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HYPOGLYCEMIC EFFECT OF *PTEROCARPUS MARSUPIUM* (*VIJAYSAR*) AND *COCCINIA INDICA* (*BIMBI*) W.S.R TO *MADHUMEH* (DIABETES MELITIS)

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ABSTRACT

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both processes are involved in the development of diabetes. The basis of the abnormalities in carbohydrate, fat, and protein several pathogenic metabolisms in diabetes is deficient action of insulin on target tissues.

Diabetes is also known as *Madhumeha* in Ayurveda. Diabetes Mellitus has become a global problem in spite of advances in modern science. Ancient science of Ayurveda has discussed diabetes at length thousands of years ago. India has been projected by WHO as the country with the fastest growing population of Diabetic patients. It is estimated that between1995 – 2025 diabetic patients in India will increase by 195%.Number of diabetic patients are increasing in very high range. Year by year, its growing speed is very fast. In Ayurveda there are many ways to prevent diabetes mellitus and to cure its complications. In this paper, I am trying to explain the hypoglycemic effect of *vijaysar (pterocarpus marsupium) and bimbi (coccinia indica)* in diabetes mellitus *(madhumeh).*

Key Words: Diabetes mellitus, *Madhumeh*, Ayurveda Insulin.

INTRODUCTION: Diabetes mellitus is considered as one of the five leading causes of death in the world. It is a syndrome of disordered metabolism, usually due to a combination of hereditary and environmental causes, resulting in abnormally high blood sugar levels (hyperglycemia).[1]Being a major degenerative disease, diabetes is found in all parts of the world and it is becoming the third most lethal disease of mankind and increasing rapidly. It is the most common endocrine disorder, affecting 16 million individuals in the United States and as many as 200 million individuals worldwide. Ayurvedic remedies for *Madhumeha* (diabetes mellitus) are the oldest among all the available therapies. *Pramehas* are a list of urinary disorders, especially characterized by profuse urination with several abnormal qualities due to doshic imbalances. The word *Prameha* is derived from, Pra – means excess, Meha – ksharane - passing of urine. So *Prameha* is passing excessive urine and turbid in color (‘*prabhootha avila mootrata*’). The main causes of *prameha* are lack of exercise and improper food habits. Main causes Sleeping in day time, lack of exercise, Laziness, Sedentary habits, consumes food and drinks which are cold, unctuous, sweet and fatty items etc, (Fat rich Diet).[2]

Classification –

I.) *Prameha* is classified aetiologically in to *Sahaja* (Hereditary) and *Apathya nimittaja* (Unwholesome things – food and exercise etc,.).

II.) According to physical management i. *Apatharpana uthaja prameha* describing the lean diabetic ii. *Santharpana uthaja prameha* relating the obese diabetic.

III.) According to the doshic causes, these pramehas are classified as twenty types :

i. *Vataja pramehas* – There are totally four *vataja pramehas*. ii. *Pittaja pramehas* – There are totally six *pittaja pramehas*. iii. *Kaphaja pramehas* – There are totally ten *kaphaja pramehas*.[3]

Medicinal plants and its products continue to be an important therapeutic aid for alleviating the ailments of human kind. Herbs for diabetes treatment are not new. Since ancient times, plants and plant extracts were used to combat diabetes. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter.[4]The incidence of diabetes is increasing day by day. Being a silent killer, it is attacking the young generation secretly that increases the burden of exchequer on the people as well as the government. Two things are common these days- Side effects and Insulin resistance among the people who are taking modern medicines for diabetes treatment. It leads to searching of alternative system of medicine where Ayurveda has greater application and importance. Ayurveda treats diabetes through drugs, diet, *panchakarma* and exercise. Many drugs and herbs are used in diabetes. As this way, *vijaysar (pterocarpus marsupium) and bimbi (coccinia indica)* is very useful in diabetes according to Ayurveda.[5]Diabetes mellitus is well known clinical entity with various late complications like retinopathy, neuropathy, nephropathy, *etc*. *Vijaysar and Bimbi* has significant antidiabetic as well as hypolipidemic activity so that it can be used as an adjuvant along with allopathic treatment of medicine to treat diabetes as well as to delay the late complications of diabetes.

Profile of *Pterocarpus Marsupium:*

Botanical Name : *Pterocarpus marsupium*

Family : Leguminosae (Fabaceaea)

Many plants have been used for the treatment of diabetes mellitus in Indian system of medicine and in other ancient systems of the world. Out of these only a few have been evaluated as per modern system of medicine. Most of them seem to act directly on pancreas (pancreatic effect) and stimulate insulin level in blood. Some have extra pancreatic effect also by acting directly on tissues like liver, muscle etc. and alter favourably the activities of the regulatory enzymes of glycolysis, gluconeogenesis and other pathways.

Morphology:

It is a deciduous tree about 90 ft or more high.

BARK :

Stem bark is grey-brown to brown. Heart wood is golden yellow and bark yields a re ddish gum.

LEAVES :

3-5 inches long, have 5-7 leaf lets long, margin wavy and obtuse. The petioles are r ound,

smooth and waved from leaflet to leaflet, 5 or 6 inches long and no stipules.

FLOWER :

1.5 c.m. long, very numerous, white, with a small tinge of yellow, stamens are 10. Un ited

near the base but soon dividing into two pa

rcels of
5 each; anthers are gllobose and 2 lobed.

Chemical Composition:

Pterocarpol, Marsupol, Maesupin, Carpusin(Marsupsin), (-) epicatechin, Propterol, Pterosupin, Marsupinol, Lupeol are the main constituents. Resin contains Kino tannic acid, Pyro catechin, epicatechin.

Pterocarpus marsupium is the only pure herb ever found to regenerate beta cells in the pancreas that produce, store and release the hormone insulin. *Pterocarpus marsupium* is a very rich source of pterosupin, pterostilbene, marsupin and epicatechin which are highly effective blood glucose lowering compounds. *P. marsupium* exhibits strong anti-diabetic, anti-oxidant and astringent properties used in the treatment of inflammation and non-insulin dependent diabetes mellitus (NIDDM).[6]

Control Blood Sugar Level in Diabetes:

Vijaysar is well-known remedy to take care of diabetes. *Pterocarpus marsupium* reduces blood sugar level, cholesterol and triglycerides. It also lowers the symptoms of diabetes such as frequent urination, over eating, regular thirsts, and burning sensation in palms and soles.

Vijaysar continues to be used for diabetics for thousands of years. In ancient time, people had a unique method of implementing *Vijaysar* tree for dealing with diabetics.[7]

Lowers total Cholesterol:

Vijaysar shows good anti-hyperlipdemic properties. It assists in lowering total cholesterol, LDL, VLDL and serum triglyceride levels in your body. On the other hand, It fails to induce any change in the HDL cholesterol levels.

Indian Kino Tree is a very famous medicine of diabetes. It lowers blood sugar level, cholesterol and triglycerides. Indian Kino Tree Tumbler is made from its heartwood. The water is stored in this tumbler overnight and taken for managing blood sugar level. Heart wood powder also lowers total cholesterol levels in the body. There are many classical as well as modern Ayurvedic medicines containing bark powder of this medicinal tree are used to manage diabetes.[8]

In *Ayurveda*:

Hindi name- *Vijayasara, Vijaysar*, English name- Indian Kino tree, Malabar Kino tree

Sanskrit synonyms:

Asana, Beejaka, Kavya, Priya, Bandhukapushpaka, Shouri, Karshya, Sarjaka, Mahasarja, Tishya, Krushnasarjaka, Pushpavruksha, Alakapriya Peetasara, Peetashalaka, Sugandha Neela niryasa

In *samhita- beejak* use as *madhumehhar-* [9]

***Vijaysar* Medicinal Properties:**

*Rasa (*taste) – *Kashaya* – astringent, *Tikta* – bitter

Guna (qualities) – *Laghu* – light to digest, *Ruksha* – dry,

Vipaka- Katu – Undergoes pungent taste conversion after digestion

Veerya – *Sheeta* – Coolant [10]

Effect on *Tridosha* – Balances *Kapha* and *Pitta Dosha*.

Part used- Heart-wood, exudate resin

Dosage-Decoction 50-100ml; powder 3-6 g [11]

Prpfile of *Coccinia Indica*

Botanical name: *Coccinia indica*

Family: Cucurbitaceae

In traditional medicine, there are numerous medicinal plants that have the potential to treat many diseases and disorders, one of

them is *Coccinia indica* (family: Cucurbitaceae) popularly known as Kanduru in Hindi. This plant is traditionally used in blood diseases.

The plant has the reputation of having a remarkable effect in reducing the amount of sugar in the urine of patients suffering from diabetes mellitus.

Morphological Profile:

This plant is a perennial climber with single tendrils and glabrous leaves. The leaves have 5 lobes and are 6.5–8.5 cm long and 7–8 cm wide. Female and male flowers emerge at the axils on the petiole, and have 3 stamens.

LEAVES: Leaves are 5-10 cm, long and broad, bright green above, paler beneath, studded and sometimes rough with papillae, palmately 5-nerved from a cordate base, often with circular glands between the nerves, obtusely 5-angled or sometimes deeply 5-lobed, the lobes broad, obtuse or acute, apiculate, more or less sinuate toothed, petioles 2-3.2 cm. long.

FLOWERS: Male flowers: Peduncles are 2-3.8cm.long and subfiliform. Calyx-tube is glabrous, broadly campanulate and 4-5 mm. long. Corolla is 2.5 cm. long, veined, pubescent inside and glabrous outside. Female flowers: Peduncles are 1.3-2.5cm. long. Ovary is fusiform, glabrous and slightly ribbed.

FRUITS: Fruits are fusiform-ellipsoid, slightly beaked, 2.5-5 by 1.3-2.5 cm. sized, marked when immature with white streaks, bright scarlet when fully ripe.

SEEDS: Seeds are obovoid and rounded at the apex, slightly papillose, much compressed and yellowish grey.

ROOTS: The fresh root is thick, tuberous, long tapering, more or less tortuous with a few fibrous rootlets attached to it. Roots are flexible, soft and break with a fibrous fracture. A transaction of root shows circular outline and is characteristic of storage type. Parenchyma is full of starch grains and thorough permeation of parenchyma with vascular elements is observed. The cork is composed of rows of cells. [12]

Chemical composition:

Plant contains resins, alkaloids, fatty acids, flavonoids and proteins as chief chemical constituents. Aspartic acid, Glutamic Acid, Asparagine, Tyrosine, Histidine, Phenylalanine And Threonine, Valine, Arginine are also found. The methenolic extract of fruit contains alkaloids, steroids, tannins, saponins, ellagic acid, phenols, glycosides, lignans and triterpenoids.[13]

***Kundaru* use as *Madhumehhar Dravya*:**

Coccinia indica is used in Ayurveda and Siddha for treatment of diabetes. It has blood sugar lowering effect on body. For lowering blood sugar, various parts of plant viz. root, fruit, leaves and stem are used.

The active principle (with Insulin like activity) which is responsible for anti-diabetic effect is slow acting. So the visible effect is obtained only after a month of treatment. Therefore for controlling high sugar level and high lipid level in blood use this for longer duration.

IN *AYURVEDA*-

Sanksrit Synonym of *Bimbi* –

Tundikeri/ Tundika- The ripened red color of the fruit resembles the color of beak of parrot.

Raktaphala- The ripened fruit is blood red in color

Ashtopama Phala – ripe fruit resembles lips in shape and colour

Oshta upama phala- The color of the ripened fruit resembles red color like that

of lips *Vidruma phala, Ushnaphala, Dantachada, Peeluparnika* [14]

In *nighantu-* bitter property of *bimbi* useful as *madhumehhar-*[15]

Medicinal property

*Rasa (*Taste*)* – *Tikta (*Bitter*)*
*Guna (*Qualities*)* – *Laghu (*Light for digestion*)*, *Ruksha (*Cause dryness*)*, *Teekshna (*Strong*)*
*Veerya (*Properties*)* – *Ushna (*Hot in potency*)*
*Vipaka –Katu (*Undergoes Pungent taste after digestion*)*
Karma (Action) – *Kaphapittahara* (reduces the vitiated *kapha* and *pitta dosha)* [16]

Part used: Leaves, Root (Medicinal purpose), Fruit (as vegetable)

Dosage

Juice: 10-15 ml
Root: 3-6 g [17]

CONCLUSION:

In developing countries, providing modern healthcare facilities is still in infancy. The most common uses of pterocarpus in modern herbal medicine include to help support the body's natural ability to manage and regulate blood sugar levels.

Coccinia indica is famous plant for its safe antidiabetic property. It possesses hypoglycemic, antidiabetic, hypolipidemic, hepatoprotective, larvvicidal, Anti-inflammatory, analgesic and antipyretic activities**.** Both plants are very useful in diabetes.

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