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A REVIEW ON ROLE OF THE HERBAL MEDICINES AND FORMULATIONS IN TREATING MADHUMEHA WITH SPECIAL REFERENCE TO DIABETES MELLITUS

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Abstract
Madhumeha is stated as a condition, where the patient is afflicted with honey like micturition. It is also expressed as one among the *Vatadosha* predominant *Prameha* exasperating *medodhatu*. In the *nidansthan* of *Susrut samhita* it's announced as an incurable consequence to all *Pramehas,* those who are therapeutically neglected. *Acharya Charak* decodes Madhumeha as an upshot of *Ojakshaya*. Amidst the controversies regarding the word *Prameha* & *Madhumeha*, *acharya Charkrapani* comments them as synonymous to each-other & also signifies the word *Madumeha* which denotes all the Pramehas specifying *Madhumeha* just as the word "*Trina* (grass)" refers to *trina* in general & also as the specific one in the *Chikitsasthan, Carak samhita*. Starting from etio-pathophysiology to the clinical manifestations a Madhumehi has much-more in common to share with that of the hormone Insulin affiliating metabolic disarray, Diabetes mellitus (DM). Countless herbal medicines & formulations apart from other treatment modalities have been narrated meticulously in most of the classical treaties for remedying *Madhumeha-Prameha* by restituting *Oja-Medodhatu-Vatadosha* and to recoup the rest *dosa-dusyas* especially *Vasa-Lasika-SharijaKledo*; since in *Indriyasthan* of *Carak Samhita, Madhumeha* is designated as irremediable in case of *Balamamsakshaya* (i.e loss of strength-&-muscles). Formulated or solitarily herbs like *Amalaki-Haridra* from the Shrestha/Agraya*dravyas*; other drugs viz. *Guduchi*, *Kiratatikta*, *Meshasringi*, *Vidanga*, *Parijata*, *Pippali* etc. including some Visha-*Upavishas* like *Bhallatak-Dhatura* etc. convey the *Agnideepana*, *Vatanulomana* & *Rasayan* effect by facilitating the hypoglycemic, rejuvenating, antioxidant, immune modulatory actions; to aid in treating *Madhumeha* (Diabetes mellitus) by sensitizing & enhancing bodily metabolisms.

Keywords: *Madhumeha*, *Prameha*, Diabetes mellitus, *Chikitsa Siddhanta*, Herbal medicines

Introduction

In Ayurvedic classical treatises the condition associated with the sweetness or honey like consistency or color or smell or taste of the urine is termed as *Madhumeha* or *Kshaudra meha* or *Oja meha*, viz. क्षौद्ररसवर्णं क्षौद्रमेही… क्षौद्रमेहो मधुमेह[1].

Contemporarily the word 'Diabetes' possesses the Greek origin, which denotes a siphon - to pass through, excessive urination and the Latin word 'mellitus' means sweet.[2] Synchronously urinary affliction is the prime characteristic of this malady. Diabetes mellitus is a clinical syndrome characterized by the cascade of metabolic disarrays attributed to flawed carbohydrate metabolism in which glucose is both underutilized as an energy source and overproduced due to inappropriate gluconeogenesis and glycogenolysis, resulting in hyperglycemia, a state of an increased plasma glucose level; issuing from the hormone Insulin's defective secretion & action or both. Further diagnostically it is demonstrated as an escalated concentrations of the glucose in venous plasma or increased A1C in the blood. It's conventionally subclassified into type 1 or type 2 diabetes, gestational diabetes mellitus, and other specific types as per the other varieties of causes; such as genetic causes, metabolomic, exocrine pancreatic disorders, and due to some medications with their respective cascade of diversified pathogenesis. Type 1 diabetes is characterized as an autoimmune disease requiring daily administration of Insulin, because of the destruction of beta cells in pancreas (responsible for production of Insulin), attacked by the misdirected immune system. It includes latent autoimmune diabetes in adults (LADA). Type 2 is due to non-autoimmune progressive loss in the β-cells, leading to defective insulin secretion, frequent insulin resistance and metabolic syndrome. Diabetes with specific other causes are Monogenic diabetes syndromes including neonatal diabetes and maturity-onset diabetes of the young (MODY)[3]. Because of the exocrine pancreatic disorders like cystic fibrosis, pancreatitis & various drugs or chemical inductions, Diabetes may happen there, and also in glucocorticoid administrated cases & HIV treated individuals, or after organ transplantation it may manifest. Gestational diabetes mellitus usually diagnosed in the second or third trimester of pregnancy which is not clearly overt diabetes prior to gestation or other types of diabetes occurring throughout pregnancy, such as type 1 diabetes. There is a state termed as Prediabetes or Impaired glucose tolerance (IGT) aka Impaired fasting glycemia (IFG), which is the intermediate condition between normoglycemia & diabetes; where the fasting blood glucose level stays in the range of 100-125mg/dl with the IGT as 2-h PG levels during 75-g OGTT from 140 to 199 mg/dL & an A1C range of 5.7–6.4%. This condition is

evitable with modest weight loss & moderate physical activity to correct the lifestyle, so that from the further worsening affirmation it can be delayed or prevented.[4]

In these few decades the prevalence of diabetes has elevated dramatically by region, country and territory because of our desk bound sedentary life style with inadequate physical exercises & faulty dietary regimens. As per the data of International Diabetes Federation Diabetes Atlas 10th edition, about 537 million individuals worldwide have diabetes, where only type 2 Diabetes Mellitus accounts upto 90-95% and 4 million deaths are directly attributed to it each year.[5] Similarly in India, there are estimated 74.2 million people above age of 18 years are suffering from diabetes and nearly 39.4 million are undiagnosed. Almost every corner of the globe is suffering from the devastating microvascular, macrovascular complexities along with high mortality rate & compromised quality of life due to diabetes mellitus; despite of the concerning huge health expenditure approximately more than USD 966 billion (in 2021) upon abundant anti-diabetic drugs & other diverse treatment modalities.[6] So there is a globally agreed target to halt the rise of diabetes & to cease its outcomes to some extent by 2025.[7]

Starting from the etio-pathophysiology to the clinical manifestation *Madhumeha* in Ayurveda has much resemblance with that of the present-day malady Diabetes mellitus. The ayurveda intellectualist Acharya Vagbhat in the 10th chapter of *nidan sthan* in *Astang Hridaya* elucidates the honey like peculiarity of the micturition as *Madhumeha*. All the varieties of *Prameha* could be accredited as *Madhumeha* because of this kind of anomaly, commonly found in every subtype of *Prameha*.

मधुरं यच्च सर्वेषु प्रायो मध्विव मेहति, सर्वेऽपि मधुमेहाख्या माधुर्याच्च तनोरतः[8]

When a patient possesses sweet micturition, resembling honey then the condition is known as *Madhumeha* as mentioned by Acharya Vagbhat.

Definition: मधुमेही मधुसमम्[9]

Madhumeha is described as one among the *vataj* subclassifications of *Prameha*. It is entitled so, because of the sweetness of the urine.

Nidanas (Etiological factors)

- गुरुस्निग्धाम्ललवणान्यतिमात्रं समश्नताम्| नवमन्नं च पानं च निद्रामास्यासुखानि च|| त्यक्तव्यायामचिन्तानां संशोधनमकुर्वताम्| श्लेष्मा पित्तं च मेदश्च मांसं चातिप्रवर्धते[10]

Aharaja nidan	Viharaj nidan
Rasa : amla, lavana rasa Pradhan dravya atimatra sevan *Guna : guru, snigdha guna Pradhan Dravya atisevan* Others : *navanna paan, asya sukha, atimatrasana*	*Nidra sukha, tyakta vyayama, tyakta chinta, samsodhana akurvatam*

- सर्व एव प्रमेहास्तु कालेनाप्रतिकुर्वतः मधुमेहत्वमायान्ति[11]

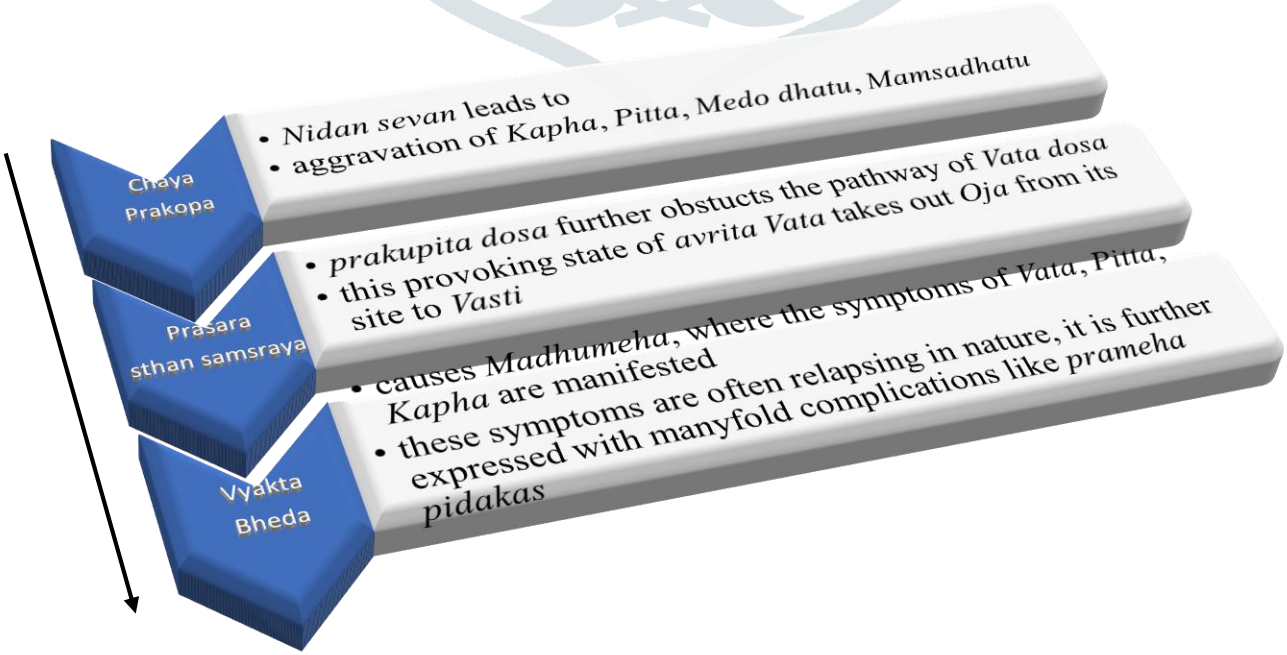
All the classes of *Prameha*, especially therapeutically unattended ones are the ultimate metamorphosed manifested form of *Madhumeha*.

Samprapti (Pathophysiology)

- ओजः पुनर्मधुरस्वभावं, तद् यदा रौक्ष्याद्वायुः कषायत्वेनाभिसंसृज्य मूत्राशयेऽभिवहति तदा मधुमेहं करोति[12]

The *oja*, instinctually sweet by nature transfigured into *Kashaya rasa* by the virtue of *rukshyata* of the *Vata dosa*, further it courses through the bladder; which has been labeled as *Madhumeha*.

- तैरावृतगतिर्वायुरोज आदाय गच्छति| यदा बस्तिं तदा कृच्छ्रो मधुमेहः प्रवर्तते|| स मारुतस्य पित्तस्य कफस्य च मुहुर्मुहुः| दर्शयत्याकृतिं गत्वा क्षयमाप्यायते पुनः[13]



Samprapti Ghatak [14]

- *Dosa: kapha, pitta, Vata*
- *Dusya: bahu avaddha Medo, mamsa, shariraj kledo, shukra, shonita, vasa, majja, lasika, rasa, Oja*
- *Agni: agni mandya*
- *Srotas: Medovaha srotas, Srotas mula: Vikka, Vapavahan*
- *Srotasusti: Sanga* of *Kapha* leading to *Vimarga gamana* and *Ati-pravrutti* of *Kleda* through the *mutra*
- *Udbhava sthana: Amashayottha vyadhi*
- *Vyakta sthana: mutra vaha srotas (Vasti, medhra)*

Laxan

गमनात् स्थानं स्थानादासनमिच्छति | आसनादृणुते शय्यां शयनात् स्वप्नमिच्छति[15]

A *madhumehi* usually exhibits five traits, to be specific: while he/she strolls around, he/she tries to curb it into a halt, then he desires to restraint his halting into sitting position. Next his longing turns towards dozing off from sitting to lie down. Then he preferably falls asleep at last.

Types

- द्विधा: क्रुद्धे धातुक्षयाद्वायौ दोषावृतपथेऽथवा[16]

According to the idiosyncrasy of pathogenesis at the rear of *Madhumha*, it is generally manifested in two ways; one is due to *Dhatu kshayat kruddha Vata* & the other one is assignable from the *Avrita patha* of *Vata dosha*. In both the kind of *Madhumeha* principles of *Vata prakopa* are the reasonable segregating influence as per the explications of the *Sarvanga Sundari teeka* of *Astang Hridaya* over this.

- प्रमेहं मधुरं सपिच्छं मधूपमं स्याद्द्विविधो विचारः| क्षीणेषु दोषेष्वनिलात्मकः स्यात् सन्तर्पणाद्वा कफसम्भवः[17]

The honey like micturating *pramehi* can be categorized into two classes, where one is *Anilatmak*, who is *Kshina* : the diminutive one and the other one is *Kapha sambhavaja*, because of *atisantarpana*, the over nourished one.

Upadravas (Complications)

उपेक्षयाऽस्य जायन्ते पिडकाः सप्त दारुणाः| मांसलेष्ववकाशेषु मर्मस्वपि च सन्धिषु|| शराविका कच्छपिका जालिनी सर्षपी तथा| अलजी विनताख्या च विद्रधी[18]

If the *Madhumehi* is kept neglected or mistreated then seven types of *pidakas* or pustulated eruptions can be eventuated in the *mamsala*, *avakasha*, *marma*, *sandhi* sites. The *pidakas* are namely: *Sharavika*, *Kachhapika*, *Jalini*, *Sarshapi*, *Alaji*, *Vinata*, *Vidradhi*.

Sadhyasadhyata (Prognosis)

- कषायमधुरं पाण्डु रूक्षं मेहति यो नरः वातकोपादसाध्यं तं प्रतीयान्मधुमेहिनम्[19]

According to acharya Carak in case of *Madhumeha*, because of the *prakupita vata dosha*, the aggravated state of *Vata dosha, Madhumehi* passes *Kashaya* (astringent) & *Madhura* (sweet) urine & It is irredeemable gradually.

- जातः प्रमेही मधुमेहिनोः बीजदोषात्| ये चापि केचित् कुलजा विकाराः प्रवदन्त्यसाध्यान्[20], प्रमेही यः प्रमेहिणो जातः सोऽप्यसाध्यो..बीजदोषादिति; प्रमेहारम्भकदोषदुष्टबीजजातप्रमेहित्वात्|..कुलजा इति पितृपितामहादिकारणोद्भूताः..सन्तानानुबन्धित्वोपदर्शनार्थम्| उक्तं हि- "प्रमेहोऽनुसङ्गिनाम्"

Congenitally *madhumehi*, the ones who are *madhumehi* since their birth & the hereditary cases, where *madhumeha* runs in the families are the incurable ones, because of the *beeja dosa* i.e most probably the errored genetical dispositions. These familial trends signify the *anusamgita* or the obstinate persistence of the ailment *Prameha*.

Madhumeha vs. Prameha

- मधुमेहशब्देनात्र मेहमात्रमुच्यते,.. प्रमेहो मधुमेहशब्दवाच्यो.. मेहशब्दोऽयं सामान्येन सर्वमेहेषु वर्तत... मधुमेहशब्दः सर्वप्रमेहे मधुमेहविशेषे च वर्तते; यथा तृणशब्दः सर्वतृणे तृणविशेषे च वर्तते[21]

Despite of the word *Madhumeha* as defined as one among the subclasses of *Vataja Prameha* and it could also be indicative to all the *Prameha*; just like specificity of the word *Trina* among the overall *Trina*.

- वातव्याधिरपस्मारी कुष्ठी शोफी तथोदरी| गुल्मी च मधुमेही च राजयक्ष्मी च यो नरः|| अचिकित्स्या भवन्त्येते बलमांसक्षये[22]

The loss of strength & muscle wasting in case of the eight substantial maladies, to be specific *Vata vyadhi*, *apasmari*, *kusthi*, *shophi*, *udari*, *gulmi*, *Madhumehi* & *rajayakshmi*. In fact these particular scinario drives them to become irremediable.

- सर्व एव प्रमेहास्तु कालेनाप्रतिकुर्वतः | मधुमेहत्वमायान्ति तदाऽसाध्या[23]

All the types of *Prameha*, eventually after a while, if left untreated then they emerge into *Madhumeha*, which is incurable by nature.

Treatment

Chikitsa sutra: स्थूलः प्रमेही बलवानिहैकः कृशस्तथैकः परिदुर्बलश्च| सम्बृंहणं तत्र कृशस्य कार्यं संशोधनं दोषबलाधिकस्य|[24]

Principally two types of *chikitsa* siddhantas are adopted according to the strength of the Patients. The *Sthula*, obese ones are with strength so they are advised to undergo with the *Samsodhana* line of treatment, the purificatory modalities or the elimination therapies & the *Krisha* ones, the emaciated patients are the weaker ones; so they are advocated with *Samvrimhana* therapies, the nourishing treatment.

Objectives: To review the herbal medicines and formulations in Ayurveda & their role in treating *Madhumeha* with special reference to Diabetes mellitus.

Methodology: This review has been made on the basis of various Ayurvedic Classical treaties, Ayurvedic books, contemporary Medicine books, Pharmacology books, Pathology books, Magazines, Research journals, digital libraries, NIIMH, google scholar, PUBMED, Ayush data portal, research databases like Web of Science, Scopus.

Some regularly used Herbal Medicines[25]

S. No.	Herbal medicine	Botanical name	Family	Active principle Pharmacological action
1	*Haridra*	*Curcuma longa*	Zingiberaceae	Curcumin, vitamin A Hypoglycemic
2	*Amalaki*	*Emblica officinalis*	Euphorbiaceae	Vitamin C, tannic acid, gallic acid Anti diabetic, anti oxidant
3	*Kiratatikta*	*Swertia chirayita*	Gentianaceae	Gentianine Anti diabetic
4	*Haritaki*	*Terminalia chebula*	Combretaceae	Chebulagic acid, corilagin, Chebulinic acid Anti diabetic
5	*Vibhitaki*	*Terminalia bellirica*	Combretaceae	Gallic acid, ellagic acid Antidiabetic
6	*Vidanga*	*Embelia ribes*	Myrsinaceae	Embelin, christembine Anti diabetic
7	*Meshashringi*	*Gymnema sylvestre*	Asclepiadaceae	Gymnemic acid, quercitol Anti diabetic
8	*Nyagrodha*	*Ficus benghalensis*	Moraceae	Tannins Antidiabetic
9	*Pippali*	*Piper longum*	Piperaceae	Piperine, piplartine Anti diabetic, Antioxidant
10	*Jambu*	*Syzygium cumini*	Myrtaceae	Cyanidin diglycosides, jamboline Anti diabetic
11	*Arjuna*	*Terminalia arjuna*	Combretaceae	Arjunetin, fridelin Anti diabetic
12	*Daruharidra*	*Berberis aristata*	Berberidaceae	Berberine Anti diabetic
13	*Devadaru*	*Cedrus deodara*	Pinaceae	Sesquiterpene Anti diabetic
14	*Karavellaka*	*Momordica charantia*	Cucurbitaceae	Momordicine Anti diabetic
15	*Patol*	*Trichosanthes dioca roxb.*	Cucurbitaceae	Plant protein Hypo lipidemic, anti diabetic, anti oxidant
16	*Nimba*	*Azadiracta indica*	Meliaceae	Nimbin, margosine Anti diabetic
17	*Amrasthi*	*Mangifera indica*	Anacardiaceae	Mangiferin, gallic acid, tannic acid

				Anti diabetic
18	*Khadira*	*Acacia catechu*	Mimosaceae	Catechin
				Anti diabetic
19	*Bhallataka*	*Semecarpus anacardium*	Anacardiaceae	Bhilwanol, semecarpol
				Anti diabetic
20	*Tuvaraka*	*Hydnocarpus laurifolia*	Flacourtiaceae	Chalmugric acid, palmitic acid, hydnocarpic acid
				Anti diabetic
21	*Dhatura*	*Datura metel*	Solanaceae	Scopolamine, hysciamine, atropine, norhyosciamine, meteolodine
				Antioxidant, analgesic, cholinergic blocker
22	*Guduchi*	*Tinospora cordifolia*	Menispermaceae	Giloin
				Anti diabetic, immunomodulatory
23	*Kataka*	*Strychnos potatorum*	Loganiaceae	Brucine
				Anti diabetic
24	*Asana*	*Pterocarpus marsupium roxb.*	leguminosae	Kito tannic acid, pyro catechin
				Anti diabetic

Rasapanchaka of the stated Herbal Medicines[26]

S. No.	Herbal medicine	*Rasa*	*Guna*	*Veerya*	*Vipaka*	*Doshakarma & Samsthanik Karma*
1	*Haridra*	*Tikta, katu*	*Rukshya, Laghu*	*Ushna*	*Katu*	*Kapha vata shamak, pitta rechak, meha jit (agray), sotha jit, rakta prasadak*
2	*Amalaka*	*Amla rasa Pradhan, Madhura anurasa*	*Guru, sheeta, rukshya*	*Sheeta*	*madhura*	*Tridosaghna, chakshusya, sweda medo hara, vrisya etc.*
3	*Kiratatikta*	*Tikta*	*Rukshya, laghu, sara*	*Ushna*	*Katu*	*Kapha pitta shamak, meha paha, daha, trisha, sopha shamak*
4	*Haritaki*	*Lavana varjita pancharasa*	*Ruksha, laghu*	*Ushna*	*Madhura*	*Tridosaghna, deepani, pachani, rasayani, mehaghna etc. (k.n.63/45)*
5	*Vibhitaki*	*kashaya*	*Ruksha, laghu*	*Ushna*	*madhura*	*Pitta kaphaghna, chakshusya, bhedana, himasparsha (k.n.65/48)*
6	*Vidanga*	*Katu tikta*	*Rukshya, laghu, tikshna*	*Ushna*	*Katu*	*Vata kapha paha, medo meha paha (k.n 344/212), krimighna*
7	*Meshashringi*	*Kashay, tikta*	*Laghu, Rukshya*	*Ushna*	*Katu*	*Kapha pitta shamak, deepan, meha pranut*
8	*Nyagrodha*	*Kashaya*	*Ruksha, guru, grahi*	*sheeta*	*Katu*	*Kapha pitta nashak, Pramehaghna*
9	*Pippali*	*Katu*	*Laghu, snigdha, Tikshna, ushna, sara*	*Anushna sheeta*	*Madhura*	*Kapha vata hara, hridya, deepan, pachan, Rasayan, vrisya, nihanti meha (k.n.348/215)*
10	*Jambu*	*Kashaya, amla, madhura*	*Ruksha, guru, shitala, samgrahi*	*sheeta*	*Madhura*	*Kapha pittaghna (k.n. 85/65)*
11	*Arjuna*	*Kashaya*	*Laghu, rukshya*	*sheeta*	*katu*	*Jayet pitta kapha medo meha ashra hrit roga sweda, kshata kshaya, hridya*
12	*Daruharidra*	*Tikta, katu*	*Rukshya, Laghu*	*Ushna*	*Katu*	*Kapha pittaha, meha jit, sotha jit, Netra roga jit, deepaniya, yakrit uttejak*

13	*Devadaru*	*Tikta, katu*	*Laghu, snigdha*	*Ushna*	*Katu*	*Hanti kapha anila meha vivandha kandu ashra shopha (k.n.400/242)*
14	*Karavellak*	*Tikta, katu*	*Laghu, ushna*	*Ushna*	*Katu*	*Kapha Vatahara, pathya, Prameha hanti, agnideepaka*
15	*Patol*	*Tikta, kashay*	*Laghu, rukshya*	*Ushna*	*Katu*	*Tridosa nashak, mehaghna*
16	*Nimba*	*Tikta, kashaya*	*Laghu*	*Sheeta*	*Katu*	*Kapha pitta shamak, jayet meha, deepan (k.n.257/163)*
17	*Amrasthi*	*Kashaya, madhura*	*Laghu, Ruksha, samgrahi*	*Ushna*	*Katu*	*Kaphapitta shaman, pramehaghna, ruchya*
18	*Khadira*	*Tikta, kashaya*	*Laghu, rukshya*	*Sheeta*	*Katu*	*Kapha pitta nashak, hanti aama shopha meha medo ashra*
19	*Bhallataka*	*Tikta, katu Kashaya, madhura*	*Laghu, snigdha, tikshna*	*Ushna*	*Katu*	*vata kapha shamak, asraghna, balya, shukrala, Medhya, deepaniya*
20	*Tuvaraka*	*Katu, tikta, Kashaya*	*Tikshna, snigdha*	*Ushna*	*Katu*	*Kapha vata paha, meha jit*
21	*Dhatura*	*Kashaya, Madhura, tikta*	*Laghu, rukshya, vyavayi, vikashi*	*Ushna*	*Katu*	*Shlesma krimi kandu vosha paha, swedavarodhak*
22	*Guduchi*	*Kashaya, katu, tikta*	*Laghu, samgrahi, snigdha*	*Usna virya*	*Madhura*	*Tridosaghna, chakshusya, deepaniya, vayasthapan, mehaghna etc. (k.n.1/5)*
23	*Katak*	*Kashay, tikta, madhura*	*Laghu, Vishada, Vikashi*	*Sheeta*	*Madhura*	*Kapha vata nut, Trishna daha visha hanti, chakshusya, toya mala paham, meha nashan*
24	*Asana*	*Katu Kashaya, tikta*	*Laghu, rukshya*	*Ushna*	*katu*	*Kapha pittaha, rasayana, hanti medo meha, madhumehahara*

Herbal Formulations In Various Ayurvedic Classical Treaties

Swaras kalpanas with their references

S. No	*Kalpanas*	Reference
1	*Triphala swaras*	Ca. chi. 6/46[27]
2	*Dhatri swaras*	C.D. 35/17[28]
3	*Guduchi swaras*	C.D. 35/21[29]
4	*Bhudhatri swaras*	Y.R. Ut. 1/85 page[30]

Kalka kalpanas with their respective references[31]

S. No	*Kalka kalpanas*	Indicated *dosa karma*	Reference
1	*Shaladi yoga*	*Sarva meha hara*	C.D. 35/22
2	*Triphala kalka*	*Asadhya meha sadhan*	Y.R. Ut. 1/86 page
3	*Sala musta yoga*	*Sarva meha hara*	Y.R. Ut. 1/86 page

Churna kalpanas with their respective references :-[32]

S. No	*Churna kalpanas*	Indicated *Dosa karma*	Reference
1	*Kampilaka, saptaparna, shala, vibhitak, haritaki, kutaja, kapitha*	*Kapha-pittaj prameha*	Ca. chi. 6/35
2	*Eladi churna*	*Praya pramehi hitakari*	B.R. 37/41
3	*Nyagrodhadi churna*	*Vimshati meha*	B.R. 37/46
4	*Triphala churna*	*Sarvan meha*	C.D. 35/21
5	*Haritaki churna*	*Sarvan meha*	C.D. 35/21
6	*Kataka veeja yoga*	*Asadhya meha*	Y.R. Ut. 1/85 page
7	*Akulyadi yoga*	*Vimshati prameha*	Y.R. Ut. 1/85 page
8	*Amalakadi churna*	*Sarva meha nivaran*	Ha. Sam. 3rd sthan. 28/43
9	*Khadiradi churna*	*Sarva meha*	Ha. Sam. 3rd stan. 28/44

Vati kalpanas with their respective references[33]

S.no	*Vati*	Indicated *Dosakarma*	Reference
1	*Tryusanadi vati*	*Prameha jayet*	C.D. 35/48

Kwatha Kalpana with their respective references[34]

S. No	*Kwatha kalpanas*	Indicated *dosakarma*	Reference
1	*Triphala*	*Kaphaj pramehi*	Ca. Chi. 6/22
2	*Phalatrikadi*	*Sarvaprameha*	Ca. Chi. 6/40
3	*Haritaki, katphal, mustak, lodhra*	*Kaphaj pramehi*	Ca. Chi. 6/26
4	*Patha, vidang, arjun, dhanvan*	*Kaphaj pramehi*	Ca. Chi. 6/26
5	*Dvi haridra, tagar, vidang*	*Kaphaj pramehi*	Ca. Chi. 6/27
6	*Kadamba, shal, arjun, yavani*	*Kaphaj pramehi*	Ca. Chi. 6/27
7	*Daruharidra, vidang, khadir, dhava*	*Kaphaj pramehi*	Ca. Chi. 6/28
8	*Devadaru, kustha, agaru, Chandan*	*Kaphaj pramehi*	Ca. Chi. 6/28
9	*Daruharidra, agnimantha, haritaki, vibhitaki, amalaka, patha*	*Kaphaj pramehi*	Ca. Chi. 6/28
10	*Patha, murva, swadamstra*	*Kaphaj pramehi*	Ca. Chi. 6/28
11	*Ushir, yavani, haritaki, giloy*	*Kaphaj pramehi*	Ca. Chi. 6/29
12	*Chavya, Abhaya, chitrak, saptaparna*	*Kaphaj pramehi*	Ca. Chi. 6/29
13	*Ushira, Chandan, lodhra arjuna*	*Pittaj prameha*	Ca. Chi. 6/30
14	*Ushir, musta, amalaka, haritaki*	*Pittaj prameha*	Ca. Chi. 6/30
15	*Patol, nimba, amalaka, giloy*	*Pittaj prameha*	Ca. Chi. 6/30
16	*Musta, Abhaya, padmak, vrikshaka*	*Pittaj prameha*	Ca.Chi. 6/30
17	*Lodhra, dhataki, sugandhabala, kaliyaka,*	*Pittaj prameha*	Ca. Chi.6/31
18	*Shirisha, sarja, nagakeshar, arjuna*	*Pittaj prameha*	Ca. Chi. 6/31
19	*nimba, arjun, Nisha, Utpal*	*Pittaj prameha*	Ca. Chi. 6/31
20	*priyangu, Padma, neel kamal, palash*	*Pittaj prameha*	Ca. Chi. 6/31
21	*Asvattha patha, asana, vetasa*	*Pittaj prameha*	Ca. Chi. 6/32
22	*Daruharidra, neel kamal, nagarmotha*	*Pittaj prameha*	Ca. Chi. 6/32
23	*Khadira, kramuka*	*kshaudrameha*	Su. chi. 11/9
24	*Mustadi kwatha*	*Sakala bheda bhave*	B.R. 37/18
25	*Kadaradi kwatha*	*kshadrameha*	B.R. 37/39
26	*Kataka, Khadira, Dhatri, darvi, Rajani etc*	*Harati Sakala mehan sapta ratra*	Sahasrayoga. 2/21
27	*Katankateri kwatha*	*prameha*	C.D. 35/19
28	*Vidangadi kwatha*	*Hanti Pramehan dustaran*	Y.R. Ut. 1/85 page
29	*Palasha puspa kwatha*	*Nanavidha prameha*	Y.R. Ut. 1/85 page
30	*Musta, triphala, Nisha, devadaru, murva, indrayana*	*Sakala meha*	Ha. Sam. 3rd sthan. 28/15

Avaleha Kalpana with their respective references[35]

S. No	*Avaleha kalpanas*	Indicated *Dosa karma*	Reference
1	*Kushavaleha*	*Vimshati prameha*	B.R. 37/51
2	*Shalasaradi leha*	*mehan*	B.R. 37/52
3	*Balya pga paka*	*Meha*	Y.R. Ut. 3/88 page

Asava/Arista Kalpana with their respective references[36]

S. No	*Asavarista kalpanas*	Indicated *dosa karma*	References
1	*Lodhrasava/Madhvasava*	*Kapha pittaj prameha*	Ca. chi. 6/44
2	*Dantyasava*	*Kapha pittaj prameha*	Ca. chi. 6/45
3	*bhallatakasava*	*Kapha pittaj prameha*	Ca. chi. 6/45
4	*Devadarvyarista*	*Durjaya prameha*	B.R. 37/235
5	*Kumaryasava*	*Vimshati mehajan*	Sha. Ma. Kha. 10/29
6	*Babbularista*	*Prameha*	Sha. Ma. Kha. 10/70

Paniya - Udaka kalpanas with their respective references[37]

S. No	*Paniya kalpanas*	References
1	*Sarodaka*	Ca. chi. 6/46
2	*Kushodaka*	Ca. chi. 6/46
3	*Madhudaka*	Ca. chi. 6/46
4	*Nisha triphala yoga*	Y.R. Ut. 1/86page

Ghrita/Taila Kalpana with their respective references
[38, 39]

S.no	*Ghrita/taila kalpanas*	Reference
1	*Simhamrita ghrita*	Y.R. Ut. 4/90 page
2	*Haridradi taila*	Y.R. Ut. 1/91 page
3	*Danti taila*	Ca. Chi. 6/20
4	*Ingudi taila*	Ca. Chi. 6/20
5	*Sarsapa taila*	Ca. Chi. 6/20
6	*Trikantakadya sneha*	Ca. Chi. 6/39
7	*Tuvaraka taila*	Su. chi. 13/23
8	*Shalmali ghrita*	B.R. 37/188
9	*Dhanvantara ghrita*	B.R. 37/196
10	*Dadimadya ghrita*	B.R. 37/201
11	*Dadimadya ghrita mahat*	B.R. 37/216
12	*Prameha mihira taila*	B.R. 37/229
13	*Trikantakadya ghrita taila*	C.D. 35/29
14	*Ghrita paan*	Ha. Sam. 3rd sthan. 28/17

Madya kalpanas with their respective references
[40]

S. No	*Madya kalpanas*	Reference
1	*Madhvika*	Ca. chi. 6/46
2	*Sidhu*	Ca. chi. 6/46

Results

The herbal drugs & the herbal formulations chronicled in the classical treatises possesses the vatanulomana, pittashamana, Kaphahara, medohara, kledo hara, Pramehaghna, krimighna, Vayasthasthapana, Deepaniya, pachaniya & Rasayana etc. attributions along with hypoglycemic, hypolipidemic, anti-obese, antioxidant effects & immunomodulatory action etc.. To thrive holistically while combating Madhumeha (Diabetes mellitus) with its samprapti vighatana, these herbal medicines & formulations could be advantageous, since they are affordable, accessible, palatable along with positively effective to the physiological homeostasis of the body.

Conclusion

There is a saying 'once you know Diabetes then the rest of the Medicine will be known to you' [41]. Therefore to aware the globe about its consequences, to break the barriers during its preventive aspects & to bridge the gaps in its curative aspects on every year 14th of Nov, the world celebrates the World Diabetes Day to remark another milestone of the medical science in human history on the birthday of Sir Frederick Banting, the pioneer of Insulin discovery along with Charles Best.[42] To get rid of this malady in every discipline of the medical sciences the foremost aim is to correct the Metabolic health which refers to the wellbeing of the constellation of biochemical processes that occurs inside the body for the physiological homeostasis. In these few decades owing to our heights of desk bound sedentary lifestyle, presently these maladies like Obesity, Diabetes mellitus on account of Insulin resistance, metabolic syndrome etc. are alarming the globe catastrophically afflicting almost 1/3rd of the population despite of countless conventional treatment modalities. In Ayurveda the concept of these metabolic issues has been vividly narrated under the umbrella of Santarpanajanya vikaras on the grounds of the defective tissue metabolism & over nutrition by burdening the Medovaha srotas, afflicting kapha vatadi tridosha, rasa, rakta, mamsadi dusya, with manda Jatharagni, dhatvagni adi, further depleting the Ojas. Along with nidan parivarjana, Samshaman ausadhis, Samshodhana measures, pathyapathya palana i.e following proper dietary & behavioural regimens accompanied with proper Dinacharya, Ritucharya coupled with adequate yogasana, pranayama altogether may limit the worsening incidence, prevalence & consequences of Madhumeha (Diabetes mellitus) along with enhancing the quality of life. The numerus herbal medicines along with various formulations will be fruitfully rewarding in treating Madhumeha, Diabetes mellitus. Let us Harmonize with the Timeless Wisdom & Thrive Holistically.

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