Antidiabetic Effect of Karanja Seed Powder in Type-2 Diabetes Mellitus (DM)

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ABSTRACT
Madhumeha is a Vatika type of Prameha, it can be described as disease in which patient voids the urine having concordance with Madhu i.e. of Kasaya and Madhura taste, Ruksa texture and madhu (honey) like colour and body acquires sweetness so called Madhumeha. Diabetes Mellitus is a metabolic disorder with a group of symptoms like polyurea, polydipsia, hyperglycemia etc. Pongamia pinnata (L.) Pierre [family: Fabaceae] is a medium –sized glabrous tree popularly known as Karanja in Hindi, Indian beechn in English and Pongam in Tamil. Karanja is indicated in Prameha in Samhita granthas and many nighantus, due to its properties opposite to Sampraapti ghatak of Madhumeha. This is an attempt to compile and document information on different aspect of Pongamia pinnata and its potential use as antidiabetic drug.

Introduction:
In Ayurvedic classics Madhumeha is described under heading of Prameha Roga. Ayurvedic scholars have referred Madhumeha as Maharoga or Mahagada. Prameha comprises a number of diseases with various physical and chemical changes in urine. The manifestation of this dreaded disease is described as Prabhutavilmutrata, means in which patient voids frequently copious urine with turbidity. (1,2) Anusanginam, as considered by Caraka gives the clue for the adherent nature and poor prognosis of the disease.

Diabetes Mellitus is defined as the state of chronic hyperglycemia due to impairment of insulin secretion or its action. Diabetes mellitus (DM) comprises a group of common metabolic disorders that share the phenotype of hyperglycemia. The most important demographic change to diabetes prevalence across the world appear to be the increase in the proportion of people>65 years. By the 2030 it is estimated that number of people with diabetes >64 age will be >82 million in developing countries and >48 million in developed countries. (6)

Long term Diabetes lead to several complications like diabetic retinopathy, neuropathy, nephropathy and several other so it is necessary to use such drugs which cure the Diabetes along with its complications. (7)

In this respect many drugs have been used for treatment of Diabetes. In the present work, the drug Karanja has been used for the management of Madhumeha. The selected drug Karanja is mentioned in Ayurvedic classics like Caraka, Susruta, Vagabhati and various Nighantus. In the traditional system of medicines, such as Ayurveda and Unani, the Pongamia pinnata plant is used for anti-inflammatory, anti-plasmodial, antinociceptive, anti-hyperglycemic, anti-oxidative, anti-diarrhoeal, anti-ulcer, anti-hyperammonic and antioxidant activity. (8)

Aims and objectives
To study the effect of Karanja seed powder in the management of Madhumeha.

Discussion
In prevedic era the Diabetes is described to have originated after consumption of Havis of Vajna performed by Daksa Prajapatii. Its inclusion in “Asta Mahagada” by Caraka, Susruta and Vagbheda signifies the importance of the disease. “Prameha Anusanginam”, as considered by Caraka gives the clue for the adherent nature and poor prognosis of the disease.

The prevalence of type 2 Diabetes is increasing all over the world, it was estimated for all age group to be 2.8% in 2003 and 4.4% in 2030.

India has high prevalence of Diabetes and the number is increasing at an alarming rate. The most disturbing trend is the shift in age of onset of Diabetes to a younger age in the recent years. This could have long lasting adverse effects on nation’s health and economy.

Our mission was launched with an aim to explore the possibility of a better control over Diabetes by Karanja.

Karanja has Kasaya, Katu and Tikta Rasa, Tikna and Laghu Gunas, Katu Vipaka and Usna Virya. It is KaphaVatamamaka and Pittavardhaka. All these properties make it suitable to combat Madhumeha. (9)

During review we found that different chemicals are also isolated from Karanja viz. Karanjin, pongapin, pongamol-chromeno crhmoene, furanoflavones and various other chemical constituents.

Ethnobotanical review reveals that different parts are used by many tribes all over the world to cure many diseases viz. Diabetes, diarrhea, skin diseases as scabies, dyspepsia, inflammation, leprosy, cough etc. In wound caused by poisonous fish it is used and also used in fever and jaundice. BotanicallyPongamia pinnata (Linn.) Pierre is studied as source plant of Karanja (10)

Madhumeha has been described as one among the 20 types of Prameha and is subtype of Vataja Prameha. It is Tridosaja vyadhii. Abaddda Slesna is particular Dosa in all types of Prameha. The clinical entity in which patient voids the urine having concordance with Madhu i.e. of Kasaya and Madhura taste, Ruksa texture and Madhu (honey) like colour and body acquires sweetness is called Madhumeha. Treatment of Madhumeha is difficult due to contradictory treatment of Vata (predominant Dosa) and Meda (predominant Dusya). Drugs which combat Vata will increase Meda and Kapha and vice-versa. In Avaranajanya Madhumeha the treatment must be such that is should not vitiates Vata and should clear Avarana also.

Karanja is indicated in Prameha by authors of many Nighantus. Kapha, Abaddda Meda and Vata are main factors in pathogenesis of Madhumeha. Karanja having Katu, Tikta Rasa and Katu...
Vipaka alleviates Kapha and Meda Dosha involved in all types of Prameha. Kasaya Rasa of Karanja also allivate Kapha and being Stambhana it also decrease Sarira gata Kleda and useful in Ba-humutrata. Because of its Tiksna, Laghu Guna and Bhedana action it is Srotosodhaka. Its Usna Vira, pacifies Vata and Kapha. It also has Kapha Vatasamaka action which is desirable in treatment of Madhumeha.

The test drug is effective in polyurea because of its Kasaya Rasa which is Stambhana and also reduces Sarira Gata Kleda. This result shows that trial drug proved better synergistically with Gliclazide.

It lowers the post prandial blood sugar (PPBS) might be due to its Katu, Tikta Rasa and Katu Vipaka which pacify Kapha and Meda. Kapha and Meda are the causative factors to increase Madhumatta. It may have Acarbose like action to which causes reduction in glucose absorption.

In all we can say that factors involved in Madhumeha (type 2 DM) are increase in Meda and Kapha, vitiation of Vata and Dhatuk-saya chiefly. Karanja by virtue of Tikta and Katu Rasa alleviate Meda and Kapha main etiological factors involved in pathogenesis of disease. Being Usna Vira it pacify Vata, and by virtue of Kasaya Rasa it reduces Sarira Gata Kleda. This seems here it acts by Guna Prabhava. Improvement in physical strength observed in the test subjects could not be explained by its properties and action therefore, this benefit may be due to Dravyaguna Prabhava. So we may infer that the drug acted by both Gunaprabhava and Dravyaprabhava.

**Medical importance**

- Seed used for keloid tumors, used in hypertension, skin ailments and rheumatic arthritis. (11),(12),(13)
- Seed powder valued as a febrifuge, tonic and in bronchitis and whooping cough (14).
- Useful in inflammations, pectoral diseases, chronic fevers, hemorrhoids and anemia.(15).

**Reference**