation, quantitative evaluation of use and management and experimental assessment (Choudhary *et al.*, 2008) <sup>[3]</sup>. It has been realized all over the world that much valuable knowledge about uses of plants including medicinal uses is still endemic among many tribal or rural human societies. The ayurvedic system of medicine not only provides cure for a large number of general and chronic diseases but it also strengthens the inner body strength.

**Table 1:** Showing the use of plants in different diseases and secondary metabolites released from the medicinal plants

S. No.	Common Name	Botanical Name	Place of Origin	Plant Part Used	Disease Name	Secondary Metabolites Released
1	Safed Musli	<i>Chlorophytum borivilianum</i>	Tropical and Subtropical Zones of Africa	Tuber, Leaves, Seeds	Rheumatism, Male impotency, oligospermia, Delaying Ageing process, Lactation in nursing mothers, Diabeties, Used as expectorant, Obstruction of the urine	Fructo-oligosaccharide Steroids Saponins (Furostanol) Potassium, Calcium Phenol
2	Ashawgandha	<i>Withania somnifera</i>	Mediterranean region and Northern Africa	Roots	Anxiety and depression, Chronic stress, Parkinsons Inflammation, Immunomodulation	Alkaloids (ashwagandhine) Steroidal Compounds (withaferin A, withanolides A-Y) Saponins Ducitol
3	Jungle Jalebi	<i>Pithecellobium dulce</i>	Pacific coast, Mexico	Bark Leaves seeds	Gum ailments, Toothache, chronic diarrhea, Tuberculosis, Open wounds, Ulcers, Leprosy, Diabetes, cancer	Flavonoide, Glycosides (Quercitin), Dulcitol, afezililn, Glutamic acid, Polysterol quinoids
4	Arjuna	<i>Terminalia arjuna</i>	Indian Peninsula	Stem Bark Root bark Fruits Leaves	Stress Induced Heart problems, Cronic, Respiratory Disorders, Urinary Tract infection, High cholesterol (LDL), Fractured, Bones Harmonal imbalance, Obesity, Tonic for Rejuvenation, Deobstrunt Earache	Tannin Coenzyme-Q10 Triterpenoids (Saponins) Phytosterols Calcium Magnesium Zinc Copper Glycosides
5	Amrita / Giloe	<i>Tinospora cordifolia</i>	South Asia	Shoots Roots Whole plant	Diabetes Fever Hepatic, Amoebiasis Respiratory tract infections negative side effects of radiation therapy AIDS, Cancer, Ulcers Rheumatoid arthritis, Mental disorders, Neurological disorders, Liver disorder	Alkaloids (tinosporin) tetrahydropalmitine Clerodane derivatives Diterpenoids Sesquiterpenoids alphatic Glycosides Lectones
6	Vajradanti	<i>Barleria prionitis</i>	Tropical Asia	Aerial parts	Fever, Toothache, Inflammation, Gastrointestinal	Beta-Sitosterol, Barlerin,

		Linn.		Bark Roots Leaves Flower	disorders, Expectorant, Tonic, Anti-Nociceptive	Potassium, Acetylbalerin, Barlenoside, tannin, Carbohydrates
7	Kali Musli.	<i>Curculigo orchioides</i> Gaertn	India	Roots Rhizome Leaves	Aphrodisiac, Improves Sperm counts, Jaundice, Pain in Joints, Cancer, Diabetes, Tissue rejuvenating, Physical Strength Respiratory Disorders Skin Diseases	Curculigoside A, B, C, D Curculigine A, D Curculin C Saponin Sitosterol Alkaloidal Lycorine
8	Adoosa, vasaka	<i>Adhatoda vasica</i>	India	Leaves Roots Young plants	Asthama, allergic bronchitis, wound healing Cholagogue, Abortifacient, cardio vascular diseases, tuberculosis.	Alkaloids (Vasicine, Vasicinolone, vasicol), Flavonoids (Apigenin, astragaline Vitexin) Quinazolin.
9	Sahanjana	<i>Moringa oleifera</i>	Asia	Leaves flower Pods Roots Gum Seeds	Cardiac tonic, Paralytic afflications, Rheumatism, Kidney Diseases, Piles, Sour Throat, scurvy, Glandular swelling, earches, dental caries, enlargement of spleen.	B-carotene, Zeatin, Caffeoyquinic acid, Kaempferol, glucurmic Acid, Isoquercitrin, Niazimicine, Campestanol .
10	Kaith	<i>Feronia lemonica</i>	India Srilanka	Roots Leaves Stembark Fruits gum	Sore Throat, sting and bites of Insects, dysentery, snakebite, menorrhagia	Stigmasterol, Friedelin, B-sitosterol, Bergapatn, xanthotoxin, Scopoletin, Isoimperatorin, Osthol
11	Dyers' oleander, Sweet Indrajao	<i>Wrightia tinctoria</i>	India and Myanmar	Leaves Stem Bark Seeds	Jaundice, Malaria, Psoriasis, Skin diseases, Carminitive Aphrodisiac, Stomach Disorders Eczema, Antidote for snake Poison, Epilepsy, Piles, Diabetes.	Indigotin, Indirubin, Tryptanthrin B-amyryn, Wrightial, Rutin, Indigotin, campesterol Ursolic Acid, Oleonic acid
12	Bael	<i>Agele marmelos</i>	India	Leaves Roots Fruit Flower	Fever, Expectorant, inflammation Palpitation of Heart.loss of Appetite, Dysentery, Diabetes, Brain tonic, Inflammation of Rectum, Cholera, Intestinal Parasites,	Ethyl cinnamamide, P-cymene, Marmelosin, Marmesin, Alloimperatorin, Tannins, arabinose, flavones`

Generally, wasteland plants are called as weeds and said to be unwanted and undesirable plant species. On the contrary as suggested by 'Ayurveda' has said, "No plant of this world is useless". In ayurvedic system of medicines a large number of plants are employed for the treatment of several diseases like Alzheimer's disease, AIDS, cancer, depression, nervous disorders, diabetes, rheumatism, leprosy, skin disease, urinary stone track diseases, hepatic diseases, diseases of digestive system, malaria and paralysis. The World Health Organization estimates that about 80% of the population of most developing countries relies on herbal medicines for their primary health care needs.

About 610 species of medicinal plants have been used by 42 lakhs population of tribals of Rajasthan (Singh and Pandey, 1998) [18]. Rajasthan, where 80% of its people live in the rural areas and cannot afford costly medicine. They depend on vegetation surrounding them and make perfect uses of them for their medicinal needs. A floristic survey of ethnomedicinal plants occurring in the tribal area of Rajasthan was conducted to assess the potentiality of plant resources for modern treatments. A large number of medicinally important tree species are present on Aravalli hill range and other areas including less hospitable North-West Rajasthan. An attempt was made to characterize tree species of the region and detailed ethnobotanical studies on them are in progress. In a floristic survey, 61 ethnomedicinal plant species belonging to 38 families were recorded from Aravalli hills of Mewar region of Rajasthan (Katewa *et al.*, 2004; Katewa, 2009) [7, 8]. Ethno medicinal uses of biodiversity from Tadarh-Raoli wildlife sanctuary of Rajasthan was reported by Jain *et al.* (2007) [5]. Ethnobotanical survey of Sariska and Siliserh regions from Alwar district was reported by Jain *et al.* (2009) [6]. A categorical list of plant species along with their plant part/s used and the mode of administration reported to be for effective control in different ailments.

The tribals who depend on forest (mostly their surrounding vegetation) wealth are the real custodians that safeguard the medicinal plants till now. Rapid deforestation caused by over-harvesting and exploitative trade of medicinal plants has significantly reduced the availability of the medicinal plants in arid and semi-arid region of Rajasthan (Singh and Pandey, 1980) [17]. Generally the folk people are well acquainted with the medicinal properties of their surrounding vegetation particularly for their well being (Mishra and Kuamr, 2001) [12]. It is traditionally used as food and medicine. (Singh *et al.*, 2007) [16] Now a days, natural products and herbal medicines have been recommended for the treatment of diabetes (Gupta and Kumar, 2002) [4]. Over 50 plants are present in arid zone of Rajasthan having anti diabetic potentials (Menghani and Ojha, 2010) [11]. In Dang region of Rajasthan, 36 plants species are used as cooling agents during summers (Sharma and Khandelwal, 2010) [15]. An extensive survey of southern part of Rajasthan including Chittorgarh, Udaipur, Banswara and Dungarpur districts was made to document the traditional knowledge of medicinal plants used by tribal communities (Meena and Yadav, 2010) [10].

The tribals who depend on forest (mostly their surrounding vegetation) wealth are the real custodians that safeguard the medicinal plants till now. Rapid deforestation caused by over-harvesting and exploitative trade of medicinal plants has significantly reduced the availability of the medicinal plants in arid and semi-arid region of Rajasthan for sustainable development; *in-situ* strategy of conservation is needed.

## Results and Discussion

According to WHO report, several diseases of modern times are generally life style diseases. Medicinal plants have great importance in providing health care to about 80% of the population in India. Plants have been an important source of

precursors and products used in a variety of industries, including those of pharmaceuticals, food, cosmetics and agrochemicals. The continuing search for new drugs has seen researchers looking to the natural world for potential products. On the other hand the traditional medicines are enjoying an upsurge in popularity because of their low or no residual toxicity. Initially the plants are the main part of folk medicines. Gradually the folk medicines led to the rise of traditional system of medicine like Ayurveda in India. In Rajasthan (India), tribal's are using herbal medicine for long time. According to our research all 12 plants are important to cure various diseases as like: rheumatism, diarrhea, tuberculosis, joint pain, cancer, dysentery, malaria, Diabetes, Skin diseases, scurvy, Respiratory Disorders, Asthama and Bones Harmonal imbalance as given in table: 1. These 12 plants are frequently used by tribal but some are still untouched by modern medical science. Although earlier researchers was conducted research in Pratapghar Tehsil of Rajasthan to survey ethanobonaical plants but plant properties are still not analyzed till today.

The present research highlights useful ethno botanical information about the uses of plants by the tribal's communities of Rajasthan. Efforts should be made to conserve the ethno medicinal plants. The plant parts used in various ailments, so ecological monitoring is the essential methodology for the conservation of biodiversity in Hadoti region. Hadoti is a rich area in biodiversity but ever-changing climatic conditions affecting growing area and natural habitats. This is an attempt to avoid probable consequences in future and to elevate these important plants to stand in endangered species in future.

### Conclusion

This is the first research ethno botanical survey in Hadoti Region, all 12 medicinal plants belonging to different Families. The medicinal plant resources of the region are diminishing due to over exploitation of certain species, illegally trading, laying of roads and other developmental works (that causes destruction of their habitats). The present study signifies the necessity of the scientific validation of herbal remedies. This will not only provide recognition of this undocumented knowledge but will also help in conservation of such rare, gradually vanishing important medicinal plants. These highly valuable findings require further research, while the efficiency of the various medicinal plants will need to be subjected to functional and molecular validation. Finally, this study documented the use of plant products by a people in a little known region of India.

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