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Full Length Research Paper

Ethnobotanical studies on medicinal plants of Rajasthan (India): A review

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Ethnobotany is a distinct branch of natural science dealing with various aspects such as anthropology, archaeology, botany, ecology, economics and medicine, religious, cultural and several other disciplines. Recently, great interest in the above given studies of herbal drugs and traditional remedies is indicated world wide and there has been an upsurge in the scientific investigations in this area. The present review highlights useful ethnobotanical information about the uses of plants by the tribals of Rajasthan as food, fodder, medicine, timber, fire-wood, tannin, dye, oil, fibre, alcohol, gum, resin etc. This folk wisdom, if subjected to scientific studies, could benefit humankind in many ways.

Key words: Ethnobotany, tribals, indigenous system, folk medicinal plants, folklore.

INTRODUCTION

The term "Ethnobotany" was coined by J. W. Harshberger in 1895 to indicate plants used by the aboriginals: From "ethno"-study of people and "botany"-study of plants. Ethnobotany is considered as a branch of ethnobiology. It deals with the study and evaluation of plant-human relations in all phases and the effect of plant environment on human society. 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) are shown in Figure 1.

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 Seharia 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.

Although, flora of Rajasthan has been compiled by Bhandari (1990) and Sharma (1993) but detailed information about their medicinal properties are lacking. The present review highlights the importance of ethno medicinal plants from different regions of Rajasthan.

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MATERIALS AND METHODS

Detailed survey has made in all districts in Rajasthan and the information regarding the use of medicine has been documented (Figure 2). The plants were identified by using standard monographs and flora (Bhandari, 1990; Sharma, 1993) 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. 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

Figure 1. Figure showing the herbal medicines used in Rajasthan (Indian). (A) Bark of Terminalia arjuna (Arjun),(B) Bark of Bauhinia veriegata (Kachnar), (C) Dried rhizomes of Curcuma longa (Haldi), (D) Dried rhizomes of Zingiber officinale (Sonth), (E) Barleria prionitis and (F) Bacopa monnieri.

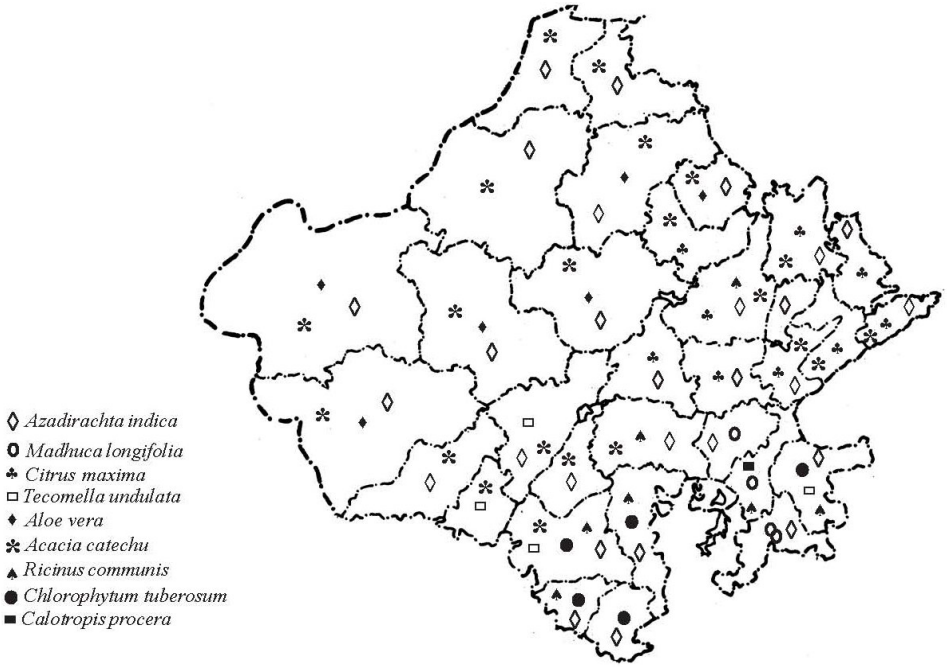

Figure 2. Map showing the distribution of medicinal plants in various districts of Rajasthan.

Table 1. Showing some of the important Indian treatises.

S/No.	Indian treatises	Authors	Dates	No. of medicinal plants included
1.	Pre- Vedic period:		ca 3000 –2000 B.C	-
2.	Vedic period: Rigveda and Atharvaveda		ca 2000 – 1000 B.C.	148
3.	Post- Vedic period:			
	Charaka Samhita	Charaka	100 A.D	400-450
	Bower's mss (Navanitakam)	?	350-375 A.D.	-
	Sushruta Samhita	Sushruta	800-900 A.D.	573
	Ashtanga Hridiyam Samhita	Vagbhatta	ca 700 A.D.	700-800
	Ratnamala	Madhava	700 A.D.	-
	Dravyaguna Sangrah	Chakrapani Dutt	1060 A.D.	-
	Dhanwantri Nighantu	Mahendra bhogick	?	373
	Shodal Nighantu	Shodal	1200 A.D.	499
	Madan Pal Nighantu	Madan Pal	1374 A.D.	-
	Raj Nighantu	Narhari	1600 A.D.	750
	Bhava Prakash Nighantu	Bhava Misra	1600 A.D.	-
	Rajballabh Nighantu	Rajballabh	1760 A.D.	-
4.	Modern Period:			
	Indian Medicinal Plants	Kirtikar and Basu	1935	1775
	Glossary of Indian Medicinal Plants	Chopra et al.	1956	above 3500

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) enlisted 248 botanical drugs which are mentioned mainly in Atharvaveda and Rigveda. Singh and Chunekar (1972) published a glossary of such medicinal plants, which have been mentioned in Charak Samhita, Sushurta Samhita and Ashtanga Hridiyam.

Perhaps the outstanding example, at least in modern times of the use of the literature is the huge compilation of all anti-tumor plants, cited in old texts and local folk medicine from all over the world for screening purpose at Cancer Chemotherapy National Service Center (CCNSC). Recently, checklists of Ayurvedic and Yunani treatises have been published. A list of some of the important Indian treatises is presented in Table 1.

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).

Field resources

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 wild plants employed in common ailments are listed in Table 2.

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

The term "Ethnobotany" is not new even to India, Kirtikar and Basu (1935) stated", the ancient Hindus should be given the credit for cultivating what is now called ethnobotany". According to Schultes (1962), 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 stillremains 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). It has been realized all over the world that much valuable knowledge about uses of plants including medicinal uses

Table 2. Showing wild medicinal plants to cure various ailments.

S/No.	Ailments	Plant used
1.	For wounds and as disinfectant	*Panicum anidotale, Artemisia maritima*
2.	Bronchisl troubles	Bulbs of *Urginea indica*
3.	Blood purification and promoting lochial discharge	*Mollugo cerviana*
4.	Urinary troubles	*Glinus lotoides*
5.	For swellings	Root paste of *Corallocarpus epigaeus,*
6.	As tonics	*Neurada procumbens* and *Colchium luteum*, seeds of *Mimosa hamata* root of *Asparagus recemosus*
7.	Pneumonia	*Achyranthus aspera*
8.	Diarrhoea	*Podophyllum hexandrun*; *Salvia aegyptiaca*
9.	Chest pain	*Cuscuta hyalina*
10.	Rheumatism	*Carum carvi, Inula racemosa*
11.	Gastritis and fever	*Achillea millaefolia*
12.	Spleen disorders	*Capparis spinosa*
13.	Hyperacidity	*Nepeta lingibracteata*
14.	Skin diseases	*Ranunculus hirtellus*
15.	Conjunctivitis	*Thalictum minus*

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.

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 (Gupta et al., 2010).

About 610 species of medicinal plants have been used by 42 lakhs population of tribals of Rajasthan (Singh and Pandey, 1998). 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 ethnomedicianl plant species belonging to 38 families were recorded from Aravalli hills of Mewar region of Rajasthan (Katewa et al., 2004; Katewa, 2009). Ethnomeicinal uses of biodiversity from Tadgarh-Raoli wildlife sanctuary of Rajasthan was reported by Jain et al. (2007). Ethnobotanical survey of Sariska and Siliserh regions from Alwar district was reported by Jain et al. (2009). 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 is prepared (Table 3).

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 (Srivastva, 1977; Singh and Pandey, 1980). Some medicinally important trees of Rajasthan are listed in Table 4. Generally the folk people are well acquainted with the medicinal properties of their surrounding vegetation particularly for their well being (Mishra and Kuamr, 2001). Some folk-lore claims with their related data are presented in Table 5. Kheep (*Leptadenia pyrotechnica*) is a widely distributed shrub in western Rajasthan. It is traditionally used as food and medicine. (Singh et al., 2007) Nowadays, natural products and herbal medicines have been recommended for the treatment of diabetes (Gupta and Kumar, 2002). Over 50 plants are present in arid zone of Rajasthan having anti diabetic potentials (Menghani and Ojha, 2010). In Dang region of Rajasthan, 36 plants species are used as cooling agents during summers (Sharma and Khandelwal, 2010). 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).

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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

Table 3. Ethnomedicinal plants of Rajasthan, India.

Name	Family	Local name	Official organ	Medicinal Properties	How administered	Ailment	Tribe
A. indica	Meliaceae	Neem	Leaves		Poultice locally	Snakebite and scorpion sting	Sahariya, Bhil, Kalbelia, Meena
C. procera	Asclepiadaceae	Arka, Aak	Roots		Applied locally	Scorpion sting	Kalbelia, Garasia
A. catechu	Mimosaceae	Khair	Bark, flower tops	Antiinflamatory	Juice + asafoetida	Gonorrhoea	Sahariya
T. undulata	Bignoniaceae	Rohida	Bark, branch	Antiseptic	Chewed	Syphilis	Bhil, Garasia
A. barbedensis	Liliaceae	Gwarpatha	Leaves	-	Orally	Sexual vitality	Garasia, Bhil
R. communis	Euphorbiaceae	Erand	Seeds	Anti-fertility	Oil, locally	Birth control	Meena, Sahariya
D. metel	Solanaceae	Kannkak	Leaves	Sedative cerebral depressant	Extract orally, extract locally	Cure insunity, cerebral complications	Sahariya, Bhil

Table 4. Some medicinally important trees of Rajasthan.

Local name	Botanical name	Family	Part used	Medicinal uses
Kesudo	*Cassia occidantalis*	Caesalpiniaceae	Leaves	Skin diseases.
Amaltas	*Cassia fistula*	Caesalpiniaceae	Fruits	Laxative
Imli	*Tamarindus indica*	Caesalpiniaceae	Fruits	Laxative, general fever
Asundro	*Bauhinia racemosa*	Caesalpiniaceae	Stem, Leaf	Dysentery, malaria, headache.
Samrsro	*Delonix elata*	Caesalpiniaceae	Leaf	To alleviate flatulence and reumatism
Phalas	*Buea monosperma*	Fabaceae	Gum, Seeds	Anthelmintic, blood pressure
Sisham	*Delhergia sissoo*	Fabaceae	Stem	Blood dysentery, Gonorrhoea
Karanj	*Derris indica*	Fabaceae	Whole plan	Ulcers, bleeding piles, Beri, Leucoderma, bronchitis.
Babul	*Accia nilotica*	Mimosaceae	Leaf, stem	Toothache
Urajio	*Acadia leucophloea*	Mimosaceae	steam (bark)	Local swelling
Pardesi amli	*Pithecellohim*	Mimosaceae	Stem (bark)	Anermia
Khejari	*Prosopis cineraria*	Mimosaceae	Leaf, seed stem	Skin diseases.

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), tribals are using herbal medicine for long time. The present

Table 5. Showing folk-lore claims with their related data.

S/No.	Botanical name and family	Tribal name of plant	Part used	Mode of administration	Disease	Locality
1.	*Alstonia scholaris* (Apocynaceae)	Chatinidaru	SB	Decoction with country liquor	Pain during delivery	Kumdi
2.	*Atylosia scarabaeoides* (Fabaceae)	Gulsuni	RT	Paste	Rheumatism	Kotgarh
3.	*Cassia fistula*(Fabaceae)	Hari	RT	Paste	Inflammation	Salai
4.	*Ficus benghalensis* (Moraceae)	Bargad	RT	Decoction	Leucirrhoea	Baraiburu
5.	*Cynodon dactylon* (Poaceae)	Dhoob ghas	PL	Decoction	Leucirrhoea	Baraiburu
6.	*Sida glutinosa* (Malvaceae)	Puri	LF	Paste	Inflammation	Kumdi
7.	*Lygodium flexpsum* (Schizaeaceae)	Sorgajal	RH	Decoction	Ear-ache	Baraiburu
8.	*Rauvolfia serpentina* (Apocynaceae)	Nagbel	RT	Decoction	Rheumatism	Jate
9.	*Vitex peduncularis* (Verbenaceae)	Simjanga	RT	Powder	Jaundice	Kumdi
10.	*Asparagus racemosus* (Liliaceae)	Utro	RT	Powder	Malaria	Kumdi

review highlights useful ethnobotanical information about the uses of plants by the tribals of Rajasthan. Efforts should be made to conserve the ethnomedicinal plants.

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