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Ethnomedicinal studies on plants used in folk remedies to treat *Diabetes mellitus* in rural areas of Jharkhand

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Abstract : Obesity and physical inactivity are on the rise due to modernization. This has led to increased incidence of different diseases among which diabetes is most prominent. Despite advances in development of chemical drugs, its side effects have led patients to use traditional plant remedies. The indigenous knowledge of plants used for the treatment of diabetes was collected through questionnaire and personal interviews of baidyas, knowledgeable person and patients of diabetes. The present paper deals with the medicinal plants which are used to treat diabetes in Jharkhand. The scientific name of plants, local names, family, habit, plant parts used and method of use are described. The available data regarding the anti-diabetic activity of the detected plants is not sufficient to adequately evaluate or recommend their use. Further scientific research based on the findings of this work is needed and recommended so as to provide evidence for a safe and effective use of the identified plants in treating *Diabetes mellitus*.

Keywords : Diabetes, Jharkhand, Medicinal plants

INTRODUCTION

The term diabetes is the shortened version of the full name diabetes mellitus. Diabetes comes from a Greek word which means siphon and the Latin word mellitus means sweet. The term diabetes was first coined by Arateus of Cappadocia (81-133 AD). It was Thomas Willis who added the word mellitus to the word diabetes in 1675. Diabetes is one of the serious chronic diseases of the world. It occurs either when the pancreas is unable to produce insulin or produces insufficient insulin.

It is followed by various problems related to heart, blood vessels, eyes, kidneys and nerves. The main symptoms of diabetes are frequent urination, excessive thirst, weight loss, hunger, tiredness, skin problems, slow healing of wounds, yeast infection and numbness in the feet. Risk factors of diabetes are obesity, family history,

high blood pressure, sedentary life style, age above 45, etc.

Jharkhand is a state carved out of Bihar. The name "Jharkhand" means "The land of Forests". It is situated between 23.6102°N and 85.2799°E coordinates. Jharkhand is very rich in the diversity of medicinal plants. The tribal populations of this area have their own tradition to treat different ailments.

There are many vaidyas in this state who possess valuable knowledge about the use of ethnic plants to treat various diseases. The roots of *Aegle marmelos* (Fig.1), *Andrographis paniculata* (Fig.2), *Azadirachta indica* (Fig.3), *Butea monosperma* (Fig.4), etc. are used to treat diabetes.

MATERIALS & METHODS

Physical, geographical and climatic study of the area has been done. Interview of the vaidyas and knowledgeable persons were taken with the help of questionnaire regarding the plants used against diabetes¹.

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Interview of the cured persons and their impression about the treatment was recorded.

The plants prescribed as medicines for treatment of diabetes were identified with the help of flora entitled Botany of Bihar and Orissa². The plants were collected during

field tour for taxonomical study and herbarium preparation.

Photographs of the identified plants were taken. Herbarium of investigated plants were prepared according to the prescribed standard method³. Investigated ethnomedicinal plants were tabulated in Table-1.

Table 1

Sl.No.	Botanical Name	Family	Local Name	Habit	Parts used	Chemical constituent	Method of use
1.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Prickly chaff flower-E Chirchitta-H Chirchiti-M	Herb	The whole plant, especially the roots and seeds.	Triterpenoid saponin, Achyran-thine.	2-3gm dried root powder is taken twice a day.
2.	<i>Aegle marmelos</i> L.Corr.	Rutaceae	Bael-E Bel-H Sinju daru-M	Tree	Roots, leaves and fruits	Marmalosin, coumarin	5gm dried root powder is taken in empty stomach in the morning.
3.	<i>Amorphophallus companulatus</i> Blume ex.Decne.	Araceae	Elephant foot yam-E Jamikand-H Hatu hada-M	Herb	Corms	Betulinic acid, triacontane.	5gm root powder is consumed thrice a day before meals.
4.	<i>Andrographis paniculata</i> (Burm.f.) Nees	Acanthaceae	Kariyat-E Kalmegh-H Bhuimin-M	Herb	Whole plant	Andrograph-olide, Andrograph-in.	2gm dried root powder is taken in empty stomach in the morning.
5.	<i>Asparagus racemosus</i> Willd.	Liliaceae	Wild asparagus-E Satavar-H Huring atkir-M	Climber	Tuberous roots	Shatavarin I-IV, mucilage.	2gm dried root powder is taken in empty stomach in the morning.
6.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem tree-E Nim-H Nim daru-M	Tree	Bark, leaves, flowers, seeds and oil.	Nimbin, Azadiradi-one.	2gm dry powdered root is taken in the morning.
7.	<i>Butea monosperma</i> (Lam.)Taub.	Fabaceae	Flame of the forest-E Palas-H Murud-M	Tree	Bark, leaves, flowers, seeds and gum.	Butrin, Mono spermoside.	5gm powdered bark is taken before meals twice.
8.	<i>Cassia tora</i> L.	Caesalpiniaceae	Sickle senna-E Chakunda-H Huring Chakonda-M	Herb	Seeds, leaves and roots	Anthragluco-sides, oleic acid.	10gm root is boiled in 400ml water and taken once a day.
9.	<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	Hill glory bower-E Tita bhamt-H Bir chamgar-M	Shrub	Leaves and root	Sterol glycoside, clerosterol	6gm dried root powder is taken in empty stomach in the morning.
10.	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Air potato-E Zamin kand-H Harad bho-M	Climber	Tubers	Mono arachidin, diosbulbin B.	Tuber (50gm) is boiled in water ,cut into slices and consumed.
11.	<i>Elusine coracana</i> (L.) Gaertn.	Poaceae	Indian millet-E Mandva-H Kode-M	Herb	Seeds	Terpenoids, alk aloids.	2 Chapatti made up 100 gm flour is eaten in breakfast.

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12.	<i>Ficus racemosa</i> L.	Moraceae	Country fig tree-E Gular-H Loa-M	Tree	Bark, fruit, latex and root.	Glycosides, lupeol	12gm powdered bark is taken twice before meals.
13.	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	China rose-E Jasut-H Orhul-M	Shrub	Leaves, flowers and bark	Hibiscetin, campesterol	5gm powdered bark is taken in the morning in empty stomach.
14.	<i>Madhuca indica</i> (Koenig) Macbride	Sapotaceae	Indian butter tree-E Mahwa-H Madhukam-M	Tree	Bark, heart-wood, flowers, fruits and seeds	Myristic, oleic acid	5 gm powdered bark is taken in empty stomach in the morning.
15.	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Ceylong Leadwort-E Chitarak-H	Herb	Leaves and roots	Plumbagin, triterpenoids.	1-2gm dried root powder is taken per day.
16.	<i>Pongamia pinnata</i> (L.) Pierre	Fabaceae	Indian beech-E Karanj-H Koronjo-M Karanj-N	Tree	Flowers	Oleic acid, Karanjin.	10 gm flowers are consumed raw.
17.	<i>Terminalia arjuna</i> (Roxb. ex. DC) Wight & Arn	Combretaceae	Arjun-E Arjun-H Gara hanta-M	Tree	Bark	Arjunolic acid, Arjunetin	1gm dried bark powder is taken in the morning in empty stomach.
18.	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook. f. & Thoms.	Menispermaceae	Gulancha tinospora-E Giloy-H Harjora-M	Climber	Stem and roots	Tinosporin, columbin.	1 inch (6-7 gm) stem is soaked in water for 12 hrs and taken in empty stomach in the morning.
19.	<i>Vitex negundo</i> L.	Verbenaceae	Five-leaved chaste tree-E Shivari-H Bigana-M	Shrub	Whole plant	Nishindine, Hydrocotyl-ene.	2gm dried root powder is taken twice after meals.
20.	<i>Vitex peduncularis</i> (Wall)	Verbenaceae	Charaigorwa-H Simkata-M	Tree	Leaves and bark	Vitexin, triterpenoids.	3 gm bark is boiled in water and taken as tea.

Abbreviations – E = English, H = Hindi, M = Mundari

RESULT & DISCUSSION

During the ethnobotanical survey of Jharkhand it was found that investigated plants were highly effective against type 2 diabetes. Identified specimens were 8 trees, 3 shrubs, 3 climbers and 6 herbs.

Earlier many valuable works have been done in different parts of the world in this field. Viz. Ocvirk *et al* (2013)⁴ reported *Achyranthes aspera*, *Asparagus racemosus*, etc are used in the treatment of diabetes in Dhaka, Bangladesh⁴ Vidyasagar and Siddainga (2013)⁵ reported the use of *Hibiscus rosa-sinensis* and *Vitex negundo* root to treat diabetes in Karnataka. Yadav *et al*⁶ reported *Cassia tora* is used to treat diabetes by the Baiga

tribe living in Rewa district, M.P. Bhuyan (2015)⁷ reported *Erythrina variegata* is used in North-East for the treatment of diabetes by different tribes. Sunil *et al* (2012)⁸ reported the use of roots of *Plumbago zeylanica* to treat diabetes. Rao (2006)⁹ reported roots of *Andrographis paniculata* having anti-hypoglycemic effect on blood glucose level. Goyal and Jain (2012)¹⁰ reported the use of *Ficus racemosa* against diabetes. In Jharkhand, Kandir (2008)¹¹ have worked on ethnomedicinal value of some plants which are curative against diabetes. *Tinospora cordifolia* was reported to have antidiabetic properties^{12,13}. *Azadirachta indica* was reported to be used in folk medicines to treat diabetes¹⁴.

Previously there was no trace of diabetes among the tribals of Jharkhand. Due to modernization and the tendency of younger generation to discard their traditional way of living, their life style has changed thus, many tribals are now found to suffer by this chronic disorder.

During the investigation it was found that the tribals manage to control their blood sugar level by regular use of herbal medicines. Tribal communities living in biodiversity rich areas possess a wealth of knowledge on the utilization and conservation of medicinal plants. They have developed this traditional knowledge over several years of observations, trial and error, inference and inheritance.

Some of the indigenous technologies are effective, much cheaper than modern medicines, prepared by locally available natural resources and easy to prepare. The potentiality of indigenous health technologies is increasingly being recognized. The concept, preparation and doses vary from locality to locality and from person to person. Hence a critical scientific verification is needed for the welfare of the population. In present day this knowledge of indigenous people is fast disappearing. There is an urgent need to study and document this precious knowledge for the prosperity of human society.

PHOTOGRAPHS



Fig.1 *Aegle marmelos*



Fig. 2 *Andrographis paniculata*

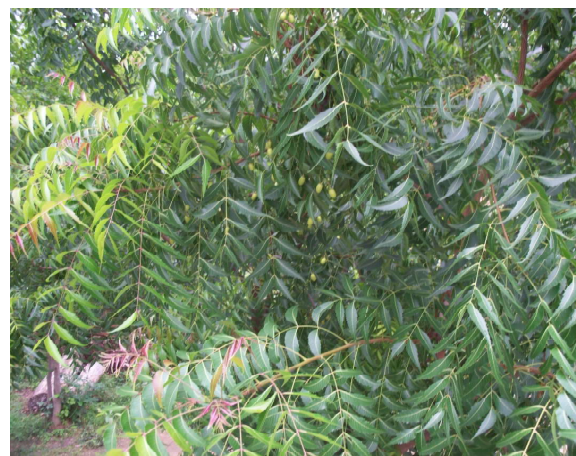


Fig. 3 *Azadirachta indica*



Fig. 4 *Butea monosperma*



Fig. 5 *Clerodendrum viscosum*



Fig. 8 *Hibiscus rosa-sinensis*



Fig. 6 *Elusine coracana*



Fig. 9 *Madhuca indica*



Fig. 7 *Ficus racemosa*



Fig. 10 *Plumbago zeylanica*

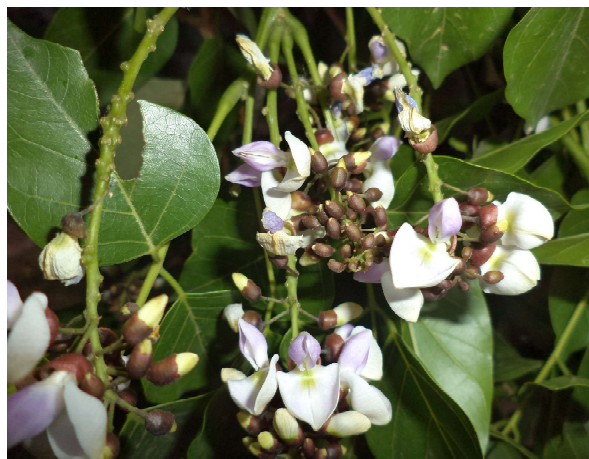


Fig. 11 *Pongamia pinnata*



Fig. 14 *Vitex peduncularis*

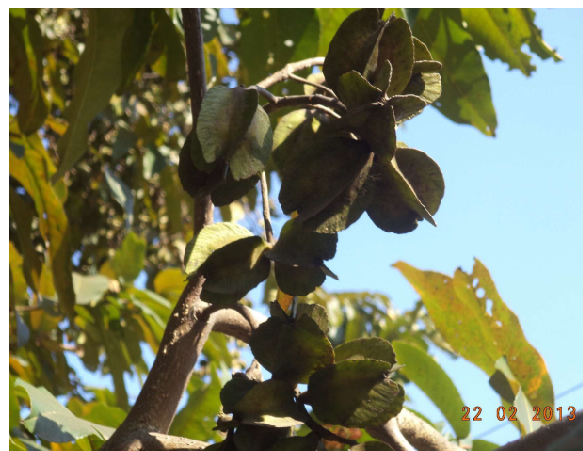


Fig. 12 *Terminalia arjuna*



Fig. 13 *Tinospora cordifolia*

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