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Research Article

STUDIES ON ETHNO-MEDICINAL PLANTS OF SHEKHAWATI REGION, RAJASTHAN, HAVING HYPOGLYCEMIC PROPERTIES

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ABSTRACT
Ethnobotanical studies and documentation of various uses of the plants by common man can help to preserve our traditional medicinal knowledge of plants. This paper includes ethnobotanical studies on 31 plants belonging to 23 families, used by indigenous people of the Shekhawati region, Rajasthan, India to cure their common ailments. These plants also have hypoglycemic potentials. During ethnobotanical studies we have compiled important information about the medicinal uses of these selected plants. Such plants have natural power to cure the diseases without any side effect. Hyperglycemia is a common symptom of Diabetes mellitus, characterized by increased blood sugar. Some plants have secondary metabolites to control increased blood sugar level of human body.

Keywords: *Shekhawati Region, Hyperglycemia, Diabetes Mellitus, Ethnobotony, Traditional Medicinal Knowledge*

INTRODUCTION
Ayurveda says, there is nothing in this universe which is non-medicinal and cannot be made use for any purpose and by many modes. Ethnobotany includes the documentation, description and explains complex relationship between cultures and uses of plants, focusing primarily, on how plants are used, managed and perceived across human societies as food, medicines, cosmetics, furniture, rituals, etc.
The term ethnobotany was given by Harshberger in 1895. In India, Dr. S. K. Jain, known as Father of Indian Ethnobotany, established ethnobotany as new research area of interest (Sinha, 1996). Dr. E. K. Janaki Aromal initiated researches on ethnobotany in Botanical Survey of India. She worked on some food plants in certain aborigines of South India (Patil & Patil, 2006).
India has vast ethno-botanical knowledge from ancient time. *Ayurveda*, *Rigveda*, *Charak Samhita*, *Sushrut Samhita*, etc. are the old Indian literatures, having wonderful knowledge of plants as medicines. In Rajasthan, King (1870), Billore and Audichya (1978), Jain (1981), Mangala (1969), Sebastian and Bhandari (1984), Singh and Pandey (1982), Sharma and Singh (1994), Katewa and Guria (2001), Nargas and Trivedi (1999), etc. done a notable work on ethonobotany.
Hyperglycemia or high blood sugar is a condition in which an excessive amount of glucose circulates in the blood plasma. It is caused by low insulin level. Low insulin level prevents the body from converting our primary energy source glucose into glycogen, which is our body's reserved energy source. Blockage of glucose-glycogen conversion allows sugar to circulate the blood more so than normal even with the body at rest (Christopher *et al.,* 2000).
Plants have amazing power to cure any disease from its root without any side effect. Plants contain many useful phyto-chemicals which make them useful for medicinal purpose (Gupta *et al.,* 2009). These active principles are dietary fibres, alkaloids, flavonoids, saponins, amino acids, steroids, peptides, etc.
The ethnic and rural people of India have preserved indigenous knowledge of medicinal uses of plants growing around them. Ethnobotanical studies give them a scientific base for further advanced heights. The primary aim of the study is to report various ethnobotanical uses of plants having hypoglycemic potential and try to generate awareness among the people about importance of the medicinal plants.

MATERIALS AND METHODS
The Shekhawati region consists of mainly two districts Sikar and Jhunjhunu, localized at northeastern part of Rajasthan. It is nearest part of Indian Thar Desert, Western Rajasthan. Sikar (7,742 km^2) and

Jhunjhunu (5,928 km^2) districts are situated between 27^0 21' to 28^0 12' north latitude and 74^0 44' to 75^0 25' east longitudes. Most part of Shekhawati is hilly region such as Lohargal, Shakambhari, harshnath, Chappoli, Khetri, etc. Rest part of the Shekhawati has sand dunes and sandy plains.

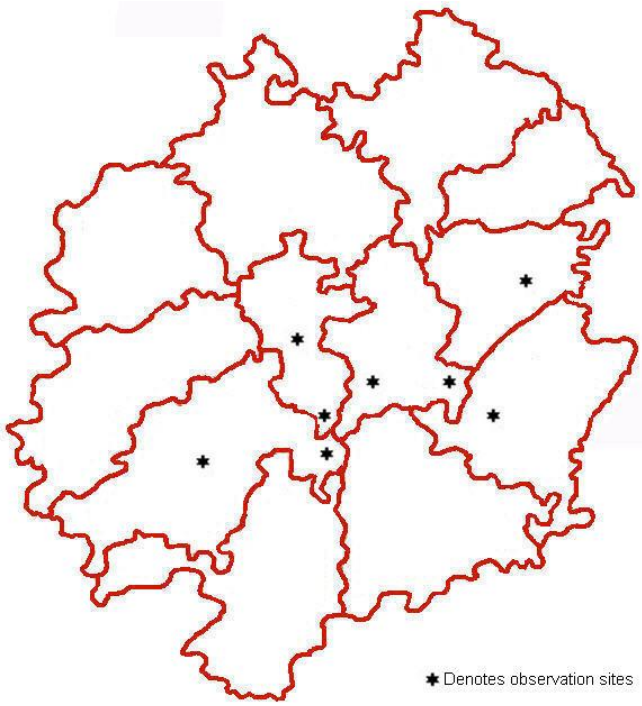

Figure 1: Map of Study Area (Sikar & Jhunjhunu)

This study is mainly based on survey of the study area and documentation of ethnobotanical information of medicinal plants. The study was organized from 2010 to 2012. Many small field trips were organized in different parts of study area and in different seasons mainly winter (December-February), summer (April-June), monsoon (July-September) and post monsoon (October-November).

Some sites were selected for study on the basis of availability of flora. These sites are Shakambhari, Lohargal, Harshnath, Chappoli, Udaipurwati, Nawalgarh, Khetri, Ganeshwar etc. About 33 medicinal plants were selected having hypoglycemic potentials. The selected plants were identified with the help of local people, and available flora (Kirtikar & Basu, 1993).

Small interviews were organized during these surveys, in which local people of different age groups, herbal vendors, herbal physicians, old ladies, etc. were included. The obtained dates were cross checked with different medicinal books (Kirtikar & Basu, 1993; Sukh Dev 2005, Prajapati *et al.*, 2003) ayurvedic literature Vanoshadhi Chandrodaya (Chandrodaya, 1953) and interviews.

RESULTS AND DISCUSSION

Investigation revealed about 31 plant species are being used to cure many diseases in the Shekhawati region. They are used in various modes, like raw, powder, paste, decoction, vegetable, sweets, etc. This study shows that single plant or plant parts are also used in raw form and mixture of different parts of different plants is used to cure different diseases. Various plant products are also used with many food items, like vegetables, laddu or other sweet, etc.

About 6 plants are individually used as whole plant. Gum of 2 plants is used for chewing or with water. About 4 plants are used to make laddu. About 7 plants are used to cure diabetes. Table 1, 2, and 3 contain data about the name of plant species, diseases, number of diseases and used part of diseases according to trees, herbs and shrubs, under shrubs, small trees, climbers, respectively.

Table 1: Ethno-medicinal tree plant species with their used parts and diseases

S. No	Plant Name	Used part	Diseases	No. of diseases
1.	*Acacia nilotica* (L.) Willd. Ex Del.	Stem & gum	Gingivitis, toothache, dysentery, ear pain, ear glue,	5
2.	*Aegle marmelos* (L.) Corr. Serr.	Leaves & fruits	Dysentery, loose motion, stomach worms, sun stroke, blood pressure, diabetes	7
3.	*Azadirachta indica* A. Juss	Leaves, bark & stem	Snake bite, Mosquito bite, toothache, stomach worms, ear pain, burn, fever, vitiligo, blood purification, wound, dandruff, mumps, chicken pox, irritation in eyes, carbuncle, boils and pimples, eczema, ringworm, itches, prickly heat, diabetes, Pyrrhoea, asthma, cold & cough **VU:** Decoction of leaves is given to animals in gastric problems and paste of leaves is directly applied on wounds.	24
4.	*Capparis decidua* (Forssk.) Edgew	Fruits	As cooling agent, abdominal pain, constipation	3
5.	*Cassia fistula* L.	Pods	As laxative **VU:** Crushed stem bark is soaked in water ovemight and given orally in the morning in diarrhoea.	1
6.	*Emblica officinalis* Gaertn.	Fruits	Constipation, abdominal pain, dysentery, jaundice, nose bleeding, body strength, weakness, as cooling agent, good health, dandruff, hair fall, cataract, weak eye sight, cold and cough, diabetes, hair growth, eye's irritation	17
7.	*Eugenia jambolana* Lam.	Fruits	Dysentery, diabetes	2
8.	*Ficus religiosa* L.	Roots & bark	Post delivery, boils and pimples, wound	3
9.	*Ficus benghalasis* L.	Latex	Joint pain, toothache, loose motion, stomach pain, leucorrhoea, cracked sole, burns, wound, back ache, hair fall, body pain, carbuncle, cuts, hair growth, asthma, eczema, ringworm **VU:** Latex is used to increase lactation.	17
10.	*Mangifera indica* L.	Fruits	Pyrrhoea, sun stroke, anemia	3
11.	*Moringa oleifera* Lam.	Pods & gum	Joint pain, toothache, gastric problem, stomach worms, lactation problem, swelling, wound, body pain,	8

Table 2: Ethno-medicinal herbaceous plant species with their used part and diseases

S. No	Plant's name	Used part	Disease	No. of Diseases
1.	*Achyranthes aspera* L.	Whole plant	Cholera, typhoid, eczema, itches, cold & cough, headache, quick delivery, gingivitis **VU:** Crushed roots are given to animals in cramps.	8
2.	*Allium cepa* L.	Bulbs	Snake bite, Scorpion bite, ear pain, nose bleeding, sun stroke, dandruff **VU:** Raw buds are given orally to camel in abdominal pain.	6
3.	*Allium sativum* L.	Bulbs	Ear pain, head ache, neck pain, mumps, paralysis, body pain, cold and cough, asthma, ringworm, gastric problems, blood pressure **VU:** Crushed bulbs are given orally in fever and cough.	11

4.	*Boerhavia diffusa* L.	Roots & leaves	Jaundice, irritation in urine, typhoid **VU:** Aerial parts are given orally in urine problems.	3
5.	*Catharanthus roseus* (L.) Don	Leaves & flower	Diabetes	1
6.	*Ocimum tenuiflorum* Linn.	Whole plant	Mouth ulcer, fever, vitiligo, chicken pox, cold and cough, asthma, boils and pimples, ringworm, itches,	9
7.	*Phyllanthus amarus* Schum.& Thonn.	Whole plant	Jaundice, blood purification, and to cooling the body	3
8.	*Tribulus terrestris* L.	Whole plant	Leucorrhoea, body strength	2
9.	*Trigonella foenum-graecum* L.	Seeds	Arthritis, gastric problem, abdominal pain, loose motion, quick delivery, body pain, back ache, hair fall, body pain **VU:** Seeds are given to animals with fodder.	9

Table 3: Ethno-medicinal plant species (shrubs, under shrubs, small trees, & climbers) with their used parts and diseases

S. No	Plant's name	Used part	Disease	No. of Diseases
1.	*Adhatoda zeylanica* L.	Whole plant	Asthma, cold and cough, bronchitis, piles, mumps, Typhoid VU: Leaf juice is given as expactotant.	6
2.	*Aloe vera* (L.) Burm. F.	Gel	Arthritis, ear glue, post delivery, menstrual irregularity, burn, as cooling agent, hiccup, body pain, dandruff, hair fall, boils and pimples,	11
3.	*Asparagus racemosus* Wild.	Roots	Leucorrhoea, lactation problem, piles, body strength, mental retardness, body pain	6
4.	*Calotropis procera* (Aiton) W. T. Aiton	Leaves & stem	Scorpion bite, back ache, kidney pain, cold & cough **VU:** Stem-ash is given to goat in gastric problems.	4
5.	*Momordica charantia* L.	Fruits	Piles, diabetes	2
6.	*Piper longum* Linn.	Fruits	Abdominal pain, fever, pimple, typhoid	4
7.	*Psidium guajava* L.	Leaves & fruits	Toothache, constipation, loose motion,	3
8.	*Punica granatum* L.	Fruits	As cooling agent, cough	2
9.	*Tinospora cordifolia* (Thumb.) Miers	Whole plant	For body strength **VU:** Crushed stem bark is soaked in water overnight and given orally in the morning as blood purifier. Crushed stem powder is given in loss of appetite.	1
10.	*Withania somnifera* (L.) Dunal	Leaves	Arthritis, gastric problem, hair fall, weakness **VU:** Paste of plant is given with salt in gastric problems. Boiled water with leaves in used to give bath animals to cure their abdominal pain.	4
11.	*Zingiber officinalis* Roscoe	Tubers	Joint pain, gastric problem, abdominal pain, loose motion, post delivery, fever, head ache, hair fall, cold and cough, asthma, typhoid	11

VU- veterinary uses

Conclusion

The study provides important information such as same plant or same part of the plant treating different ailments and different parts of a plant or different plants are also used for treating the same ailment. Various plant parts, as roots, stem, bark, leaves, fruits, latex, gum, entire plant, etc. are used.

The Shekhawati region of Rajasthan has very harsh climate. Summers are very hot and winters are very cool here. The main source of water is ground water. Having harsh conditions, some areas of Shekhawati region have rich flora, whereas some areas have less.

Plant based knowledge vary with distribution of age among the people. The old age persons have much knowledge about the plants and their uses. Women are better known with plants than men. Many wildly growing plants are being used as household remedies by women.

The commonly used medicinal plants in the Shekhawati are *Acacia nilotica*, *Azadirachta indica*, Allium cepa, *Allium sativum, Ficus benghalensis, Ocimum tenuiflorum, Emblica officinalis, Zingiber officinalis, Withania somnifera*, etc. Some plants are also used for veterinary diseases such as *Achyranthes aspera*, *Adhatoda zeylanica*, *Allium cepa*, *Allium sativum, Azadirachta indica*, *Boerhavia diffusa*, *Calotropis procera, Cassia fistula, Ficus benghalensis*, *Tinospora cordifolia*, *Trigonella foenum-graecum* and *Withania somnifera*.

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