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INDIGENOUS MEDICINAL PLANTS USED IN AYURVED FOR THE TREATMENT OF DIABETES IN CHITRAKOOT AREA OF SATNA DISTRICT, M.P.

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ABSTRACT

Herbal medicines have great potential and are being extensively used in curing various human ailments. There is thus a need to explore and record them especially for their hypoglycaemic properties. In this investigation 25 indigenous medicinal plant species belonging to 20 families have been found effective in curing and management of blood sugar level in diabetic patient in Chitrakoot area of Satna district (M.P.). The medicinal plants have been alphabetically arranged with their botanical name, family, local name(s), habit, chemical constituents and mode of administration and dose(s).

KEYWORDS : Ayurveda, Medicinal plants, Diabetes, Chitrakoot Area of Satna

Diabetes was known to mankind as Madhumeha from antiquity. This was known to Indian Ayurveda since about 3000 years as a disease with some persons whose urine was sweet enough to attract insects and flies. Diabetes comprises a group of common metabolic disorders characterised by hyperglycaemia (increased blood sugar level) resulting from defects in insulin secretion, insulin action or both. Several distinct types of diabetes mellitus (DM) exist and are caused by a complex interaction of genetics, environmental factors and life style choices (Powers, 2001). Diabetes mellitus (DM) is prevalent in all countries of the world. More than 30 million people are said to be affected throughout the world with this disease. The chronic hyperglycaemia of diabetes is associated with long term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels. (American Diabetes Association, 1998). Therefore, it is certain that DM will be one of the most challenging health problems in the new millennium.

Ayurveda is the oldest system of disease treatment in the world. Ayurvedic literature contains intelligent observations on human diseases (Cragg, 1996; Rao et al., 1997; Hallock, 1998 and Das et al., 2001). Herbal medicines have great potential and are being extensively used in curing various human ailments. There is thus a need to explore and record them especially for their hypoglycaemic properties. Use of alternative therapies, some of which may impact blood glucose, is wide spread and growing in U.S. (Egede et.al. 2002; Eisenberg et.al. 1998). Some world bodies including WHO are providing much encouragement for the search of medicinally important plants.

Realizing the prevalence of ethnomedicinal information among the tribal's, forest dwellers and medicine men of Chitrakoot area of Satna district (M.P.), the present study on diabetes care through herbal medicine was undertaken.

MATERIALS AND METHODS

The present study is based on the results of two and half years of work during which extensive as well as intensive survey of the area was carried out for collecting information from the local tribal's (Mawasi, Kol, and Gond), forest dwellers and medicine men regarding treatment of diabetes through herbal drugs.

The Chitrakoot area is situated in the northern region of Satna district of M.P. It extends from 80^0 52' to 80^0 73' N latitude and 25^0 10' to 25^0 52' E longitude and cover an area of 1,584 square Km. The forest of the Chitrakoot predominantly consists of tropical dry mixed deciduous type. The climate is dry and the maximum temperature goes up to 50.5^0C in the month of May and minimum up to 5^0C in the month of January. The Chitrakoot area of Satna is surrounded on north, northwest and northeast by Chitrakoot district of Uttar Pradesh and west by Panna district of Madhya Pradesh.

During the course of collection, plenty of information about the local name(s) and the method of application of medicinally useful plants (especially for diabetes therapy) were noted down. Literature available on

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cure of diabetes by traditional herbal medicine was carefully scrutinized by the authors. Authentic information regarding present status of diabetes care was noted down from leading journals on the subject. The collected plants were identified with the help of local Floras by Duthie (1903-1929); Mudgal, et al., (1997); Singh, et al., (2001); Verma, et al., (1993) as far as possible. The doubtful specimens were further verified and their identity confirmed at NBRI, Lucknow; Central Circle of BSI at Allahabad. Properly mounted specimens are deposited at the Herbarium Department of Botany, Shibli National College, Azamgarh.

OBSERVATIONS

***Abelmoschus esculentus* (Linn.) Moench. (Malvaceae)**

Bhindi

Annual erect herb, commonly cultivated.

Chemical Constituents

9 flavonoid glycosides, quercetin-4-glucoside, quercetin-7-glucoside, quercetin-5-glucoside, quercetin-3 (o-glucosylglucoside)-4-(o-glucosylglucoside0 etc and 2 anthocyanins cyanidine 4 glucoside and cyanidine 3glucoside 4 glucoside isolated from flower petals.

Uses

Two fresh seedless tender fruits are given twice in a day till cure.

***Abutilon indicum* (Linn.) Sweet. (Malvaceae)**

Kanghi

A tall undershrub, sometimes woody, commonly found in moist areas.

Chemical Constituents

Alkaloids, steroids, glycosides, flavonoids, aminoacids, fatty acids

Uses

One table spoonful leaf powder is taken orally along with cow milk in the morning and evening. Seven fresh leaves are also given to patient for seven days.

***Aegle marmelos* (Linn.) Corr. (Rutaceae)**

Bel

A small or medium sized deciduous tree, commonly found in mixed forests.

Chemical Constituents

Essential oil, aegelenine and aegeline, tannins, flavonoid glycosides, phlobotannins, umbeliferon, skimmianine, marmin, lupen, a-sitosterol, furocoumarins.

Uses

About 10 ml leaf juice is given with five black pepper seeds twice a day for about two months to control the blood sugar level. For the treatment of diabetes twenty leaves from tip to downwards are plugged and boiled in two cups of water till it become one cup. It is cooled and filtered and the decoction is given to the patient in morning. One table spoonful leaf powder of Aegle marmelos and Azadirachta indica and seeds of Syzygium cumini is also given to the patient along with water twice a day to cure diabetes.

***Annona squamosa* Linn. (Annonaceae)**

Sharifa, Sitaphal

A small tree, mostly cultivated.

Uses

The leaves of Annona squamosa are used extensively for its antidiabetic activity. Ten leaves from tip to downwards are plugged, cleaned with a soft cloth and then made into small pieces which are soaked in a glass of water. It is kept over night and the following morning water is filtered which is given to the patient daily every morning.

***Azadirachta indica* A. Juss. (Meliaceae)**

Neem

A large tree, commonly planted in villages and on roadside.

Chemical Constituents

Leaves contain flavonone, meliacinsolannolide, solannin, triterpenoidnimocinol, azadirachtannin, tetranorterpenoid isoazaditolide, nimbocinolide, quercitin and b-siitosterol. Seeds contain nimbolin A and B, nimbenene triterpinoids, 3-acetoxy-1-hydroxy-azadirachtol. Seed oil contains miliantriol. Bark contains deacetylnimbin.

Uses

The young leaves are chewed in the morning and it is also used in the form of paste. Leaf paste with black pepper is given once a day for one month. Seed powder (1

gm) is given twice a day for two months to cure the disease. Roasted bark powder is taken with milk for thirty days. One teaspoonful oil is also given to the patient orally for one month in the morning in the empty stomach for the treatment of the disease.

***Butea monosperma* (Lamk.) Taub. (Papilionaceae)**

Dhak, Palas, Tesu, Chheul

A deciduous tree, commonly found in forest areas.

Chemical Constituents

Alkaloids, flavonoids, B-sitosterol, fatty acids, enzymes, acoumaranone glucoside-palsitrin from the plant and palasonin from seeds.

Uses

The leaves and flowers juice (10 ml) is given to the patient to reduce the blood sugar and are also used in glycosuria. The leaf decoction is also given to the patient in the morning.

***Cassia fistula* Linn. (Caesalpiniaceae)**

Amaltas, Kirwar

Small tree, commonly found in mixed forest and along the roadside.

Chemical Constituents

Glycosides, Steroids, tannins, quinines, flavonoids, disaccharides, phlobaphenes, oxyanthroquinone substances.

Uses

Fruit is eaten once a day for 30 days in the treatment of diabetes. One tea spoonful powder of dried fruits is given to the patient twice a day. It may also be given to the patient in the form of decoction to control the sugar level in blood. 5 ml juice of fresh root sheath along with 3 ml rhizome of Zingiber officinale and 2 black pepper seed powder is prescribed for 15 days.

***Catharanthus roseus* Linn. (Apocyanaceae)**

Sadabahar, mostly cultivated.

A small garden perennial undershrub.

Chemical Constituents

Leaves contain oleoresin, volatile oil. Flower contains diglucoside, pseudoindoxyl alkaloid-rosamine, b-carboline, bannucine and leurosinone. Roots contain ajmalacine. Fruits and seeds contain vindoline, dehydraouin dolinine and corpmaridine.

Uses

The leaves and flowers are effectively used in the treatment of diabetes. Its effect on reducing the blood sugar level has been observed by the authors in a few cases. For this purpose two to three leaves and flowers are chewed in the morning. Plants with white flowers have been found more effective. 25 ml leaf decoction is also given on empty stomach once a day for one and half month to cure the disease.

***Clerodendrum multiflorum* (Burm.f) O. Ktze (Verbenaceae)**

Aran

Small shrub, found in forest

Chemical Constituents

Leaves contain monoglucoside and Y-sitosterols, unidentified sterol, ceryl alcohol and palmitic and cerotic acids. Stem contains D-mannitol, B-sitosterol, B-D glucoside and ceryl alcohol.

Uses

The leaves of the plant are considered to be anti-diabetic. Those who have used it, have got a good result. Aqueous extract / decoction of the leaves is given to the patient on empty stomach in the morning.

***Convolvulus microphyllus* Sieb. ex. Spreng. (Convolvulaceae)**

Shankha-holi

Prostrate herb, found in open fields, sandy and rocky places.

Uses

Whole plant is soaked in four cups of water over night and boiled in the same water until the water becomes one cup, it is cooled and filtered. Two spoonful of this filtrate is taken 3-4 times daily to manage the proper level of sugar in the blood. (Its application in diabetes has also been reported by Alam et.al., 1990).

***Emblica officinalis* Gaertn. (Euphorbiaceae)**

Amla, Aoula

Small tree, cultivated.

Chemical Constituents

Linolenic, linoleic, oleic, stearic, palmitic myristic acids, trigalloyglucose, terchebin, covilagin, ellagic and phyllemblic acids.

Uses

The fruit is effective in controlling diabetes. A tablespoon of Amla fruit juice mixed with fresh juice of karela (Momordica charantia) is administered daily for two month. This medicine stimulates the pancreas and enables it to secrete insulin, thus reducing blood sugar level in diabetes. The fruit powder of E. officinalis, Momordica charantia and Syzygium cumini is also used to check diabetes. One tea spoonful powder of this mixture is given twice a day.

***Ficus benghalensis* Linn. (Moraceae)**

Bargad , Bar.

Large evergreen tree, commonly found along roadsides and in forests.

Chemical Constituents

Bark contains leuco-anthocyanins. Leaves contain quercitin-3-galactoside, rutin, b-sitosterol, taraxasterol, lupeol, B-amyrin along with psoralen bergapten. Ripe figs contain glycoside..

Uses

It is a reputed medicine for diabetes. The aqueous extract of aerial root and stem bark is used to reduce the sugar level in blood. The decoction of tender aerial roots is given to the patient in the morning. The bark is given in the form of powder twice a day. Root bark soaked in a cup of water over night and infusion administered daily morning for a month.

***Gymnema sylvestre* (Retz.) R.Br. (Asclepidaceae)**

Gurmar, Gusmuru

A woody climber, found in forest

Chemical Constituents

Gymnemic acids I-VII, XV-XVIII, gymnamine, gymnimagenin, quercitollupeol, stigmasterol, gymnosaponin TN-2, quercitol, dammarone, gymnemic acids, saponin-gymnemosides, B-amyrin, gypenosides II, V, XLIII, LXXIV

Uses

The leaves are considered as antidiabetic. Root/leaf decoction is given to the patient till cure. Fresh leaves/dried powder is also taken twice a day till cure. Some diabetic persons claimed that powder of the entire plant of G. sylvestre used with that of tender leaves of Aegle marmelos and Azadirachta indica perfectly control diabetes. For this purpose one tea spoonful powder of this mixture is taken along with water twice a day.

***Helicteres isora* Linn. (Sterculiaceae)**

Maroorphal, Ainthi, Petmurri

A small deciduous tree, found in mixed forests.

Chemical Constituents

Root contains cucurbitacin-B and Isocucurbitacin-B. Bark contains physterol, hydroxyl-carboxylic acid, saponins, phlobotannins and lignin.

Uses

The roots in the form of powder and also as decoction mixed with honey is given to the patient. Seeds are also used in the form of powder. 20 gm root bark paste is also given daily once for a month.

***Hibiscus rosa-sinensis* Linn. (Malvaceae)**

Gurhal

Shrubs or small trees, grown as ornamental.

Chemical Constituents

Alkaloids, steroids, glycosides, flavones, organic acids, vitamins, anthocyanin pigment and cyaniding diglucoside.

Uses

One mature bud (unopened flower) is chewed and eaten in the morning in empty stomach till the desired level of sugar is obtained. This treatment is said to be good in managing the level of blood sugar. 5-10 ml infusion of petals is also given to patient.

***Madhuca indica* Gmel. (Sapotaceae)**

Mahua, Mahuwa

A large deciduous tree with dense crown, commonly found in mixed dry deciduous forests

Chemical Constituents

Lupeol acetate, b-amyrin acetate, a-spinasterol, erythrodiol-monocaprylate, betulinic acid and oleanolic acid.

Uses

One cup decoction of the bark is given in the morning every day till the desired result is obtained.

***Mangifera indica* Linn. (Anacardiaceae)**

Aam

Medium to large sized tree.

Chemical Constituents

Triterpinoids (mangiferin, taraerone, taraxerol, b-sitosterol), flavonoids, phenolic compounds and tannins.

Uses

The seed kernel is given to the patient in the form of powder (one teaspoonful twice a day). The young leaves are also chewed for lowering the blood sugar level. 1/2 teaspoonful shade dried leaves is also given to the patient twice a day till cure.

***Momordica charantia* Linn. (Cucurbitaceae)**

Karela

Climbing herb, commonly cultivated,

Chemical Constituents

Plant contains Alkaloid momoridicine, saponin, carotene, glycoside and highly aromatic essential oils. Fruit contains acylglucosyl sterol, charantin, lipid, b-sistosterol glucoside, ascorbigen and stigmast-5, 25-dine-3,B-O-glucoside.

Uses

The juice of the green fruit is taken regularly in the morning to control the sugar level in blood of diabetic patient. However, the results vary from person to person. One teaspoonful powder of dried fruit is also given to the patient twice a day. Decoction of the fruits is also used in the morning on empty stomach. The aqueous extract of fresh unripe whole fruit at a dose of 20 mg/kg body weight was found to reduce fasting blood glucose by 48% an effect comparable to that of glibenclamide, a known synthetic drug (Sachdeva and Khemani, 1999).

***Murraya koenigii* (Linn.) Spreng. (Rutaceae)**

Kathnim

Deciduous shrub or small tree, common in forest

Chemical Constituents

Alkaloids cyclomahanimcine, mahanimcine, koenidien, mahanine, koenine, koenigine and scopoline, girinimbine, mahanimbine, isomahanimbine and koengicine.

Uses

7-10 leaves are consumed every morning for three months to check diabetes. The leaves posses the weight reducing properties, therefore it cures the diabetes caused by obesity. Much research work is being done on this plant these days in western countries and also in India for its role in regulating sugar level in blood.

***Phoenix sylvestris* (Linn.) Roxb. (Arecaceae)**

Khajoor

Palm like tree, commonly found in dry areas.

Chemical Constituents

Aminoacids, vitamins.

Uses

The seed powder is used in the treatment of diabetes.

***Syzygium cumini* Linn. (Myrtaceae)**

Jamun

Medium sized tree, found along rivers and streams.

Chemical Constituents

Leaves contain essential oil including a-pinene, b-pinene, limonene, cis-ocimene and trans-ocimine. Fruits contain anthocyanins delphinidin-3-gentiobioside, malvidine-3-laminaribioside. Seed oil contains oleic, myristic, linoleic, stearic, vernolic, lauric, sterculic and malvalic acid..

Uses

Leaf juice / stem bark juice is taken by the patient in case of diabetes. Fruits and seeds are also considered as a best remedy for the treatment of diabetes. One to two spoonful juice of ripe fruit is given to the patient in morning in empty stomach. The juice of ripe fruit can be stored in the season and used throughout the year. One teaspoonful seeds

powder is given to the patient twice a day along with water. The usefulness of this plant in curing diabetes has been verified by the authors in many cases.

***Swertia chirata* Buch-Ham. (Gentianaceae)**

Chirayta

Annual and perennial herb.

Chemical Constituents

Chiratin and ophelic acid, a phenolic compound, oleic, palmitic, stearic acids and a phytosterol.

Uses

Chirata might lower blood sugar levels in some people. Decoction of whole plant along with 2gm black cumin (Nigella sativa) is given once in a day during excessive urination. The plants are soaked in water over night and the filtrate is taken in empty stomach in the morning.

***Tephrosia purpurea* Linn. (Papilionaceae)**

Sarphonka

Much branched herb or under shrub, found in wastelands.

Chemical Constituents

Steroids, glycosides, flavones and fatty acids.

Uses: Decoction of the leaf is taken in the morning and evening for a period of 30 45 days. Root is also used in the treatment of diabetes.

***Tinospora cordifolia* (Willd.) Murs. (Menispermaceae)**

Gurch, Guduchi

A common climber, commonly found on trees in forests.

Chemical Constituents

Furanoid diterpene 10-hydroxycolumbin, clerodane, clerodanefuranoditerpene I, II, III, IV, tinosporaside, tinosporidine, b-sistosterol.

Uses

Oral administration of aqueous extract of root caused a significant reduction in blood glucose. The decoction of the stem with honey is taken in the treatment of diabetes. Leaf powder alone or mixed with milk is taken twice a day for one month.

***Trigonella foenum-graecum* Linn. (Papilionaceae)**

Methi

Annual herb, commonly cultivated

Chemical Constituents

2 flavonoid glycosides-quercetin and luteolin, Trigocoumarin, steroidal saponins from seeds, saponins yield diosgenin and gitogenin, alkaloid trigonellene.

Uses: One teaspoonful powder of the seeds is taken in the morning for 30 days.

RESULTS AND DISCUSSION

The area under study was visited several times to collect plants and information about their medicinal values given by local people especially the tribal's and medicine men of the area. Although use of numerous plant parts such as root, stem, stem bark, leaves, fruits, seeds etc is very common but the method of application varies among different tribes. A total of 25 Indigenous plant species belonging to 20 families have been recorded. The medicinal plants have been alphabetically arranged with their correct botanical name, family, local name(s), habit, chemical constituents and mode of administration and dose(s). In few cases plant remedies have been verified by author eg. Annona squamosa, Aegle marmelos, Azadirachta indica, Catharanthus roseus, Clerodendrum multiflorum, Emblica officinalis, Gymnema sylvestre, Momordica charantia, Syzygium cumini, Trigonella foenum-graecum. The authentic identification of the botanical source and on the spot verification is of prime importance. Usually this aspect is not given due attention by the workers.

Diabetes is a chronic illness that requires continuing medical care and patient self management education to prevent acute complications. It is desired that the care of diabetes through herbal medicine as recorded by the authors receives due attention of the persons / organizations engaged in diabetes research and care.

The author's stress upon the urgent conservation and protection of medicinal plant wealth. Over exploitation of medicinal plant wealth should be checked. According to Tandon, (2006) *in-situ* conservation of medicinal plants is highly desired along with their habitats. There is a need to encourage the cultivation of medicinal plants at large scale and development of the herbal gardens. Such steps will be

helpful in conserving our vast medicinal plant resources which can be utilized for controlling diabetes and other diseases.

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