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Exploration of Ethno- medicinal plants of Kota, Rajasthan and their practices

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Abstract
The present study focus on importance of ethno medicinal plants from Kota, Rajasthan. A field survey of the study area was carried out to document the medicinal utility of plants occurring in this area. The study revealed the new ethno- botanical uses of 64 plant species belonging to 30 families. A list of plants along with their local names, plant part used and route of administration for effective control in different diseases are recorded in this paper. Documentation of such traditional knowledge of these plants is essential for conservation efforts and for new medicine development.

Keywords: Ethno-medicinal plants, Kota, traditional remedies, conservation, plant resource

Introduction
Rajasthan, the largest state of India is located in the north western part of the country. Rajasthan has very rich diversity of plants with different habitats. The Kota district is situated in the south eastern part of state known as Hadoti region. The Hadoti plateau has fertile black soil with the natural deciduous vegetation. It is third in terms of land areas. It encompasses an area of 12,436 km² which is about 3.63 percent of the total land area of state. Its average elevation is 271 metres (889 ft) height.

Information about the taxonomic description of Kota district of Rajasthan were taken from various references such as Singh and Pandey, 1988 [23]; Shetty and Singh, 1987 [20]; Joshi and Shringi, 2014 [24]; Khandelwal and Shrivastav, 2014-15 [25]; Sharma and Kumar, 2010 [26]; Pareek and Mishra, 2016 [27].

Ethnobotany term was first used by taxonomist W. Harshberger (1895) [2] for study of plants used by indigenous people. It deals with natural relationship between plants and human beings. Ethnobotany is usually the study of relationship exists between people of primitive society and their plant environment (Hada and Katewa, 2015) [21]. The healing properties of certain herbs or their parts were discovered either through animals or by accident (Jain *et al*; 1995) [22].

The present study includes preparation of list of flora of Kota in different seasons and highlights the useful ethno -medicinal information and their uses by local people. During the study approx 64 plant species belonging to approx 30 families has been observed.

Geographical location and climatic conditions
The Kota city is situated along the bank of Chambal River. The climate is moderate to semi-arid in this area with the average rainfall is about 60-75cm in rainy period between June to September. The temperature varies between 38 °C to 40 °C in hottest month, 5 to 8 cm coldest month. The soil is fertile black soil.

Materials and Method
Study Area
In order to recognize plants of medicinal value detailed survey was made and information regarding use of medicine has been documented. The plants were identified by using standard monograph and flora (Flora of Hadoti region- N.K. Sharma, 2002) [28].

Data collection

Extensive survey of study area conducted seasonally during year Dec.2021 to 2022 for preparation of list of plant species occurring in different seasons. List was prepared for registering plants with herbaceous shrubby and tree habitats. The families were classified using Benthem and Hooker classification. Identification was done with help of different flora, herbarium and various literature resources.

Ethnomedicinal information about plant species was collected on basis of interviews from local people. The authors interacted with many local informants and came to knew about the medicinal uses of plants.

Result and Discussion

The present work is based on the result of one year's systematic survey of vegetation growth in study area. The aim of this study is to find out the ethno medicinal plants growing as wild as well as cultivated forms thrive well in this specific climatic condition without any extra care. It was observed that Kota region experienced the condition of drought except a wet spell of two or three months i.e. late June to September, herbaceous annuals had luxuriant growth during the rainy season. (Khandelwal& Shrivastava, 2013) [10].

The dominant plant species were marked specifically, recorded and collected as needed in each periodic season. In present work total 64 species belonging to 30 families have been enumerated. In enumeration, the identified plant species were arranged according to their botanical names, family, common name and their uses. Photographs of some species are also added. To know comparative status of plant diversity at Kota district results were compare with the data collected during review of literature including, Dadhich and Kasat 1988 [1], Shetty and Singh, 1991 [14] Khandelwal and Shrivastava, 2011 [9], & Karoliwal 2021 [11].

The review of literature indicates that dominant tree species observed were *Cassia siamea, Cassia fistula, Azadiecta indica, Albizzia lebbek, Anogeissus pendula, Bauhinia varigata, Acacia nilotica, Ziziphus nummularia, Alianthus excels, Delbergia sissoo, Holoptelea integrifolia, Eucalyptus rudis, Parkinsonia aculeate, Ficus benghalensis, Ficus religiosa,* etc. and the native herbaceous flora that was consistently observed in last few decades is *Euphorbia hirta, Amaranthus hybridus, Chenopodium, alba, Tidex procombances, Acyranthus aspera, Tephrosia hamiltonii, Launia asplenifolia, Oxaliss* spp, *Ageratum conyoides, Rinkosia* spp, *Convolvulus microphyllus, and Ziziphus* spp, *Datura alba, Calotropis procera, Lantana camera Nerium indium, Thevasia peruviana* etc. are common occurring shrubs found in this area.

After screening of biodiversity of Kota approximately 64 plant species have been recognized as important medicinal plant for treatment of various ailments by the locals. Medicines are extracted from different plant parts such as bark, fruit, seed, roots, leaves and latex. The information can be helpful to make a database of Kota for biodiversity studies and the comparative changes occur due to environmental changes and seasonal variations and the collection of information by locals about screened medicinal plants and their utility for future prospects. These plants have been used since ages in treatment of various diseases. These plant species are commonly used in diarrhea, vomiting, respiratory problem, fever, cold, flu, and headache.

The study will be helpful to prepare taxonomic database of arid plant species found in the region.

Table 1: Ethnomedicinal uses of plants present in Kota

S. No.	Botanical name	Family	Common name	Habit	Medicinal value
1.	*Adhatoda vasica*	Acanthaceae)	Adusa	shrub	Diarrhoea, cough
2.	*Peristophe paniculata*	Acanthaceae	Kati aghedi	herb	Antibacterial and snake poison treatment
3.	*Alternanthera pungens*	Amaranthaceae	Khaki weed	herb	Hepatitis, bronchitis, asthama
4.	*Amaranthus hybridus*	Amaranthaceae	Smooth pig weed	herb	Anti diabetic, anti malarial, anti cancer
5.	*Amaranthus spinosus*	Amaranthaceae	Jangli chouli	herb	Ulcer, diarrhoea
6.	*Gomphrena celosoides*	Amaranthaceae	Bachelor button	herb	Natural analgesic rheumatism
7.	*Mangifera indica* L.	Anacrdiaceae	Aam	tree	Bioactive compound antioxidant
8.	*Catharanthus roseus.* L	Apocynaceae	Sadabahar	herb	Anticancerous
9.	*Thevetia nerfolia*	Apocynaceae	Pila kaner	Shrub	Loosen bowels
10.	*Calotropis procera*	Asclepiadaceae	Aankda	Shrub	Leucoderma analgesic treatment, leprosy
11.	*Tridex procumbens* L	Asteraceae	Sadahari	Herb	Antifungal,used in blood cloting
12.	*Chenopodium album*	Chenopodiaceae	Bacan weed	Herb	Anthelmintic carminative, digestive, diuretic
13.	*Anogeissus pendula Edgew.*	Combretaceae	Safed Dhok	Tree	Haemoagglutinating property
14.	*Ageratum conzyoides*	Compositae	Billygoat weed	Herb	Wound healing, anti microbial
15.	*Eclipta prostrata*	Compositae	Bhringraj	Tree	Brain tonic, liver tonic
16.	*Launea procumbens*	Compositae	Jangi Gobi	Herb	Antidiabetic
17.	*Sonchus asper*	Compositae	Dudhi	Herb	Manstrual problem
18.	*Convolvulus arvensis*	Convolvulaceae	Shankhpushpi	Herb	Herbal drug, antipelpetic
19.	*Evolvulus alsinoides*	Convolvulaceae	Morning glory	Herb	Dementia, brain tonic, depression
20.	*Ipomoea* spp	Convolvulaceae	Railway creeper	Shrub	Healing body rashes
21.	*Acalypha indica*	Euphorbiaceae	Copper leaf	Herb	Diabetes, hypertension, dysentery
22.	*Euphorbia hirta*	Euphorbiaceae	Asthama plant	Herb	Female disorder, respiratory ailments

23.	*Euphorbia pulcherrima*	Euphorbiaceae	Ponsettia	Shrub	Skin disorder, toothache, infection,
24.	*Jatropha curcas* L	Euphorbiaceae	Danti	Shrub	Anti microbial, anti-cancer
25.	*Phyllanthus fraternus*	Euphorbiaceae	Bhumi amla	Herb	Treating hepatic, urinary and sexually transmitted, diabetes, hyper tension
26.	*Ricinus Communis*	Euphorbiaceae	Castor	Shrub	Abdominal disorder, arthritis, liver disorder, hypoglycemic, anti inflammatory
27.	*Albizia lebbeck*	Fabaceae	Woman's tongue tree	Tree	Abdominal tumor, eye disorder
28.	*Bauhinia variegate*	Fabaceae	Kachnar	Tree	Skin disease and blood pressure, Ulcer
29.	*Cassia fistula*	Fabaceae	Golden shower	Tree	Jaundice, piles, rheumatism, skin eruption
30.	*Cassia siamea*	Fabaceae	Kassod	Tree	Anticarcinogenic
31.	*Dalbergia sisso*	Fabaceae	Sheesham	Tree	Sore throat, bronchitis, hernia, skin disease
32.	*Delonix regia*	Fabaceae	Gulmohar	Tree	Chronic fever, Constipation, arthritis, asthma
33.	*Dichrostachys cineraria*	Fabaceae	Sickle bush	Tree	Healing of snake bite and scorpion bite
34.	*Pithecellobium dulce*	Fabaceae	Jungle jalebi	Tree	Anti diarrheal, anti ulcer, treating in cardiovascular 41.and gas42trointestinal disease
35.	*Rhynchosia minima*	Fabaceae	Least snout bean	Herb	Itch and swelling, herbicide
36.	*Tephrosia purpurea*	Fabaceae	Masa	Herb	Jaundice, kidney disorder
37.	*Ocimum americanum*	Lamiaceae	Jangli tulsi	Herb	Analgesic anti- inflammatory, cough and respiratory problem
38.	*Ocimum basilicum*	Lamiaceae	Tulsi	Herb	Antiviral, antibacterial, Bronchitis,asthama
39.	*Ocimum sanctum*	Lamiaceae	Tulsi	Herb	Bronchitis, bronchial asthama, skin disease
40.	*Asparagus racemosus Willd.*	Liliaceae	Satavari	Herb	High fever, antioxidant, sexual weakness
41.	*Aloe vera* (L.) *Burm. f.* (	Liliaceae)	Grat kumari	Herb	Skin problem, wounds, burns,
42.	*Guazuma ulmifolia*	Malvaceae	Rajasthan ka rudraksh	tree	Diarrhoea, cough, gastrointestine and cardiovascular disorder
43.	*Hibiscus rosa sinensis*	Malvaceae	China rose	Shrub	Diabetes, hair loss, hypertension
44.	*Malvastrum coromandelianum*	Malvaceae	false mallow	Herb or shrub	Anti-inflammatory, analgesic, anti-bacterial
45.	*Sida acuta*	Malvaceae	Common wireweed	Herb	Neurological disorder, leucorrhoea, tuberculosis, rheumatic problem
46.	*Azadirachta indica*	Meliaceae	Neem	Tree	Anti-inflammatory, anti-fungal, anti-bacterial
47.	*Acacia catechu*	Mimosaceae	Kattha	Shrub	Diarrhoea, Leprosy, high blood pressure
48.	*Acacia nilotica*	Mimosaceae	Babul	Tree	Anti-microbial, diarrhea, hepatitis c, cancer
49.	*Moringa oleifera Lam.*	Moringaceae	Shajna	Tree	Relieve abdomen ache, muscular pain, throbbing pain and sprain.
50.	*Nyctanthes arbor-tristis*	Oleaceae	Harsingar	Shrub	an antiemetic Ash of leaves is applied locally on body to cure urticaria. Seed powder rubbed over scalp to grow new hair
51.	*Oxalis corymbosa*	Oxalidaceae	Katti batti	Herb	Anti-inflammatory, anti-fungal
52.	*Argemone mexicana* L.	Papaveraceae	Maxican poppy	Shrub	Tumors, warts, jaundice, leprosy
53.	*Indigofera cordifolia*	Papillionaceae	Heart leaf indigo	Herb	Epilepsy, nerval disorder, gastro intestinal, respiratory disease
54.	*Indigofera linifolia*	Papillionaceae	True indigo	Shrub	Epilepsy, nervous disorder, asthma, fever, stomach pain
55.	*Emblica officinalis*	Phyllanthaceae	Amla	Tree	Antioxidant, anti- diabetic, anti -cancer
56.	*Saccharum bengalense Retz.*	Poaceae	Munji	Herb	Burning sensation
57.	*Ziziphus jujube.Mill*	Rhamnaceae	Ber	Tree	Appetizer, Food digestive
58.	*Aegle marmelos* (L.) *Corr.*	Rutaceae	Bel		Fever, inflammation, palpitation of heat, brain tonic
59.	*Verbascum Thapsus*	Scrophulariaceae	Common mullein	Herb	Pulmonary problem, inflammatory disease, migraine headache
60.	*Ailanthus excelsa Roxb.*	Simarubaceae	Ardu	Tree	Birth control
61.	*Solanum xanthocarpum*	Solanaceae	Kantakari	Herb	Hair loss remedy, diabetes, inflammation, cancer
62.	*Withania somnifera* (L.)	Solanaceae)	Dunal	Herb	Leaves used against body ache. Seeds used joint pain
63.	*Datura innoxia Mill*	Solonaceae	Datura	Herb	Inducing sleep, fever, alleviating pain
64.	*Lantana camara* L	Varbenaceae	Panchfuli	Shrub	Cancer, chicken pox, eczema, rheumatism

Figure 1- Some important ethnomedicinal plants

Fig 1: *Evolvulus alsinoides*

Fig 2: *Indigofera linifolia*

Fig 3: *Verbascum Thapsus*

Fig 4: *Tephrosia purpurea*

Fig 5: *Psidium guajava*

Fig 6: *Thevatia peruviana*

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