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RESEARCH ARTICLE

EXPLORATION OF SOME ANTI DIABETIC PLANTS (PRAMEHAGHNA AUSADHI) ALONGWITH PHARMACOLOGICAL ACTIVITIES WITH SPECIAL REFERENCE TO THE BRIHATRAYEES (CHARAKA SAMHITA, SUSHRUTA SAMHITA AND ASTANGA SAMGRAHA)

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ABSTRACT

Diabetes mellitus is a chronic degenerating disease which is worldwide occurrence with continuous upward trend in the societies. It has become very difficult to manage owing to its complexity. This disease was long been treated with diet, herbs and herbo-mineral compound long before the era of synthetic hypoglycemic drugs, many of which were found efficacious as investigated both clinically and experimentally by various research workers. In Ayurvedic classics a good number of single herbs and a number of compound preparations are mentioned – like Aragwadhadi, Salsaradi, Mustakadi, Triphaladi, Trapvadi gana etc. for the management of Diabetes mellitus in various classical texts. The drugs are detailed enumerated in this paper for the references so available in Charaka Samhita, Sushruta Samhita and Astanga Samgraha specially. However, it can pave the way for researcher in future for validation of the concept if any.

INTRODUCTION

Diabetes mellitus is a major health care problem not only in developed countries but also in the developing nation like India. Indeed amongst the various ethnic groups, Asian Indian seems to be particularly greater risk of developing diabetes. It has become a burning problem in public health all over the world and truly it is threat to medical profession in this present world health. Both the factor like – Environmental and genetic component are the responsible for its pathogenesis. This clinical syndrome is mainly characterized by hyperglycaemia due to absolute or relative deficiency of insulin. Diabetes is far the most common of the endocrine disorders and the incidence of both types of primary diabetes, that is Insulin Dependent Diabetes Mellitus (IDDM) and Non- Insulin Dependent Diabetes Mellitus (NIDDM) is rising throughout the World. However the prevalence of both varies considerably in different parts of the World. Like most chronic diseases diabetes mellitus is a self managed disease. The responsibility goes to the patients for its day to day management which is not negotiable, inescapable and cannot be shared or assigned.

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In the present time due to lack of proper awareness, screening and primary care facilities undiagnosed cases of diabetes mellitus constitute a major proportion of diabetic patients in the developing countries. Diabetes mellitus or Prameha is known to mankind since time immemorial. According to Ayurveda the morbid secretion of urine in general is called Prameha which literally means profuse urination. Twenty varieties have been described in Ayurvedic texts according to the changes of urine depending on the derangement of three bodily humors- Vata, Pitta and Kapha. In Ayurvedic classics abundant literature of this disease is found comprising of the measures for its effective managements. Of the twenty varieties of Prameha 10 varieties are caused by kapha dosa, 6 varieties are due to Pitta dosa and 4 due to Vata dosa. One of the four varieties caused by derangement of Vata dosa is called Madhumeha as discussed by ancients Ayurvedic physicians consisted of an entity known to us today as Diabetes mellitus. Since a long period herbal remedies have been used in India. The very rich literature has been found for treating different diseases in the different classics. Earliest reference about the medicinal use of plant is found in Rig Veda (4500-3000 BC). In post Vedic period major reference to use of medicinal plants are found in the famous books of Ayurveda i.e. Charak Samhita and Sushruta Samhita. More over Astanga Samgraha the next generation's classic put a very good compilation of

Table 1. The three great classics of Ayurveda vis Charaka Samhira, Sushruta Samhita and Astanga Samgrha describes lots of single herbs and compound formulation for the treatment of Madhumeha. Bellow a comparative table has been prepared of these herbs

Sl. No.	Charak Samhita		Sushruta Samhita		Astanga Samgraha	
	Sanskrit name	Botanical name	Sanskrit name	Botanical name	Sanskrit name	Botanical name
1	Agaru	<i>Aquilaria agallocha</i> Roxb.	Agaru	<i>Aquilaria agallocha</i> Roxb.	Agaru	<i>Aquilaria agallocha</i> Roxb.
2	Ajwain (Yavani)	<i>Trachyspermum ammi</i> Linn.	Amaltash	<i>Cassia fistula</i> Linn.	Agnimantha	<i>Premna mucronata</i> Roxb.
3	Amlakhi	<i>Embellica officinalis</i> Gaertn	Amlakhi	<i>Embellica officinalis</i> Gaertn	Amaltash	<i>Cassia fistula</i> Linn.
4	Amra	<i>Magnifera indica</i> Linn.	Amra	<i>Magnifera indica</i> Linn.	Amlakhi	<i>Embellica officinalis</i> Gaertn
5	Arani (Agnimantha)	<i>Premna mucronata</i> Roxb.	Aparajita	<i>Clitoria ternatea</i> Linn.	Asan (Vijaysara)	<i>Pterocarpus marsupium</i> Roxb.
6	Arjuna	<i>Terminalia arjuna</i> (Roxb.) W. & A.	Aralu	<i>Ailanthus excels</i> Roxb.	Bibhitak	<i>Terminalia bellirica</i> Roxb.
7	Bibhitaki	<i>Terminalia bellirica</i> Roxb.	Arani	<i>Premna mucronata</i> Roxb.	Candana	<i>Santalum album</i> Linn.
8	Chavya	<i>Piper retrofractum</i> Vahl.	Arjuna	<i>Terminalia arjuna</i> (Roxb.) W. & A.	Chavika (Chavya)	<i>Piper retrofractum</i> Vahl.
9	Citrak moola	<i>Plumbago zeylanica</i> Linn.	Bhallatak	<i>Semecarpus anacardium</i> Linn.	Citrak	<i>Plumbago zeylanica</i> Linn.
10	Daruharidra	<i>Berberis aristata</i> DC.	Bhargi	<i>Clerodendrum serratum</i> (Linn.) Moon.	Daruharidra	<i>Berberis aristata</i> DC.
11	Devadaru	<i>Cedrus deodara</i> (Roxb.) Loud	Bibhitaki	<i>Terminalia bellirica</i> Roxb.	Devadaru	<i>Cedrus deodara</i> (Roxb.) Loud
12	Dhanwan	<i>Grewia tiliaefolia</i> Vahl.	Candan	<i>Santalum album</i> Linn.	Ela	<i>Elettaria cardamomum</i> Maton.
13	Dhav	<i>Anogeissus latifolia</i> (Roxb. ex DC.)	Chitrak	<i>Plumbago zeylanica</i> Linn.	Gambhari	<i>Gmelina arborea</i> Linn.
14	Gokshur	<i>Tribulus terrestris</i> Linn.	Dadima	<i>Punica granatum</i> Linn.	Guduchi	<i>Tinospora cordifolia</i> Willd Miers ex Hook f. &Thoms
15	Guduchi	<i>Tinospora cordifolia</i> Willd Miers ex Hook f. &Thoms	Daruharidra	<i>Berberis aristata</i> DC.	Guggulu	<i>Commiphora mukul</i> (Hook ex Stocks) Engl.
16	Haridra	<i>Curcuma longa</i> Linn.	Draksha	<i>Vitis vinifera</i> Linn.	Haridra	<i>Curcuma longa</i> Linn.
17	Haritaki	<i>Terminalia chebula</i> Retz.	Durba	<i>Cynodon dactylon</i> Pers.	Haritaki	<i>Terminalia chebula</i> Retz.
18	Kadamba	<i>Anthocephalus indicus</i> Miq.	Gambhari	<i>Gmelina arborea</i> Linn.	Hingu	
19	Katphal	<i>Myrica esculenta</i> Buch-Ham.	Guduchi	<i>Tinospora cordifolia</i> Willd Miers ex Hook f. &Thoms	Kadar (Sweta khadir)	<i>Acacia suma</i> Buch. Ham.
20	Khadir	<i>Acacia catechu</i> Willd.	Haridra	<i>Curcuma longa</i> Linn.	Kamal	<i>Nelumbo nucifera</i> Gaertn.
21	Khas (Usir)	<i>Vetiveria zizanioidis</i> (Linn.) Nash.	Haritaki	<i>Terminalia chebula</i> Retz.	Kampillak	<i>Mallotus philippinensis</i> Muell Arg
22	Kumkum	<i>Crocus sativus</i> Linn.	Hingu	<i>Ferula assa-foetida</i> Linn.	Katphal	<i>Myrica esculenta</i> Buch-Ham.
23	Kuth (Kustha)	<i>Saussurea lappa</i> C.B. Clarke	Jalaveta	<i>Salix tetrasperma</i> Roxb.	Khadir	<i>Acacia catechu</i> Willd.
24	Murba	<i>Marsdenia tenacissima</i> W.&A.	Jambu	<i>Syzygium cumini</i> (Linn.) Skeels	Kharjura	<i>Phoenix sylvestris</i> Roxb.
25	Nagarmotha	<i>Cyperus rotundus</i> Linn.	Kamal	<i>Nelumbo nucifera</i> Gaertn.	Khas	<i>Vetiveria zizanioidis</i> (Linn.) Nash.
26	Nimba	<i>Azadirachta indica</i> A. Juss	Kamalnala	<i>Nelumbo nucifera</i> Gaertn.	Kustha	<i>Saussurea lappa</i> C.B. Clarke
27	Padmakath (Padmak)	<i>Prunus cerasoides</i> D. Don	Karanja	<i>Pongamia pinnata</i> (Linn.) Pierre	Kutaja	<i>Holarrhena antidysenterica</i> (Linn.) Wall
28	Palash	<i>Butea monosperma</i> (Lam.) Kuntze	Kaseru	<i>Scirpus grossus</i> Linn. F	Kutki	<i>Picrorhiza kurroa</i> Royle ex Benth
29	Parbal(patol)	<i>Trichosanthes dioica</i> Roxb.	Khadir	<i>Acacia catechu</i> Willd.	Lodhra	<i>Symplocos racemosa</i> Roxb.
30	Patala	<i>Stereospermum suaveolens</i> DC.	Kuchila	<i>Strychnos nuxvomica</i> Linn.	Manjistha	<i>Rubia cordifolia</i> Linn.
31	Patha	<i>Cissampelos nareira</i> I inn	Kutaia	<i>Holarrhena antidysenterica</i> (Linn.) Wall	Mustak	<i>Cyperus rotundus</i> Linn.
32	Pathani lodh (Lodhra)	<i>Symplocos racemosa</i> Roxb.	Kuth	<i>Saussurea lappa</i> C.B. Clarke	Nagkeshar	<i>Mesua ferrea</i> Linn.
33	Priyangu	<i>Callicarpa macrophylla</i> Vahl.	Kutki	<i>Picrorhiza kurroa</i> Royle ex Benth	Nilakamal	<i>Nymphaceae nouchali</i> Burm. F.
34	Rakta candana	<i>Pterocarpus santalinus</i> Linn.	Lodhra	<i>Symplocos racemosa</i> Roxb.	Nimba	<i>Azadirachta indica</i> A. Juss
35	Shal	<i>Shorea robusta</i> Garten.	Manjistha	<i>Rubia cordifolia</i> Linn.	Nyagodhra	<i>Ficus bengalensis</i> Linn.
36	Sirish	<i>Albizia lebbek</i> Benth.	Mulethi (Yastimadhu)	<i>Glycyrrhiza glabra</i> Linn.	Palash	<i>Butea monosperma</i> (Lam.) Kuntze
37	Sweta kutaja	<i>Wrightia tomentosa</i> Roem. & Schult	Murva	<i>Marsdenia tenacissima</i> W.&A.	Parijata	<i>Nyctanthes arbortristis</i> Linn.
38	Tagar	<i>Valeriana wallichii</i> DC.	Nagkeshara	<i>Mesua ferrea</i> Linn.	Patha	<i>Cissampelos pareira</i> Linn.
39	Utpala	<i>Nymphoea stellata</i> Willd.	Narikela	<i>Cocos nucifera</i> Linn.	Patol	<i>Trichosanthes dioica</i> Roxb.
40	Vayovidanga	<i>Embelia ribes</i> Burm. F.	Nimba	<i>Azadirachta indica</i> A. Juss	Priyangu	<i>Callicarpa macrophylla</i> Vahl.
41	Vijayasara	<i>Pterocarpus marsupium</i> Roxb.	Nyagodhra (Vat)	<i>Ficus bengalensis</i> Linn.	Rohitak	<i>Tecoma undulate</i> G. Don
42	Bhallatakasav	Compound formulation	Palash	<i>Butea monosperma</i> (Lam.) Kuntze	Saptaparna	<i>Alstonia scholaris</i> R. Br.

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43	Phalatrikadi kwath	Compound formulation	Parijat	<i>Nyctanthes arbortristis</i> Linn.	Sarja	<i>Vateria indica</i> Linn.
44	Madhvasav	Compound formulation	Patha	<i>Cissampelos pareira</i> Linn.	Shal	<i>Shorea robusta</i> Gaertn.
45	-	-	Pippali	<i>Piper longum</i> Linn.	Sirish	<i>Albizia lebbeck</i> Benth.
46	-	-	Priyangu	<i>Callicarpa macrophylla</i> Vahl.	Tagar	<i>Valeriana wallichii</i> DC.
47	-	-	Puga	<i>Areca catechu</i> Linn.	Tinduk	<i>Diospyros Peregrina</i> (Gaertn) Gurke.
48	-	-	Salaparni	<i>Desmodium gangeticum</i> DC	Vidanga	<i>Embelia ribes</i> Burm.
49	-	-	Salasar (Shal)	<i>Shorea robusta</i> Gaertn.	Trikatakadi sneha	Compound formulation
50	-	-	Saptaparna	<i>Alstonia scholaris</i> R. Br.	Dhanwantar ghrita	Compound formulation
51	-	-	Semal (Salmali)	<i>Salmalia malabarica</i> Schott & Endl.	Lodhrasav	Compound formulation
52	-	-	Sewar	<i>Ceratophyllum demersum</i> Linn.	Dasamoolarista	Compound formulation
53	-	-	Sirish	<i>Albizia lebbeck</i> Benth.	Loharista	Compound formulation
54	-	-	Sisam	<i>Dalbergia sissoo</i> Roxb.	Mustadi churna	Compound formulation
55	-	-	Strivestak	<i>Pinus roxburghii</i> Sargent.		
56	-	-	Sweta khadir	<i>Acacia suma</i> Buch. Ham.		
57	-	-	Tinduk	<i>Diospyros peregrina</i> (Gaertn) Gurke.		
58	-	-	Tinish	<i>Ougenia oojensis</i> (Roxb.) Hochr.		
59	-	-	Vijaysara	<i>Pterocarpus marsupium</i> Roxb.		

Table 2. The pharmacological activities

Sl.	Plants	Action in Ayurvedic view	Pharmacological activities
1.	Agaru	6. Sheet Prashaman - Herbs which Relieve Cold. 7. Shwashar - Herbs which are good for Asthma and breathlessness. 8. Shirovirechan - Herbs which are good for cleansing the head / Sinuses. 9. Tikta Skandh - Herbs which are bitter.	10. Antiasthmatic 11. Anti-inflammatory 12. Analgesic 13. Aphrodisiac 14. Sedative 15. Cardiac Stimulant 16. Antihyperlipidemic 17. Anti-thrombotic 18. Anti-diarrheal 19. Anti-dysentery
2.	Ajwain (Yavani)	• Deepan, Pachan, Sulaghna, Krimighna.	Germicide, Anti-spasmodic and Fungicide.
3.	Amlakhi	• Pachan, Rasayan, pramehaghna, swasaghna,	Digestive stimulant, Antispasmodic, Broncho-dilating, Antiplatelet-aggregatory, Antitussive.
4.	Amra	3. Hridya - Herbs good for heart. 4. Chardimigrahana - Anti-emetic herbs. 5. Purish Sangrahnaya - Herbs to increase bulk of feces. 6. Mutar Sangrahnaya.	Antioxidant, Cytoprotective, Anti-ulcer, Immune modulatory, Anti Inflammatory, Antitussive and Gastro-protective. Sunstroke, Ophthalmia, Eruption, Night blindness, Insect bite.
5.	Arani (Agnimantha)	• Shothahara – Anti inflammatory group of herbs. • Sheetaprashamana – Group of herbs to relieve cold. • Anuvasanopaya – Group of herbs useful in Oil Basti (enema).	Thermogenic, Laxative, Febrifuge, Anti-inflammatory, Cardiotonic and Alterant expectorant.
6.	Arjuna	• Hridya, Kshayhara, Medohara, Prameahar, Katu	Hyperlipidemia, Antioxidant, Anti-inflammatory and Immunomodulatory, Anti-ischemic effects, Hypertension.
7.	Bibhitaki	• achan, Krimighna, Jwaraghna, Swasahara, Chakshusya.	Anti diarrhoeal, Antioxidant, Antidiabetic, Anti-Spasmodic and Bronchodialator.
8.	Chavya	• Truptighna – Satiation relieving group of herbs. • \Arshoghna – Group of herbs useful in relieving hemorrhoids. • Deepaneeya – Digestion improving group of herbs Shoola Prashamana – Abdominal colic relieving group of herbs.	Hepatoprotective, Analgesic activity, Anti-inflammatory activity, Diuretic activity, Anti-diarrhoeal activity, CNS depressant activity.

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9.	Citrak moola	<ul style="list-style-type: none"> • Deepneya - Herb used to improve appetite and digestion. • Shool prashmana - Herb used to cure adominal pain. • Arshoghna - Herb used to cure piles. • Lekhneeya - herbs which have scraping power. 	Antiplasmodial, Leishmanicidal, Anticarcinogenic, Hypolipidemic.
10.	Daruharidra	<ul style="list-style-type: none"> • Arshoghna – Herbs used in haemorrhoids. • Lekhaniya – Herbs used in scraping and reducing cholesterol levels. • Kandughna - Herbs used in various skin disorders. 	Anti-fungal, Anti-bacterial, Anti-Oxidant, Anti-viral, Ant-diabetic, Anti-tumor and Anti-inflammatory in nature.
11.	Devadaru	<ul style="list-style-type: none"> • Krumihara – useful in worm infestation, infected wounds. • Shwasahara – useful in treatment of asthma and chronic respiratory disorders. • Kasahara – useful in cough and cold. • Jwarahara – useful in fever. • Mehaghna – useful in urinary tract disorders and diabetes. 	Anti-fungal, Anti-tubercular, Anxiolytic and anticonvulsant activity, Anti-diabetic, Neuroleptic, Cytotoxic Activity
12.	Dhanwan	Raktapittanasak., Kasa, Kanthya	Antioxidant, Antiproliferative, Antidiabetic.
13.	Dhav	Prameghna, Pandu, Arshaghna	Antiulcer, Hypolipidemic Hepatoprotective
14.	Gokshur	Sothahara, Mutravirechaniya, Pramehahara, Vrися.	Diuretic, Aphrodisiac, Antihypertensive, Antihyperlipidemic, Antidiabetic, Hepatoprotective, Anticancer, Analgesic, and Anti-inflammatory.
15.	Guduchi	Rasayan, Dahahara, Jwaraghna, Pramehaghna, Vatasra, Kusthaghna.	Anti-diabetic, Anti-malarial, Anti-oxidant, Anti-allergic, Hepatoprotective, Immunomodulatory & Anti-neoplastic activities.
16.	Haridra	Lekhaneeya , Kushthaghna, Krimighna and Vishaghn, Varnya	Antidiabetic, Anti-allergic and Rogenic, Anticancer.
17.	Haritaki	Rasayan, Lekhaniya, Anuloman, Chakshusya, Arsoghna	Anti-carcinogenic, Antioxidant, Hypocholesterolemic Antispasmodic activity.
18.	Kadamba	Daha, Raktipitta, Vrana, Yonidosha, Visha Vrana, Pramehaghna.	Hypoglycaemic Sedative and Antiepileptic.
19.	Katphal	Vedanasthapakar, Sita Prasamana, Samjna Sthapana Kanthya, Visaghna.	Anti inflammatory, Anthelmintic, Antiasthmatic,
20.	Khadir	Kusthaghna, Krimighna, Medohara, Pramehaghna.	Hypoglycemic, Hypotensive, Skin ulcer healing, Immunomodulator.
21.	Khas (Usir)	Varnya, Stanyajanana, Chardinigrahana, Daha Prasamana, Mutrala.	Analgesic, Anti-inflammatory, Antiarthritic, Antifungal, Diuretic, Hemostatic.
22.	Kumkum	Vrися, Hridya, Chaksusya.	Hypolipidemic, Anti cancer, Anti Alzheimer's, Anti convulsant, Anti diabetic
23.	Kuth (Kustha)	Sukrasodhana, Lekhaniya, Asthapanopaga, Svasaghna.	Antispasmodic, Hypotensive, Anticancer, Antitumor, Hypoglycemic
24.	Murba	Stanyasodhana, Raktapittanasak, pramehaghna, Jwaraghna.	Antitumor, Hypoglycemic, Anti nociceptive, Analgesic and Anti inflammatory activity
25.	Nagarmotha	Lekhaniya, Trishna Nigrahana, deepan, Pachan, Stanya Shodhana.	Antipyretic, Anti-emetic, Antidiarrhoeal, Cytoprotective, Anti-obesity activity
26.	Nimba	Kusthaghna, Krimighna, Mehaghna, Kandughna, Jvaraghna	Antipyretic, Antifungal, Antiviral, Antibacterial, Contraceptive, Hypoglycemic.
27.	Padmakath (Padmak)	Kusthaghna, Raktapittanasak, Garbha Samsthapana, Vedanasthapana.	Antioxidant, Antiseptic. Ulcer healing, Antimicrobial.
28.	Palash	Pramehaghna, Krimighna, Pradara.	Antifertility, Anticonvulsive, Antihelmintic, Antitumor, Antidiabetic, Contraceptive.
29.	Parbal(patol)	Truptighna, Trishna Nigrahana, Jvaraghna.	Chemo Preventive Anti-hyperglycemic & Antihyperlipidemic.
30.	Patala	Sothahara, Svasahara, Mutrala.	Neuroprotective, Gastroprotective, Immunomodulator.
31.	Patha	Sandhaniya, Jwarhara, Stanyashodhana.	Analgesic, Anti-inflammatory, Antipyretic, Antidiarrhoeal, Antihyperglycemic, Antitumour.
32.	Pathani lodh (Lodhra)	Kusthaghna, Raktapittanasak, Svetapradara, Chakshusya.	Antifungal, Antitumor, Cytotoxic, Antimutagenic, Antigenotoxic, Hypolipidemic, Antidiabetic
33.	Priyangu	Raktapittanasak, Asthibhagna, Jwaraghna, Mutravirajaniya, Purisha Samgrahaniya.	Antidiabetic, Anti-inflammatory, Antifungal, Antibacterial, Antiarthritic, Anti-pyretic & Analgesic
34.	Rakta candana	Kusthaghna, Chakshusya, Vrися, Raktapittanasak.	Antiplasmodial, Hepatoprotective, Antitumor, Antihyperglycemic.
35.	Shal	Atisaraghna, Arsaghna, Kshataropak, Vedanahara, Svetapradara.	Antinociceptive, Anti–Obesity, Antiulcer, Analgesic. Antipyretic Anti–inflammatory.
36.	Sirish	Vishaghna Vedanasthapana, Shirovirechana, Visaghna.	Antimicrobial, Hypoglycemic, Anticancer, Antifertility activity.
37.	Sweta kutaja	Kusthaghna, krimighna, jwaraghna	Anti breast cancer, Antimicrobial, Anti hyperglycemic, Anti tubercular, Anti tumour, Anti psoriasis, Antidiabetic
38.	Tagar	Sheeta Prashanama, bhutaghna, sirorogahara, Aksephara, Kaphaja prameha hara	Anxiolytic and Antidepressant, Antispasmodic, Hypoyensive.
39.	Utpala	Mutra Virajaniya, Samgrahi, Raktapitta nasak.	Antiinflammatory, Hepatoprotective, Antidepressant.
40.	Vayovidanga	Krimighna, kusthaghna, Triptighna	Anthelmintic, <u>Antihistaminic and Bronchodilator</u> , Dyslipidemia.
41.	Vijayasara / Asana	Medohara, Pramehahara, Kusthaghna.	Antidiabetic, Anti-hyperinsulinaemic and anti-hypertriglyceridaemic, Cardiotonic, Anti cataract.
42.	Amaltash	Virechana, Kusthaghna, Kandughna, Jwaraghna.	Antitussive, Antipyretic, Laxative, Wound healing activity, Hypocholesterolemic and Hypoglycaemic.
43.	Aparajita	Shirovirechanopaga, Kusthaghna, Unmāda, Vrana ropak.	Antipyretic, Anti-inflammatory, Analgesic, diuretic, Local anesthetic, Anti diabetic, blood platelet aggregation-inhibiting.
44.	Aralu	Purishasangrahaniya, Krimighna, Kusthaghna.	Antitumor, Anti-amoebic antimalarial, Antifertility, Anticancer, Hypoglycemic

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45.	Bhallatak	Deepaniya, Bhedniya, Shirovirechan, Kusthghna, Mutra sanghrehniya.	Antiatherogenic, anti-reproductive, CNS stimulant, Hypoglycemic, anticarcinogenic and hair growth promoter.
46.	Bhargi	Pureesha sangrahaniya, Swasahara, Krimighna, Jwarahara.	Anticarcinogenic, hepatoprotective, Antiasthmatic, Anticancer, Anti-allergic.
47.	Candan	Angamada Prassamana, Varnya, Kandughna, Daha Prasamana, Trishna Nigrahana, Vishaghna.	Anti-ulcerogenic, Antipyretic, antiviral, anti diarrhoeal, anti ulcer.
48.	Dadima	Hridya, Balya, sukrala, grahi.	Anti diabetic, anticancer, haematinic, hypolipidemic, anti atherosclerotic
49.	Draksha	Kanthy, Virechnopaga, Kasahara, Shramahara, vrisya.	Cardioprotective, Hepatoprotective, Anticarcinogenic, Antidiabetic
50.	Durba	Mutrala, Raktapittanasak, Chakshusya.	Antidiabetic, anticancer, Antihyperlipidemic, hepatoprotective
51.	Gambhari	Shothahara, Dahaprasahmana, Virechanopaga, Medhya, Rasayan.	Immunostimulant, Diuretic, Cardioprotective, Anti Diabetic, Antipyretic and Analgesic
52.	Guduchi	Vayasthapan, Trishna nigrah, Triptighna, Daha prashmana, Satnya shodhna, Pramehahara.	Immunomodulator, antidiabetic, Anti-arthritis, Anti-oxidant, Anti-allergic, Anti-stress, Hepatoprotective, & anti-neoplastic activities.
53.	Hingu	Deepneya, Pachaniya, Sulaghna Shvashara, Sanjnasthapana.	(i) Hypotensive, Chemoprotective, Hepatoprotective, Anti-diabetic, Antispasmodic.
54.	Jalaveta	Vedanahara, Jwaraghna.	Effect on Motor Coordination, CNS Depressant, Hypoglycemic.
55.	Jambu	Chardinigrahan, Mutarsangrehniya, Purishashviranjniye, Grahi.	Anti-Diabetic, Anticancer, Anti-diarrhoeal, Hepatoprotective.
56.	Kamal	Raktapitta Nasak, Jwaraghna, Atisaraghna.	anti-diabetic, anti-depressant and Sedative, Anti obesity.
57.	Kamalnal		
58.	Karanja	Kandughna, Kushtaghna, Arshahara, Mehahara.	Anti-diarrhoeal Anti-ulcer, Hypoglycemic and Hypolipidemic
59.	Kaseru	Stanyakar, Atisaraghna, Chardighna.	antidiabetic, antihyperlipidemic,
60.	Khadir	Udardaprashaman, Kusthaghna, Krimighna, Mehahara, Medoghna.	(ii) Chemoprotective, Hepatoprotective, Hypoglycaemic, Wound healing.
61.	Kuchila	Vedanahara, Grahi, Pramehajit.	Analgesic, anti-inflammatory, antidiabetic, Anti-tumor.
62.	Kutaja	Arshoghna, Stanyasodhana, Atisaraghna.	Antidiarrhoeal, Cytotoxic, Antidiabetic.
63.	Kutki	Lekhania, Stanyasodhana, Bhedaniya, Pramehaghna.	Hepatoprotective, Hypolipidemic, Antiobesity, Antidiabetic.
64.	Manjistha	Jwarahara, Varnya, Visaghna, Mehahara	Anti-arthritis, Anti-diabetic, Wound healing, Anti-platelet activating effect.
65.	Mulethi (Yastimadhu)	jeevaneeya, Sandhaneeya, Varnya, Shonitasthapana	Antitussive, Peptic Ulcer healing property, antihyperglycemic.
66.	Nagkeshara	Jwarahara, Vatasrahara, Bastirotgahara, Kushtahara, Sheers Harujahara, Swasahara	hepatoprotective, Anti-neoplastic, Immunomodulatory activity.
67.	Narikela	Kesya, Amlapittahara.	(iii) Antineoplastic, Depressant and anticonvulsant, Renal protective, Antidiabetic, Antihypertensive.
68.	Nyagodhra (Vat)	Yonidoshahara, Stambhana, raktapittanasak, Varnya.	Antidiabetic and Ameliorative, Antitumor, Anti stress and Ant Allergic.
69.	Parijat	Sandhivataghna, Gridhrasi hara, Jwaraghna.	Anti arthritic, Hepatoprotective.
70.	Pippali	Deepan, swasahara, Kasahara, Shiro virechana, Pramehahara, Arshahara.	Hepatoprotective, anti asthmatic, Bio availability enhancer. Antidiabetic, Hypocholesterolaemic.
71.	Puga	Atisaraghna, pradarhara, Mutradosa nasak, Vrisya.	Hypoglycemic, Hypolipideamic, Antihypertensive.
72.	Salaparni	Angamardhaprashamana, Shothahara, Balya, Kasahara.	Antiasthmatic, Smooth muscle relaxant, Cardio-protective, Antidiabetic.
73.	Saptaparna	Kusthaghna, Udarda prashamana, Shvasaghna, Jwaraghna.	Antidiabetic, Hypolipidemic, Antitussive, Antiasthmatic, Expectorant, Hepatoprotective.
74.	Semal (Salmali)	Shonitsthapana, Pureesh Viranjaniya, Vedanasthapan.	Anti-diabetic, Anti-obesity, Hypotensive, Antiangiogenic.
75.	Sewar	Atisaraghna, Kshatahara, Jwaraghna, Visaghna.	Antiulcer, Antidiarrhoeal and Wound healing, CYTOTOXIC, ANTIDIABETIC.
76.	Sisam	Medohara, Kusthaghna, Svitranasak, Vrananasak.	Antidiabetic, Anthelmintic, Antinociceptive, Anti-spermatogenic, Osteogenic.
77.	Srivestak	Krimighna, Mutradosanasak, Kusthaghna, Swasaghna.	Hepatoprotective, Anticonvulsant Antiasthmatic, Cytotoxic.
78.	Sweta khadir	Kusthaghna, Pramehaghna.	Hypoglycemic, analgesic, anti inflammatory, antipyretic.
79.	Tinduk	Kusthaghna, vrisya, Yoniroganasak, Grahi, Pramehaghna.	Antitumor, Hepatoprotective, Anticancer, Hypoglycemic.
80.	Tinish	Atisaraghna, kusthaghna, Pramehaghna.	Hepatoprotective, Antidiabetic, Hypotensive.
81.	Ela	Shwashara, kasahara, Angamarda Prashmana, Mutrakricchahara, Chakshusya.	Antihypertensive, Antiplatelet, Anticancer, Fibrinolytic.
82.	Guggul	Vataghna, Medohara, Kusthaghna.	Hypolipidemic, Anti obesity, Antiarthritic.
83.			
84.	Kharjura	Vrisya, Madatyaynasak, Hridya, Daurvalya.	Anthelmintic and Cytotoxic, Antimutagenic, Antihyperlipidemic, Hepatoprotective, Nephroprotective.
85.	Mustak	Lekhania, Trishna Nigrahana, Stanya Shodhana, Kandughna, Jwaratisarahara, Grahi	Antidiabetic, Antidiarrhoeal, Cytoprotective, Antimutagenic,
86.	Nilakamal		Anesthetic, Antidiabetic, Hepatoprotective, Antitumor.
87.	Rohitak	Pleehaghna, Kusthaghna, Gulmahara, Netrarogahara.	Hepatoprotective, Antidiabetic, Antiproliferative, AntiHIV Potential.

Charak Samhita and Sushruta Samhita with a few additions and simplification of concepts. Authors are taking esteem efforts to explore the anti diabetic plants described in the major classics for further proper experimental or a scientific study to evaluate proper medicaments in this disease.

Anti diabetic plants described in Brihatrayee

The following table has been arranged and alphabetically mentioned the name of the plants with Sanskrit names & botanical names along with classical information.

The following table has shown the pharmacological activities

DISCUSSION

The above tables shows that some of the herbs are common in between the classics which are very effective in the treatment of Prameha and being used from thousands of year back. The herbs like- Agaru, Amalaki, Amra, Arjun, Devadaru, Daruharidra, Haridra, Haritaki, Bibhitaki, Kahdir, Kuth, Lodhra, Murba, Patha, Nimba, Kutaja, Shirish, Vijaysara, Guduchi are mentioned by all the classics. In pharmacological activities many plants have used for many indications. Many clinical and experimental trials have been done over these drugs and found effective in the treatment of diabetes. More over Charak Samhita and Astanga Samgraha mentions some very effective compound preparations like Phalatrikadi kwath, Madhwasava, Dhanwantar ghrita etc. As the emerge of diabetic patients in billions it is necessary to evaluate these drugs in today's scientific parameters by more experimental and clinical trials in the form of single drug as well as in different compositions from the herbs mentioned in these great classics. With the widening up of the herbal medicine market all over the world inclusion of these drugs with proper standardization will give a better care to diabetic patients and will reduce the financial burdens to the developing nations.

Conclusion

With the advancement of medical science the knowledge of diabetology has reached far away in the field of its pathological conception.

However the knowledge of the remedial field is not enriched that much to cope up with the burden. On the other hand the established drugs for the treatment have shown adverse effects prohibiting their long term use. The different herbs described in the treatment of Prameha by Charaka, Sushruta and Bagbhata have great prospect in the management and control of diabetes mellitus as these medicines are on use from long period and does not shows adverse reaction even after long term use. The herbs like Amalaki, Arjuna, Nimba, Haridra, Vijaysara have been established for their efficacy in the diabetes management. But scopes for the other herbs mentioned by the scholars are not less. In order to establish these more scientific experimental trials are required. Authors are hopeful that this paper will further encourage the research scholars to study these anti diabetic plants in scientific way for establishing these in the field of diabetes.

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