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THERAPEUTIC AND PHARMACOLOGICAL IMPORTANCE OF *MESHASHRINGI(GYMNEMA SYLVESTRE* R.Br.*)* W.S.R. TO DIABETES MELLITUS

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ABSTRACT

Diabetes mellitus is a clinical syndrome characterized by hyperglycaemia due to absolute or relative deficiency of insulin. Ayurvedic ancient texts have mentioned Meshashringi (Gymnema sylvestre R.Br.) Family: Asclepiadaceae, is a diffuse, twining shrubs with pubescent young parts having an antidiabetic property. As this is having Laghu, Ruksha Guna, Kashaya, Tikta Rasa, Katu Vipaka, Ushna Virya. By the virtue of above properties this is Kaphavatashamaka. It is commonly known as Gurhmar. Plant occurs naturally in various regions of India from Konkan to Travancore. Meshashringi contains two resins, ablbuminous substance, colouring matter, calcium oxalate, gymnemic acid 6%, quercitol and sugar yeast. Ash contains ferric oxide, manganese and other matters. It is used in diabetes insipidus and diabetes mellitus in particular for which leaves powder is prescribed as a single drug or as an ingredient of a recipe. Roots decoction is orally given in case of snake-bite. The drug is bitter tonic. Seeds are useful in coryza, cold, cough and asthma. The present review is therefore, an effort to give a detailed focus on its botanical details, phytochemistry, pharmacodynamics, etiopathogenesis and its therapeutic importance.

Keywords: *Ayurveda, Meshashringi, Gymnema sylvestre, diuretic, diabetes mellitus, prameha, etiopathogenesis, pharmacology.*

INTRODUCTION

Meshashringi (Gymnema sylvestre R.Br.) Family: Asclepiadaceae is a diffuse, twining shrubs with pubescent young parts commonly known as Gurhmar, occurs naturally in tropical Africa, Asia and Malesia. It is occasionally found upon bushes or trees in various regions of India; central, northern and western India and from Konkan to Travancore. Diabetes mellitus is a clinical syndrome characterized by hyperglycaemia due to absolute or relative deficiency of insulin. Lack of insulin affects the metabolism of carbohydrate, protein and fat and causes a significant disturbance of water and electrolyte homeostasis[1]. The drug *Meshashringi* is an effective antidiabetic medicine and recommended particularly in treatment of *Mutra-raktagatasarkara hrashaka, Madhumehaghna, Mutrala, Kaphaghna*[2] as mentioned in classical texts of Indian medicine. It is used in diabetes insipidus and diabetes mellitus in particular for which leaves powder is prescribed as a single drug or

as an ingredient of a recipe. Roots decoction is orally given in case of snake-bite. The drug is bitter tonic. Seeds are useful in coryza, cold, cough and asthma.

REVIEW

The literary review of the *Meshashringi* was started right from the *Nighantus* up to recent research works to obtain thorough knowledge of drug. In *Bhavaprakash Nighantu* its synonyms and properties has been described (Bha.P.Guduchyadi Varga,254-255), its properties described in *Kaiyadeva Nighantu* (Kai.Ni.Oshadhi Varga,735-739), in *Raj Nighantu,* it is described as the synonyms and properties(Raj.Ni.Prabhadradi Varga,32-34).

Meshashringi

Scientific Classification[3]

Kingdom : Plantae

(Unranked) : Angiosperms

(Unranked) : Eudicots

(Unranked) : Asterids

Order : Gentianales

Family : Asclepiadaceae

Genus : *Gymnema*

Species : *sylvestre*

Vernacular names[4]

Classical Name : *Meshashringi*

Sanskrit names : *Meshashringi, Madhunashini, Vishani-vishanika, Meshavalli, Ajashringika, Putrashreni, Varttika, Putrashreni, Sarpadanshtrika, cakshushya, Tiktadugdha.*

Regional names : Medhasingi, Gurhmar (Hindi); Medhasingi (Bang.); Kabali (Mar., Guj.); Shirukuriy (Tam.); Vodapatte (Tel.).

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Botanical Description of *Meshashringi*

Diffuse, twining shrubs with pubescent young parts, Leaves short-petioled, ovate, elliptic or oblong, acute or acuminate, rounded below, densely pubescent beneath.

Flowers greenish-yellow, spirally arranged in lateral corymbose cymes, calyx pubescent, divided to the base, segments obtuse, ciliolate. corolla campanulate. Corona projections with a decumbent base, flanked by 2 rows of short, stiff hairs, ciliate. Cymose cynostegium without corona.

Follicles terete, lanceolate, acuminate, up to 7.5 x 0.8 cm. Seeds flat, with marginal wing. Plant flowers and fruits in March-June. Flowering n autumn and fruiting colder season end[5].

Phytochemical Constituents of *Meshashringi*

The leaves of source plant (Gymnema sylvestre Br.) contain two resins - one soluble and another insoluble in alcohol. A bitter neutral principle in lower dose (little quantity), ablbuminous substance, colouring matter, calcium oxalate, gymnemic acid 6%, quercitol and sugar yeast. Ash contains ferric oxide, manganese and other matters[6].

Pharmacodynamics[7]

Rasa : *Kashaya, tikta*

Guna : *Laghu, Ruksha*

Virya : *Ushna*

Vipaka : *Katu*

Doshakarma : *Kaphavatashamaka*

Parts used are leaves, roots, Seeds. Dose is leaves powder 3-6 gm., root decoction 50-100 mg.

PROPERTIES AND ACTION

Rasagrahana nirodhaka (madh), Dipana-yakrduttejaka, Mutrala-vamaka, Mutra-raktagatasharkara hrashaka, Madhumehaghna, Hridayottejaka, Kaphaghna, Mutrala, Garbhashayottejaka, vishamajvaraghna, Katu paushtika, Vishaghna[8].

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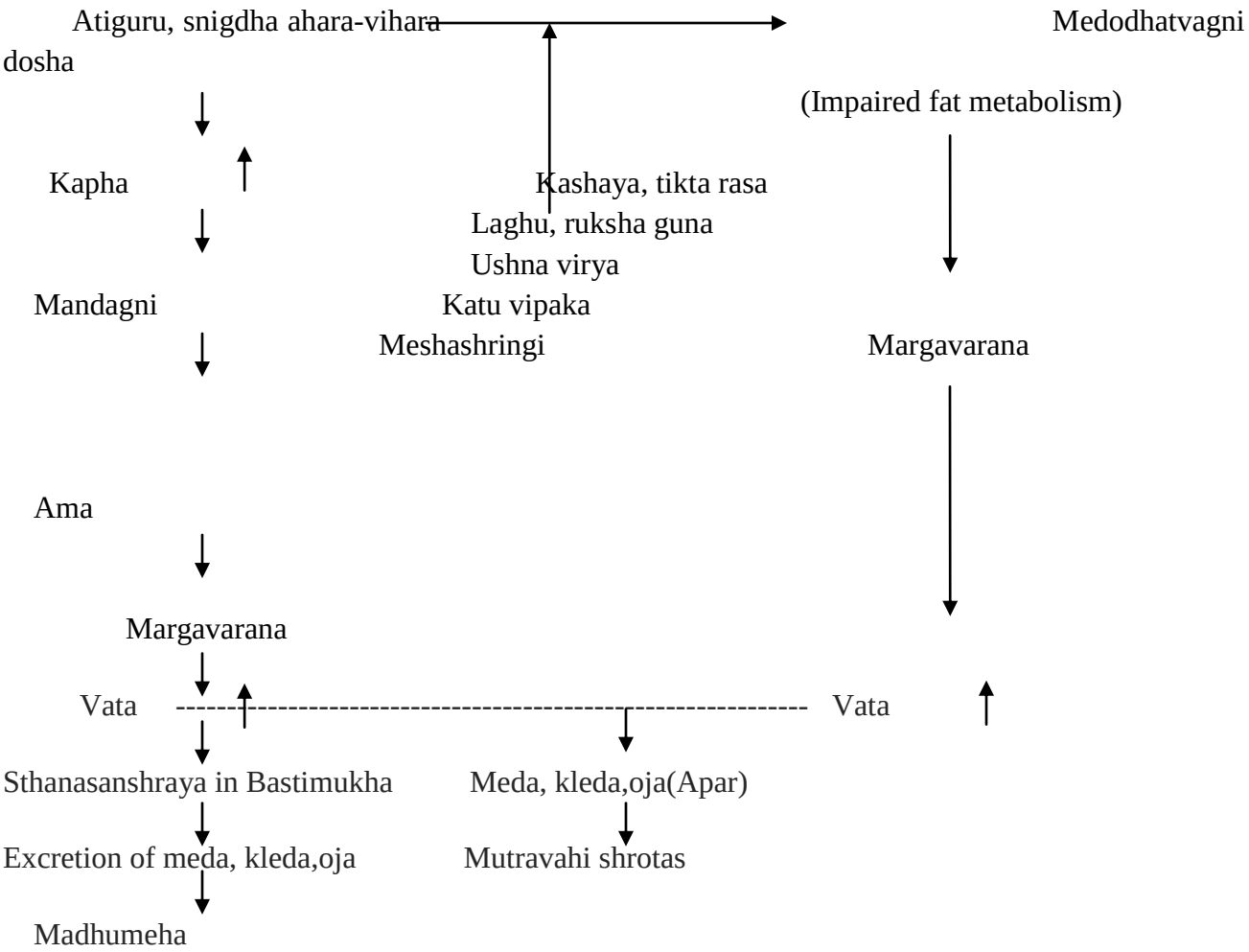
Madhumeha

The concept of diabetes mellitus may be correlated with *Madhumeha* in Ayurveda. Causes and treatment of madhumeha described following (Ma.Ni.33.4,5), (Su.Ni.6.3,5) (Vag.Ni.10.7-8), (A.H.Ni.9.40), (A.H.Ni.259.3), (C.Ci.6.4,5,6,14,57), (S.Ci.11.3)[8].

Probable Mode of action of *Meshashringi* on diabetes mellitus

As the cause of *Madhumeha* are *kaphavardhaka, medovardhaka ahara* and *avyayama, vihara*. As the drug *Meshashringi* is having *laghu, ruksha guna, kashaya ,tikta rasa, katu vipaka* and *Ushna virya*. By the virtue of above properties like *laghu, ruksha* and due to ushna *virya* it pacifies the *kapha* and due to *kashaya, tikta* and *katu vipaka* it pacifies the *vata*. Ultimately *Meshashringi* cures the *Madhumeha*.

Etiopathogenesis[9]



Medicinal Uses of *Meshashringi*

The plant drug is stomachic, stimulant, laxative and diuretic. It is useful in cough, biliousness and sore eyes. The drug is initially action on rasana or jihva (tongue). It is used in diabetes inspidus and diabetes mellitus in particular for which leaves powder is prescribed as a single drug or as an ingredient of a recipe. Roots decoction is orally given in case of snake-bite. The drug is bitter tonic. Seeds are useful in coryza, cold, cough and asthma; the root-bark is employed in dhumapana (smoking) in respiratory ailments. The drug is useful in calculus, dysuria, dysmenorrhoea, malarial fever, heart trouble, constipation, loss of appetite, jaundice and piles. Leaves paste mixed with castor oil is applied to joints inflammation, liver complaints (e.g. yakrcchotha), spleen enlargement and other problems. Root paste is also suggested in snake-bite. Roots are countering poison, anti-inflammatory and analgesic medicine.

The leaves of the plant (mesasrngi patra) when chewed, possess the remarkable property of paralysing for a few hours, the sence of taste for sweet and bitter substances; acid taste is not affected while salt taste is very slightly, if at all influenced. The plant is so named Gurhmar with sense of killing the gur or anti-sweetening effect of peculiarity. The leaf powder is tasteless with a faint pleasant aromatic odour. Leaves powder is traditionally given in glycosuria and diabletes (iksumehaa madhumeha) as a valued herbal remedy in folk medical practices in different regions of country showing frequent uses of this drug among anti-diabetic herbs of tribal medicine.

The plant leaves cause hypoglycaemia in experimental animal when administered orally or by infection. Leaves are considered effective medicine in diabetes sometimes it has gained importance, despite the experimental claim, however, the effect is not due to any direct influence on the carbohydrate metabolim, but to indirect stimulation of insulin secretion by pancreas (and also stimulation of thyoid and adrenal glands secretion alongwith liver function) and hence the hypoglycaemia is induced in experimental animal during biological trials, and further experimental screenings support the hypoglycaemic activily of leaves of plants, which has been mentioned and recommended in Indian medicine as anti-diabetic agent. Leaves powder, thus, stands as hypoglycaemic herbal drug of clinical significance in Ayurveda.[10].

PHARMACOLOGICAL STUDIES

- **Antidiabetic properties**

Antihyperglycemic effect of crude saponin fraction and five triterpene glycosides (gymnemic acids I–IV and gymnemasaponin V), isolated from the methanolic extract of the leaves, was reported[11].

- **Antiarthritic activity**

The other possible mechanism of action suggested protection of the release of joint cartilage and bone destruction in chronic arthritic model[12].

- **Treatment of Dental Carries**

Dental caries can be defined as infection of tooth, occurring due to various kinds of gram-positive cariogenic bacteria[13].

- **Antibiotic and antimicrobial activities**

The antibacterial activity of *G. sylvestre* and gymnemic acid was also studied against *E. coli* and *B. cereus* and the antimicrobial effect was significant against the microbes[14].

- **Anti-inflammatory activities**

In the Ayurvedic system of medicine, the leaf of *G. sylvestre* has been widely used and is considered as bitter, acrid, thermogenic, digestive, liver tonic, anodyne, and anti-inflammatory[15].

- **Anticancer and cytotoxic activities**

Many plant-derived saponins, namely, ginsenosides, soyasaponins, and saikosaponins have been found to exhibit significant anticancer activity. Anticancer potential of gymnemagenol on *HeLa* cancer cell lines in *in vitro* conditions, was determined[16].

- **Antihyperlipidemic activity**

The triterpene saponins constitute several acylated (tigloyl, methylbutyryl, etc.) derivatives of deacylgymnemic acid. Gymnemic acids consist of gymnemic acids I–VII, gymnemosides A–F, gymnemasaponins, and so forth[17].

- **Immunostimulatory activity**

G. sylvestre is reported to be an immunostimulatory plant and the leaves possess immunostimulatory effect[18].

- **Hepatoprotective activities**

The hepatoprotective effect of hydro-alcoholic extract of *G. sylvestre* was evaluated by Srividya et al.[19].

- **Wound Healing Activity**

The alcoholic extract of leaves of *G. sylvestre* was found to exhibit significant wound healing activity in rats[20].

- **Ethnobotanical Uses**

Traditionally, the leaves of *G. sylvestre* were used for the treatment of diabetes and other disorders, while the flowers and bark are given in diseases related to phlegm[21].

CONCLUSION

On comprehensive review of Ayurvedic classics it was found that *Meshashringi* is described in *Nighantus* and *Chikitsagranthas*. Some synonyms like *Meshashringi, Madhunashini, Vishani-vishanika, Meshavalli, Ajashringika* described in various *Nighantu*. *Meshashringi (Gymnema sylvestre* R.Br.) Family: Asclepiadaceae is a diffuse, twining shrubs with pubescent young parts commonly known as Gurhmar, occurs naturally in tropical Africa, Asia and Malesia. As this is having *Laghu, Ruksha Guna, Kashaya, Tikta Rasa, Katu Vipaka, Ushna Virya*. By the virtue of

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