

**CLASSICAL USES OF YASTIMADHU (*GLYCYRRHIZA GLABRA LINN.*)
IN REFERENCE TO MADHUMEHA (DIABETES MELLITUS)**

Dr. Vandana Singh¹ Dr. Arpit Kumar Shrivastava² Dr. Bhuwal Ram³

¹PhD Research Scholar, Department of Dravyaguna, Faculty of Ayurveda, Institute of Medical Sciences, BHU

²Assistant Professor, Department of Kayachikista, Apex Institute of Ayurvedic Medicine & Hospital, Chunar, Mirzapur

³Associate Professor, Department of Dravyaguna, Faculty of Ayurveda, IMS, BHU.

ABSTRACT: The entire pharmacology of *Ayurveda* is grounded on perception, inference, observation and experiment. *Susruta* linked equal importance to both the sides of knowledge, theoretical as well as practical. Therefore, significance of both the sections of material medica viz. identification and description of drugs and pharmacology is well recognised by *Ayurveda*. *Glycyrrhiza glabra Linn.* Or Liquorice has been described as ‘the grandfather of herbs’ used medically since at least 500 BC. The present study sketches out various classical references of *Yastimadhu* in *Madhumeha* (Diabetes Mellitus). The rhizomes and root of *yastimadhu* has been studied in respect to its main active compound “Glycyrrhizin” is also analysed for its anti-diabetic effect by some researches. Therefore, more distinctive as well precise research is essential to reveal the anti-hyperglycaemic control of *Yastimadhu* as outlined by our ancient *Ayurvedic* texts.

KEY WORDS: *Yastimadhu*, Glycyrrhizin, *Madhumeha*, Diabetes.

INTRODUCTION

In the field of drugs research, the *Ayurvedic* methodology is strictly based on scientific platform. The entire pharmacology of *Ayurveda* is grounded on perception, inference, observation and experiment. *Susruta* linked equal importance to both the sides of knowledge, theoretical as well as practical. He says, “He who is well-versed only on theoretical knowledge and not in practical work, is not skilled enough to treat the patients. Therefore, significance of both the sections of material medica is well recognised by *Ayurveda* i.e; identification and description of drugs and pharmacology proper [1]. So prior to accept their pharmacological actions, mere identification and study of drugs is also essential. Antiquity of

drugs is scrutinised in *Vedic Kala*, *Samhita Kala*, *Nighantu Kala* and *Adhunik Kala* as communicated further in the paper.

Glycyrrhiza glabra Linn., also known as Licorice [2], is native to the Mediterranean, Europe and certain areas of Asia [3]. They have been used medically since at least 500 BC and licorice has been described as ‘the grandfather of herbs’ [4]. The Roman writers referred to it as *Radix dulcis* [5]. In old Chinese pharmacy, it was considered to belong to drugs of the first class and to it was ascribed the rejuvenating property when consumed for long period [6]. *Yastimadhu* is a hardy herb or undershrub attaining a height up to 2 meters; leaves are multifoliolate, imparipinnate; have flowers in axillary spikes, papilionaceous, lavender to violet in colour, compressed pods, containing reniform seeds.

The stolon and root of *Glycyrrhiza glabra* Linn. is sold in market in the name of *Yastimadhu* or licorice. Stolon is yellow brown or dark brown, longitudinally wrinkled externally; cut surface shows a cambium ring and a small central pith; root is similar but without a pith. Fracture is coarsely fibrous in bark and splintery in wood. It has faint and characteristic odour and sweetish taste. The transverse section of stolon reveals outer cork of tubular cells, outer layers with reddish brown, amorphous contents. Phloem fibres are in radially arranged groups of 10-50 surrounded by sheath of parenchyma cells. Xylem rays are 3-5 cells wide. Pith involves parenchymatous cells arranged in longitudinal rows with intercellular spaces.

Transverse section of root exhibit closely resemblance to that of stolon except that there is absence of medulla [7].

Pharmacological action: The pharmacological properties of *Yastimadhu* proclaim to be *madhura* in *rasa* with *guru*, *snigdha guna*, *sita virya* and *madhura vipaka*, useful in *vatapittaja vikara* [8].

***Yastimadhu* in Vedic Literature (Up to 7th cent.A. D.)**

Ayurveda has been stated to be the *Upaveda* of *Atharvaveda* and therefore, an elaborate description of the science of life is found in *Atharvaveda*. The reference of *Yastimadhu* has been made in it by the term ‘*Madugha*’. In *Atharvaveda* the meaning of ‘*Madugha*’ is taken as *Yastimadhu* where in the drug is used in the form of *Lepa*. The meaning of the term ‘*Madugha*’ is taken as ‘*Jayesthi Madhuka*’ by the commentator of *Kaushiksutra* also- (*Atharvaveda* 6/102/3)

In the *Bhashya* of *Atharvaveda*, *Sayana* has referred to this as ‘*Madhuka Vriksha*’ or ‘*Yastimadhuka*’ (*Atharvaveda*6/103/3). In the second *sthana* by the term *Madhuka*, a material of sweet taste (*Madhusravi Padartha*) is referred to this is *Madhuka Vriksha* or *Yastimadhuka*. No description regarding its types is found. There are no any references found about *Jalaja Klitaka* in *Veda* [9].

Yastimadhu in Samhita Kala

In *Samhita Kala*, *Acharya Charaka* dealt with *Yastimadhu* in various contexts. In the very first chapter of the *Charaka Samhita*, *Klitaka* has been mentioned as of two type’s viz. *Anupa* and *Sthalaja* under *Phalini varga* [10]. Commentator *Chakrapani* has attempted to equate these types as being that of *Yastimadhu*. In another context regarding ingredients of *Brihata Satavari ghrita* the word ‘*DwiYastimadhukaih*’ is found [11].

Acharya Susruta has not mentioned clearly about the varieties of *Yastimadhu* but reference of *Klitaka* is stated to be one of the ‘*Moola Visha*’ in one and *Kalka* of *Klitaka* in another context. *Dalhana*, commenting on this equates *Klitaka* with *Yastimadhu*. *Madhulika* – a synonym of *Yastimadhu* is also found in both *Charaka* and *Susruta Samhita*.

In *Astanga Samgraha* and *Astanga hridaya* there is no any varieties of *Yastimadhu* are mentioned.

MATERIAL AND METHODS

Charaka Samhita (1000 B.C.E– 4thCent.A.D.) [12]: It is the most cherished compendium of *Ayurveda* composed by *Maharishi Agnivesha*. *Charaka* has described *Yastimadhu* in *Jivaniya*, *Sandhaniye*, *Vrana*, *Kanthy*, *Kandughna*, *Snehopaga*, *Vamanopaga*, *Asthanopaga*, *Chardinigrahan*, *Mutravirajaniye*, *Angmardaprasmana* and *Shonita-sthapana Mahakashaya* (C.Su.4). *Agrya* of *Charak* labelled *Yastimadhu* to be *balya*, *vrishya*, *kesya*, *kanthya*, *caksusya*, *virajaniye* and *ropaniye* properties (C.Su.25). The drug *Yashtimadhu* is prescribed in different *sthana* of *Charak Samhita* in different dosage forms as *Kashaya*, *taila*, *ghrita*, *arishta*, *kalka*, *gutika*, *lepa*, *leha* and *basti*. *Yastimadhu* is also reported with properties like *Medhya* (C.Ci-1/3/30), *Rasayana* (C.Ci-1/1/49), *Bajikarana* (C.Ci-2/1/34, C.Ci-2/2/21), *Dhumpana* (C.SÚ-5/21), for *Vamana* (C.SÚ-2/7), in *Moolasava* (C.Ci-15/158), and as *Agada* (*Mritasanjivana agada* C.Ci-23/56; *Ksharagada* C.Ci-23/101).

No direct indication in *Prameha* is mentioned *Charaka Samhita*.

Susruta Samhita (1000 B.C. - 5 A.D.) [13]: *Susruta Samhita* contrived by *Acharya Susruta* is the main provenience of knowledge of surgery in ancient times. *Susruta* described *Yastimadhu* in *Vachadi, Brihatyadi, Kakolyadi, Sarivadi, Anjanadi, Priyangu-ambashtikadi, Nayogrodhadi* and *Utpaladi Gana*(S.Su.38). This drug is also prescribed in *Masanumasika Paricharya* in 1st, 2nd, 6th and 10th month of gestation (S.Sha.10). *Yastimadhu* is also indicated in *prameha&kusthaja vana* and no other directed indication in *prameha*.

Astanga Samgraha (6th – 7th Cent.A.D.)[14]: This important text is written by *Vridha Vagbhata*. The different preparations and indications of *Yastimadhu* are quoted as in **Table 1**.

Astanga hridaya (7th century A.D.) [15]: This *Samhita* had been written by *Acharya Vagbhata* in 7th century. *Yastimadhu* has been mentioned in various preparations to be used in different indications. In *Astanga hridaya*, ten synonyms of *Yastimadhu* are mentioned and the drug has been included in ten out of thirty three *Ganas* mentioned there in (A.H.Su.15).

Harita Samhita (10-12th century A.D)[16]: *Harita* is one among the 6 disciples of *Punarvasu Atreya*. *Harita Samhita* is named based on him, cited by *Acharya Vagbhata* and its commentators. Different preparations and indication of *yastimadhu* in *prameha* is mentioned in **Table 2**.

Sarangadhara Samhita (13th Cent.A.D.)[17]: This *Samhita* had been written by *Acharya Sarangadhara* in 13th century. *Yastimadhu* has been mentioned in various preparations to be used in different indications but there is no indication in *Prameha* has been found.

YASTIMADHU IN CHIKITSA GRANTHA

Chakradatta (11th Cent.A.D.)[18]: This *Samhita* is composed by *Acharya Chakradatta* in 11th century. Regarding *Yastimadhu* their are various preparations to be used for the treatment of *Prameha* as mentioned in **Table 3**.

Gada Nigraha (12th century A.D) [19]: The *Yastimadhu* along with other drugs prescribed for the treatment of *Prameha* in the compound form mentioned as in **Table 4**.

Bhava Prakasha (16th century A.D) [20]: It is written by *Bhavamishra* in 17th century. *Yastimadhu* is described in *Haritakyadi varga*. It has the synonyms of *yasti*, *madhuka*, *Klitaka* and *Klitanaka*. It is indicated in *vranashotha*, *chardi*, *trishna* and as *shukral* and *chaksusya*. Formulations of *yastimadhu* is indicated in *prameha* is tabulated in **Table 5**.

Bhaisajya Ratnavali (18th century A.D) [21]: It is the classical compilation of different formulations for the treatment of various diseases composed by *Acharya Govinddas Sen*. *Yastimadhu* is described in various formulations as mentioned in **Table 6**.

Yogaratanakara(17th Cent. A.D.) [22]: It describes many compound preparations for different diseases. Preparations, indications/actions and references regarding *Yastimadhu* in *Yogaratanakara* are given in **Table 7**.

YASTIMADHU IN NIGHANTU

1. **Amarkosha (5th cent. A.D.):** *Madhuyasti* has been mentioned in the *Vanaushadhi Varga* and its synonyms are *Madhuka*, *Klitaka*, *Yastimadhuka*, *Madhuyastika* is used in masculine gender. *Nili* is equated with *Klitakika* in *Amarkosha*[23].
2. **Sausruta Nighantu (6th Cent. A.D.):** It is based on *Susruta Samhita* composed by *Acharya Susruta*. In this *Nighantu* *Madhuyasti* has been described in *Haridradi gana*, *Kakolyadi gana*, *Brihatyadi gana*, *Sarivadi gana*, *Ambasthadi gana*, *Nyagrodhadi gana* and *Utpaladi gana*. Following synonyms are mentioned i.e. *Madhuka*, *Yastimadhuka*, *Yastika*, *Madhuyastika*, *Kasthamadhuka*, *Vallimadhuka*[24].
3. **Astanga Nighantu (8th Cent. A.D.):** In this *Nighantu* *Vahatacharya* mentioned *Madhuyasti* in *Sarivadi gana*. Following synonyms are mentioned here i.e. *Yashti*, *Madhuka*, *Klitaka*, *Parushako*, *Mriduphala*, *Dhanvanchada*[25].
4. **Paryayaratnamala (9th century):** This book is written by *Acharya Indukarsunu Madhava*. He has mentioned synonyms like *Yastika*, *Madhuka*, *Madhuyastika*, *Yasti*, *Yastimadhu*[26].
5. **Dhanvantari Nighantu(10th - 13th Cent. A.D.):** It is written by *Mahendra Bhaugika*. *Dhanvantari nighantu*, the first among the *Nighantus* has dealt

Madhuyasti and *Klitanaka* separately in which *Klitanaka* is stated to be 'Tallakshanam' i.e. possessing the same properties as that of *Madhuyasti*. *Madhuyasti* itself is divided as *Sthalaja* and *Jalaja* and to the latter synonyms, *Madhuparni* and *Madhulika*. *Klitanaka* is different from *Yastimadhu* but resembles it closely in qualities and properties. *Sthalaja* and *Jalaja* are the two varieties of *Madhuyasti*. Both types are *Madhura*, *Sitala* and acts as *Pittasamaka*.

In this *NighantuMadhuyasti* has been described in 'Guduchyadi Varga'. Following synonyms are mentioned here i.e., *Yasti*, *Yastimadhu*, *Madhusrava*, *Yastika*, *Madhuka*, *Madhuyastika*. *Madhuyasti* has *Madhura*, *Sita virya* and *Pittahara*, *Sukravardhaka*, *Soshaghana* and *Visaghanaproperties*[27].

6. **Sodhala Nighantu(12th Cent. A.D.):** In 'Guduchyadi varga' of *Sodhala Nighantu* synonyms of *Madhuyasti* " i.e *Madhuka*, *Yastika*, *Yastimadhuka* are mentioned and useful in the treatment of *Raktapitta*. It is *Grahi*, *Vrishya*, *Caksusya*, *Svarya* and *Vranya*. It is *Madhura* in rasa and *Sita Virya*[28].
7. **Nighantushesa (12th Century):** *Acharya Hemachandras* mentioned *Madhuka* in *Gulmakanda*. *Madhuyasti*, *Yastimadhu*, *madhusrava*, *Klitaka*, *niraja*, *madhuparni* and *madhulika* are mentioned synonyms of *Madhuka*[29].
8. **Hridayadipaka Nighantu(13th Cent. A.D.):** In this *NighantuYastimadhu* is mentioned only in *Chatushpada varga*[30].
9. **Abhidhanaratnamala (Sadrasa Nighantu) (13th Cent. A.D.):** In *Abhidhanaratnamala* synonyms of *Madhuyasti* are described in *Madhura dravya skandha*. Following synonyms are mentioned here *Yastimadhuka*, *Yastavaha*, *Madhuka*, *Klitaka*[31].
10. **Madhava-dravyaguna (13th Cent. A.D.):** In *Madhava dravyaguna Madhuyasti* is described in *Vividhaushadhi varga*. Here *Madhuyasti* is used in the treatment of *Raktapitta*, *Vranashodhana*, *Krimi* and *Kusthaghna*[32].
11. **Madanapala Nighantu(14th Cent. A.D.):** *Madhuyasti* has been mentioned in "Abhayadi varga". *Madanapala* has included following synonyms of *Madhuyasti*: *Madhulika*, *madhuka*, *Klitaka*, *Yastimadhu*, *Yastimadhuka*, *Jalaja* and *Madhu*. Regarding its properties it has been said as *Sita Dravya*. It is indicated in *Varnya*, *Pipasa*, *Vamana* and *Pittanashaka*[33].

12. **Kaidev Nighantu(Pathyapathya Vibodhaka) (15th Cent. A.D.):** In this *Nighantu* 'Madhuyasti' is described in "Aushadhi Varga" with following synonyms i.e. *Klitaka, Madhuka, Madhuyasti, Madhusrava, Madhu*. Another type of *Madhuyasti* is found in *Jaliya pradesh* named *Madhuparni* and *Madhulika*. Regarding its properties it has been said as *Madhura, Sukravardhaka, Chaksushya, Balya, Tridoshaghna, Varnya, Shotha, Kshaya Samanartha*[34].
13. **Bhavaprakasha Nighantu(16th Cent. A.D.):** *Yastimadhu* has been mentioned in 'Haritakyadi varga' and following synonyms are found in this *Nighantu*-*Klitaka, Yastimadhu, Yastimadhuka*[35].
14. **Gunaratnamala (16th Cent. A.D.):** In *Gunaratnamala* of *Bhavamishra* 'Madhuyasti' is described in "Haritkyadi Varga" its *Guna karma* along with characteristic features of *Madhuyasti* are described as *hima, Guru, Madhura Sukravardhaka, Chaksushya, Balya, Keshya, Svarya, Pittashamaka*[36].
15. **Saraswata Nighantu(16th century A.D.):** The *Yastimadhu* is described in *Chandanadi varga*. *Madhuka, Klitaka, Yastimadhu, madhuyastika, vallimadhu, kasthamadhu* are mentioned as synonyms of *Madhuka*[37].
16. **Raja Nighantu(NighantuRaja, Abhidhana chudamani) (17th Cent. A.D.):** *Madhuyasti* is included in "Pipalyadi varga". Synonyms of *Madhuyasti* mentioned in *Raja Nighantu* are *Yastimadhu, Madhuvalli, Madhusrava, Madhuka, Yasti, Yastavyaha*[38].
17. **Saligrama Nighantu(19th century A.D.):** The reference of *Yastimadhu* is mentioned in the *Ashta varga*. In this text a compilation work has quoted *Madhuyasti, Yasti* and two varieties of *Madhuvalli (Sthalaja and Jalaja)*. He also mentioned the qualities of *Arkakalpana* of *Jalayasti* as per *Arkaprakasha* of *Ravana*[39].
18. **Nighantuadarsha (20th Cent. A.D.):** In this *Nighantu* 'Madhuyasti' is described in "Palashadi Varga" with following synonyms *madhuka, Yastimadhu* and *Klitaka* its *Guna karma* along with characteristic features of *Madhuyasti* are described as *hima, Guru Madhura, Chaksushya, Balya, Keshya, Svarya, Shosha, Kshaya Tridoshsamaka*[40].

19. **Priya Nighantu(20th Cent. A.D.):** In *Priya Nighantu* of *Acharya Priyavrata Sharma* 'Madhuyasti is described in "SatapushpadiVarga" as *Madhuka* and *Madhuyasti*. It is used in *Kasa, Swasa, Shirasoola, Netraroga, Udararoga* and *Vrananashaka*. It is of two types *Sthalaj* and *Jalaja*[41].

Table 1

S.No.	Preparations	Indications/Actions	References
1.	Panaka, raga, sadava	Prameha	A.S.Ci-14/17
2.	Pitakanasana yoga	Prameha	A.S.Ci-14/23
3.	Madhutailika basti	Prameha, Arsha, Krimi, Gulma	A.S.K-5/3
4.	Anuvasana basti	Asmari, Gulma, Prameha	A.S.K-5/20

Table 2

Sr.No	Preparations	Indications/Actions	References
1.	Churna	Madhumeha	Ha.S.Ci-28/19
2.	Lepa	Prameha	Ha.S.Ci-28/30

Table 3

S. No.	Preparations	Indications/Actions	References
1.	Kushavaleha	Sarva Prameha	C.D.Ci-35/3
2.	Katankateryadi Kvatha	Sarva Prameha	C.D.Ci-35/23
3.	Naygrodhadi churna	Sarva Prameha	C.D.Ci-35/28

Table 4

S. No.	Preparations	Indications/Actions	References
1.	Katankateryadi Kvatha	Prameha	G.Ni.Ci-30/60
2.	Naygrodhadi churna	Sarva prameha	G.Ni.Ci-30/69

Table 5

S.No	Preparations	Indications	References
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1.	Kvatha	Prameha	B.P.Ci-9/40
2.	Kvatha	Prameha	B.P.Ci-38/58
3.	Naygrodhadi churna	Sarva prameha	B.P.Ci-38/68

Table 6

S.No	Preparations	Indications	References
1.	Lohitcandanadi kshira	Raktaja prameha	B.R.Ci-37/33
2.	Naygrodhadi churna	Sarva prameha	B.R.Ci-37/46
3.	Kushvaleha	Sarva prameha	B.R.Ci-37/52
4.	Saraveshvara Rasa	Prameha	B.R.Ci-37/180
5.	Dadimadya Ghrita	Prameha	B.R.Ci-37/211
6.	Pramehamihira Tail	Sarva prameha	B.R.Ci-37/229
7.	Vrihacchymadi Ghrita	Prameha	B.R.Ci-38/16

Table 7

S.No	Preparations	Indications	References
1.	Naygrodhadi churna	Prameha	Y.R-39/84

DISCUSSION

Miscellaneous amount of drugs and formulations are prescribed by many *Acharya* for the treatment of *Madhumeha* (Diabetes Mellitus). *Acharya Charaka* mentions *Yastimadhu* (*Glycyrrhiza glabra* Linn.) in diseases like *jwara*, *raktapitta*, *gulma*, *unmada*, *pandu*, *netra roga* etc, whereas *Acharya Susruta* indicated *Yastimadhu* in *pandu*, *vatarakta*, *kustha*, *bhagandar*, *prameha* etc. while *Vagbhata* described in *jwara*, *atisara*, *kasa*, *hridroga*, *prameha* etc. Correspondingly like *Charak*, *Susruta* and *Vagbhata* others *Acharyas* also have mentioned the application of *Yastimadhu* in *prameha*.

Madhumeha (Diabetes Mellitus Type 2) broadly included under *Prameha*. *Prameha* includes a series of urinary disorders especially characterised by excessive urination with several abnormal qualities due to imbalance in *doshas*. The main causes of *prameha* are lack of exercise and improper food habits and also excess food intake especially of the category *ushna*, *snigdha* and *guru guna* which are the primal cause of this disease. Foods that

increase *kapha*, *medha* and *mutra* are the etiological factors for *prameha*. Pharmacological evaluation of *yastimadhu* reveals its *vatapittahar karma* with *madhura rasa*, *snigdha* and *guru guna*, *sita virya* and *madhura vipaka*. The mode of action of *yastimadhu* cannot be completely deciphered by its properties and action therefore; anti-hyperglycaemic action of *yastimadhu* is because of “*dravyaguna prabhava*”. *Acharya Charaka* rationalizes the concept of *Dravya Prabhava*, *Guna Prabhava* and *Dravyaguna Prabhava* which are also responsible for the pharmacological action of drugs [42]. *Yastimadhu* being *madhura* in *rasa* is traditionally used as an artificial sweetening agent and could be useful in the treatment of insulin resistant syndrome which is very much prevalent in current scenario. Various experimental studies on *Yastimadhu* (*Glycyrrhiza glabra* Linn.) regarding its anti-hyperglycaemic activity have been done. Glycyrrhizin is a potential therapeutic agent for diabetes treatment and is found quite effective against hyperglycaemia, hyperlipidaemia and associated oxidative stress[43]. *Glycyrrhiza glabra* Linn.(500 mg/kg) also showed pronounced improvement in streptozotocin-induced diabetes in rats [44]. Yet more distinctive as well precise research is essential to reveal the anti-hyperglycaemic control of *Yastimadhu* as outlined by our ancient *Ayurvedic* texts.

CONCLUSION

The present study sketches out various classical references i.e, of *Yastimadhu* in *Madhumeha* (Diabetes Mellitus) as described i.e, A.S.Ci; Ha.S.Ci; C.D.Ci; G.Ni.Ci; B.R.Ci etc. which clearly enlightens the fact that *Yastimadhu* have anti-hyperglycaemic activity. The stem and root of *yastimadhu* has been studied in respect to its main active compound “Glycyrrhizin”, utilized commercially as artificial sweetener and as flavouring agent in some pharmaceuticals. Glycyrrhizin, a mixture of potassium and calcium salts of 18 β -glycyrrhizic acid is also analysed for its anti-diabetic effect by some researches. *Madhumeha* is one among the *vatika prameha* with its pathogenesis revolving around aggravated *kapha*, *pitta*, *meda* and vitiated *vata*, therefore the treatment requires combating these *doshas* and *abaddha medha*. The properties of *yastimadhu* having *madhura rasa*, *guru* and *snigdha guna* with *sita virya* and *madhura vipaka* exemplify its action on the basis of ‘*prabhava*’ against these interrupted *doshas*. Thus, more analytical exploration regarding action of *yastimadhu* in *madhumeha* is the need of the hour for establishing an effective remedy in treatment of *madhumeha* (Diabetes Mellitus Type 2).

Conflict of Interest: Nil

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