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## A study on *Palash* (*Butea Monosperma* Lam. Kuntz.) with special reference to its role in *Madhumeha* (Diabetes Mellitus Type 2)

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**Abstract**

The traditional system of medicine together with folklore medicine continue to play a significant role in our health care system. *Palash* is a commonly used herb in *Ayurvedic* medicine. The botanical source of *Palash* is *Butea monosperma* Lam. Kuntze. It is a medium sized deciduous tree which is widely distributed throughout the greater part of India. *Palash* belongs to family Fabaceae and is popularly known as 'flame of the forest'. The plant is traditionally reported to possess astringent, bitter, alterative, aphrodisiac, anthelmintic, antibacterial and anti-asthmatic properties. Bark yield red juice known as 'Butea gum' or 'Bengal kino'. The widespread uses of *Palash* in traditional system of medicine have resulted in their extensive chemical analysis for their bioactive principles. This article briefly reviews the botany, chemistry and pharmacology of *Palash*.

**Keywords:** *Ayurveda, Palash, Butea monosperma, Fabaceae, Bengal kino*

**Introduction**

*Palash* (*Butea monosperma* Lam. Kuntze) is a commonly used herb in *Ayurvedic* medicine. The genus *Butea* refers to beautiful appearance of flowers. The specific name *monosperma* means 'one seeded and refers to the fruit with a single seed near its apex'. is commonly known as Flame of forest, belonging to the family Fabaceae [1]. The literary review of the *Palash* was started right from the *Vedas* up to recent research works to obtain thorough knowledge of drug. On comprehensive review of *Ayurvedic* classics it was found that *Palash* is described in *Vedas, Upanisads, Caraka Samhita, Susruta Samhita* and both *Astanga Sangraha* and *Astanga Hrdaya*. In *Caraka Samhita*, it is not described in *Mahakasaya* [2]. In *Susruta Samhita*, *Palash* is described in *Rodhradi, Muskakadi, Ambasthadi* and *Nyagrodhadi Gana* [3]. In *Astanga Hrdaya*, *Vagbhata* mentioned *Palash* in *Asanadi gana* and like *Susruta Samhita*, he has mentioned *Palash* in *Rodhradi, Muskakadi, Ambasthadi* and *Nyagrodhadi Gana* [4]. In *Astanga Sangraha*, *Vagbhata* mentioned *Palash* in *Asanadi, Rodhradi, Muskakadi, Ambasthadi* and *Nyagrodhadi Gana* [5]. It is described in other *Samhita's* like *Kasyapa Samhita, Bhela Samhita, Harita Samhita* and *Sharangadhar Samhita*. *Palash* is also mentioned in *Cikitsagranthas* like *Cakradutta, Gadanigraha, Bhaishajya Ratnavali* and *Bhavaprakasha Samhita*. *Palash* is mentioned in *Nighantu* also. Many of the *Nighantus* have described the properties of *Palash* i.e the rasa of *Palash* is *tikta* and *kasaya*, *Virya usna* but flower of *Palash* is *sita* in nature. The fruit is *Laghu, usna* and used in *Prameha, Arsa, Krimi* and *Vatakaphaja rogas* according to *Bhavaprakash Nighantu* [6] while in *Nighantu Adarsh* [7], the rasa of *Palash* is *katu, tikta, kasaya, virya- usna, vipaka -katu, Doshaghnta- Kaphavatanasaka*. The author of *Dhanvantari Nighantu* [8] mentioned properties *Palash Bija* as *Katu* in *rasa, Snigdha* in *guna, Usna virya* and *kaphanasaka*.

**Scientific Classification** [9]

Kingdom: Plantae  
Division: Magnoliophyta (Spermatophyta)  
Class: Magnoliopsida (Dicotyledons)  
Order: Fabales (Rosales)  
Family: Fabaceae  
Genus: *Butea*  
Species: *monosperma*.

**Vernacular names** <sup>[10]</sup>

Hindi: Dhak, Tesu

English: Bastard teak, Bengal kino, Flame of the forest

Kannada: Muttunga, Thoras

Tamil: Parasa, Pilasu

Bengali: Palas

Gujarat: Khakharo, Palaspappda

Punjabi: Chichra, Dhak, Palas.

**Synonyms of Palash** <sup>[11]</sup>

- *Palash* – The leaves are fleshy and beautiful.
- *Kinshuka* - Resembling parrot's beak.
- *Ksharashrestha* - The plant is one of the best among the sources of alkali.
- *Parna* - The Leaves are useful.
- *Brahmavrksa* - Used in religious rites and sacrifices.
- *Yajniya* - Used in `religious rituals.
- *Raktapuspa* - Flowers are red.
- *Vatapotha* - It pacifies vata.

In *Ayurvedic* classics *Madhumeha* is described under heading of *Prameha Roga*. Considering the seriousness of the disease and its prognosis, *Ayurvedic* scholars have referred *Madhumeha* as *Maharoga* or "*Mahagada*" i.e. a disease which has grave and serious clinical manifestations with possibility of occurrence of serious complications and at times with fatal prognosis. *Acharya Susruta* has described the treatment of *Madhumeha Roga* separately in chapter 13 of *Cikitsasthana* <sup>[12]</sup>.

**Material and methods****A. For literary review**

Literary review of *Palash* ere explored from classical texts viz. *Caraka Samhita*, *Sushruta Samhita*, *Ashtanga Sangraha*, *Ashtanga Hridaya*, *Chikitsagranthas* and *Nighantus* viz. *Raja nighantu*, *Dhanvantari nighantu*, *Bhaishajya Ratnavali* and articles published in various journals.

**B. For phytochemical study**

*Palash panchanga* (Rootbark, stembark, leaf, flower and seed) were collected by rural area of Varanasi and identified by the teacher of Dravyaguna department in Faculty of Ayurveda B.H.U Varanasi. Macroscopic and microscopic evaluation was carried out with different parts of plant. They were pulverized in the mechanical grinder to a moderate fine powder to carry out microscopic studies and were stored in a well closed airtight vessel for further analysis. All reagent and chemicals used for the study were of analytical grade.

**C. For clinical study****Dose, Duration of Treatment and Follow up**

1. In text of *Ayurveda*, the general dose of kwatha has been described from 50 ml to 100 ml. An average dose of kwatha twice a day was fixed for an average individual of 70 kg. The dose of every patient was calculated with this ration.
2. All the patients were followed up at interval of every 30 days.
3. Total duration of treatment was 3 months.

Decoction of *Palash panchanga* was used for clinical study. To study the clinical efficacy of *Palash panchanga*, 60 patients of type 2 diabetes mellitus were registered. They were divided into three groups each group having 20 patients

according to our selection criteria. Out of them 3 patients were aborted and 57 were in our regular follow up.

- Patients of group A were treated with decoction of *Palash panchanga* (in a dose discussed in chapter of Material and method).
- Patients of group B were already diagnosed cases of Diabetes mellitus type2 and taking OHGs. These patients were switched over to conventional doses of Gliclazide (a dose between 40-160 mg/day).
- Patients of group C were treated with combination of decoction of *Palash panchanga* and Gliclazide.

**Result**

In the phytochemical study, it was found that carbohydrates, flavonoides, alkaloids, glycosides, tannins and phenolic compounds was present in both alcoholic and hydroalcoholic extract but fat and oils and steroids was present only in alcoholic extract. The Ash value was also done which is 10% of total Ash value of *Palash*. Acid- insoluble ash value was 5.3% and water-soluble ash value was 1.3%.

In Powder microscopy study of stembark of *Palash* shows pericycle fibres, cork cells, calcium oxalate crystals and stone cells. In powder microscopy study of flower shows vascular bundles & fibres, Pollen grains, calcium oxalate crystals and anther wall. In Leaf lignified vascular bundles, endodermis and trichome were found. In seed vascular bundles, oil globules, hemicellulose endospermic wall and aleurone grains were found.

To evaluate clinical efficacy of the test drug i.e. decoction of *Palash*, both subjective and objective parameters are taken into account. At each follow up the patients were assessed for clinical symptoms of *Madhumeha* (Type 2 DM). Fasting blood sugar, Post prandial blood sugar were also assessed at each follow up. HbA1c, serum cholesterol, HDL, LDL were taken before and after treatment.

It was found that, It was statistically highly significant difference between before treatment and 3<sup>rd</sup> follow-up when compared it within the group by Paired 't' test and it was also significant when compared between the group by One way Anova test ( $p < 0.01$ ). There was improvement in subjective parameters in terms of polyurea, polydypsia, weakness, cramps on walking, tingling and burning sensation.

The improvement in the symptoms of polyurea was found statistically highly significant in group C. This may be due to its *Kasaya Rasa* which is *Stambhana* and also reduces *Sharira Gata Kleda*. This result shows that trial drug proved better synergistic effect with Gliclazide (oral hypoglycaemic agent). The improvement in the symptoms of polydypsia was observed statistically highly significant in group C. The improvement in the symptom of polyphagia was statistically highly significant in group C while it was significant in group B. With respect to weakness, treatment response was found more pronounced with test drug in comparison to standard drug. This observation favours its adaptogenic claim and claim of folk people that it improves health.

Reduction in loss of weight was statistically significant in group C while it was less significant in group 'B'. Considering cramps on walking effect of test drug was more profound in comparison to Gliclazide. Synergistic effect of test drugs along with standard drug was better than standard drug alone. Relief in this symptom observed with test drug, this may be due to its *Vatasamaka* property.

Regarding tingling and burning sensation as well as numbness the treatment with test drug was found statistically significant. In group C, statistically significant changes were observed in

reduction of fasting blood sugar while in group 'A' and 'B' it was less significant. Effect on Post prandial blood sugar was significant in test drug groups at the same time it was highly significant in group C. Results show that trial drug proved better synergistically with oral hypoglycaemic agents. It lowers the PPBS might be due to its *Katu*, *Tikta Guna* and *Katu Vipaka* which pacify *Kapha* and *Meda*. *Kapha* and *Meda* are the causative factors to increase *Madhuratva*. It may have Acarbose like action to which causes reduction in glucose absorption.

Reduction in HbA1c was statistically significant in group C. Total cholesterol level and triglyceride was decreased in group C. Value of HDL was increased in group C after taking treatment. In group C reduction in LDL and VLDL level was significant.

Overall the observations were found more effective in group C, where the test drug was continued with the modern drug. It was more significant due to its synergistic action. We found that it has efficacy to reduce Fasting Blood Sugar, Post prandial blood sugar level, so we conclude that one of the mode of action of *Palash* is may be due to reduction in glucose absorption.

### Discussion

*Palash* is indicated in *Madhumeha* in classical texts. *Kapha*, *Abadhha Meda* and *Vata* are main factors in pathogenesis of *Madhumeha*. *Palash* having *Katu*, *Tikta* and *Kasaya Rasa* and *Katu Vipaka* alleviates *Kapha* and *Meda Dosha* involved in all types of *Prameha*. *Kasaya Rasa* of *Palash* also allviate *Kapha* and being *Stambhana* it also decrease *Sarirra gata Kleda* and useful in *Bahumutrata*. Because of its *Laghu Guna* and *Bhedana* action it is *SrotoShodhaka*. Its *Usna Virya*, pacifies *Vata* and *Kapha*. It also has *Kapha Vatasamaka* action which is desirable in treatment of *Madhumeha*.

In all we can say that factors involved in *Madhumeha* (type 2 DM) are *Meda* and *Kapha*, Vitiation of *Vata* and *Dhatukasaya* chiefly. *Palash* by virtue of *Tikta* and *Katu Rasa* alleviate *Meda* and *Kapha* main etiological factors involved in pathogenesis of disease. Being *Usna Virya* it pacify *Vata*, and by virtue of *Kasaya Rasa* it reduces *Sariragata Kleda*. Thus action of *Palash* in *Madhumeha* is due to both *Gunaprabhava* and *Dravyaprabhava* i.e. *Dravyagunaprabhava*.

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