



(REVIEW ARTICLE)



A review of Ayurvedic alcoholic fermentation products used in Prameha Chikitsa

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Abstract

Ayurveda, one of the oldest medical systems, has long recognized diabetes (*Prameha*) as a significant health concern. This is evident from ancient texts, particularly the *Charaka Samhita*, where *Nidana Sthana* (Chapter 4) and *Chikitsa Sthana* (Chapter 6) provide detailed discussions on its etiology, classification, and treatment. These classical references highlight the historical understanding of diabetes and its management within the *Ayurvedic* framework. The primary cause of diabetes (*Prameha*) is an excess of *Kaphadosha* in the body, which leads to an imbalance in the *dhatu*s (tissues) and *upadhatus* (sub-tissues). Diabetes (*Prameha*) presents a significant treatment challenge, as drug therapy must be individualized based on a patient's body constitution and the stage of disease progression. While numerous antidiabetic medications are currently in use, the steady increase in diabetes prevalence over the years suggests the need for a more refined and innovative treatment approach through the development of novel therapeutic agents. Alcoholic fermented decoctions (*Madyajanak Sandhana Kalpana*) a process involving controlled alcohol formation within medicinally permissible limits, have been widely recommended in *Ayurveda* for managing complex diseases. These formulations continue to play a crucial role in Ayurvedic medical practice today. A critical analysis of the broad therapeutic potential of fermented decoctions has led to the hypothesis that they may hold promise in the management of *Prameha*.

Given that diabetes (*Prameha*) has been recognized as a leading cause of mortality among non-communicable diseases, there is an urgent need to explore novel remedies that not only alleviate symptoms but also modify the disease progression and its harmful effects, offering a more comprehensive and effective approach to diabetes management.

Keywords: Diabetes; *Prameha*; Alcoholic Fermentation; *Aristha Kalpana*; *Ayurveda*; Non-Communicable Disease

1. Introduction

Globally, diabetes (*Prameha*) is categorized as a non-communicable disease. It is typified by endocrine dysfunction, which disrupts the ability of pancreas to regulate insulin, resulting in high blood and urine glucose levels(1). Recent statistics show that the number of diabetes cases increased steadily between 2016 and 2020, according to an ICMR analysis. The prevalence of diabetes keeps rising in spite of a great deal of study and a variety of pharmaceutical treatments available in different medical systems. A paper from *lancet* journal titled 'Metabolic non-communicable diseases in India: time to act' discusses that there will be steady rise in the number of people with diabetes with estimate of 101 million, 36% higher than the 74.2 million and awareness, treatment, and control rates of diabetes in India are 46%, 36%, and 16% respectively in current situation(2). To reduce this increasing public health burden, these figures highlight the urgent need for innovative ways to diabetes management as well as proactive changes in treatment approaches.

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In this current review paper, alcoholic fermented products (*Madyajanak Sandhana Kalpana*) for treating diabetes (*Prameha*) have been reviewed with reference to *Ayurveda* guidelines. Diabetes (*Prameha*) is discussed as a predominant disease in *Ayurveda* context by the father of *ayurvedic* medicine *Acharya Charaka* by mentioning it in the diagnosis chapter and treatment chapter both. As per *Ayurveda's* concepts, in diabetes; the body functioning weakens and disrupts due to unhealthy lifestyle pattern paving a way to the disease progression. Out of the three *doshas* diabetes shows dominance of *kaphadosha* in disease pathology(3). The qualities of *Kapha dosha* (phlegmatic imbalance) include *Snigdha* (oily/unctuous), *Sheeta* (cold), *Guru* (heavy), *Manda* (mild), *Sandra* (dense/viscous), *Slakshna* (smooth), *Prasanna* (clear), *Pichchila* (slimy), *Shlakshnatva* (jelly-like) and *Sthira* (immobile/stable). This *Kapha* (*Kaphadosha*) begins to increase quantitatively, leading to an overgrowth of *dhatu*s (tissues) that depend on *Kapha* for their function and share its qualities. Fat tissues (*Meda Dhatu*), blood (*Rakta Dhatu*), and the endocrine system-associated *dhatu*s undergo malfunctioning due to the instability of *Kapha dhatu*, ultimately leading to diabetes (*Prameha*).

One of the primary goals of diabetes (*Prameha*) treatment is to reduce excess *Kapha* (*Kaphadosha*). *Ayurveda*, with its focus on disease-specific (*Vyadhi Pratyaniika*) and cause-specific (*Nidana Pratyaniika*) treatments for various ailments, provides physicians with the flexibility to choose the most appropriate therapies based on the progression of the disease in each patient.(4). Alcoholic fermentation products of medicinal plants (*Asava-Arishta Kalpana*) is one such formulation of *Ayurveda* which is a smart fit for treatment of *Ayurveda* through *yuktipramana* (logical thinking)(5). Fermented decoctions (*Arishta Kalpana*) is a process of alcoholic preparation in which the concentration gradient of alcohol is regulated within medicinally permissible limits(6). A review article on fermented decoctions (*Arishta Kalpana*) provides insights into the modern approach to these formulations and their therapeutic utility. It highlights that older *Arishta* and *Asava* preparations are preferred, as newly prepared formulations tend to be *Tridoshakara* (aggravating all three *Doshas*) whereas aged ones become *Tridoshashamaka* (balancing all three *Doshas*). Additionally *Asava* and *Arishta* have a longer shelf life, enhancing their medicinal efficacy over time(7). This helps us understand the shifting perspective on the use of fermented decoctions (*Arishta Kalpana*), emphasizing their evolving significance in *Ayurvedic* therapeutics.

Alcohol is self-generated in the *Asava-Arishta* formulations by addition of yeast containing natural medicinal flowers of *Dhataki* (*Woodfordia fruticos*) or *Madhuka*(*Madhuka indica*). The qualities of alcohol (*Madya*) in the *Ayurvedic* context include *Laghu* (light), *Ushna* (hot), *Teekshna* (penetrative), *Sukshma* (subtle), *Amla* (sour), *Vyavayi* (permeable/distributing throughout the body), *Vikasi* (ability to spread quickly), *Ruksha* (rough/drying), and *Prasanna* (clear in nature)(8). If we compare the qualities of *asava/arishtha* and *Kaphadosha*, they are opposite to each other. This implies that alcoholic fermentations (*Sandhana Kalpana*) may serve as a useful therapeutic approach for controlling diabetes (*Prameha*) and regulating excess *Kapha*, due to their opposing qualities that help balance *Kaphadosha*.

2. Materials and Methods

All *Ayurvedic* reference classics related to *Prameha* (diabetes), literature related to *Kapha Dosha*, and *Madya* (alcohol) were reviewed. Key references were selectively taken from *Charaka Samhita* for disease understanding, while *Bhaishajya Ratnavali* was referred to for fermentation based formulations (*Sandhana Kalpana*). Additionally, various research papers and articles were analyzed and interpreted based on their relevance to the subject. The collected literary data was systematically sorted, examined, and evaluated in alignment with the objectives of this review paper.

Table 1 Denotes *Granthokta Arishtas* and *Asavas* for the treatment of *Prameha*.

	Ingredients	Sandhan Dravya	Madhur Dravya	Prakshepa Dravya	Indications
Devdarvarishta (9)	<i>Devdaru, Adulsa, Indrayava, Danti, Manjistha, Tagara, Haridra, Daruharidra, Rasna, Mustak, Shirish, Vaividang, Khadira, Arjuna bark, Yamani, Kushta bark,</i>	<i>Dhataki</i>	<i>Madhu+ Sarkara</i>	<i>Dalchini, Tejpatha, Elachi, Suntha, Kalimarich, Pippali, Priyangu, Nagkesar</i>	<i>Prameha, vatroga, grahani, Arsha, Mutrakrishra Darukushta.</i>

	<i>Chandana,kutki, Chitrakmool.</i>				
Ushirasava(10)	<i>Ushira,Lotus,Hribera, Gambhari,Neelotpala, Priyangu, Dhanvayasa, Patha,Kiratatikta, Padmaka, Lodhra,Manjishta, Shati, Parpataka,Pundarika, Patola, Kanchanara, Nyagrodha, Udumbara,Jambu, Shalmali,Draksha.</i>	<i>Dhataki</i>	<i>Madhu+ Sarkara</i>	<i>Pippali</i>	<i>Raktapitta , Pandu , Kustha, Prameha, Arsa, Krmi &shotha.</i>
Chavikasavam(11)	<i>Chavya,Chitrakmool, Dikemali, Pushkarmool,Vacha, Hauber Kurchi,Indravaruni, Dhania, Rasna,Dantimool, Kachora, Patolamoola,Haritiki, Bibhitiki,Amalki, Ajwain, Vidang,Mustak, Manjishta, Devdaru,Sunth.</i>	<i>Dhataki</i>	<i>Guda</i>	<i>Lavang,Pippali, Sunth,Kankol, Dalchini,Ela, Tejpatra, Nagkeshar,Kali Marich.</i>	<i>Sarv gulma, Prameha, Pratishaya, Kasa,Ashtila, Vatashonita, Udara, Antravruddhi.</i>
Dashmularishta (12)	<i>Dashmoola,Chitraka, Pushkaramoola, Lodhra,Guduchi,Amla, Durlabha,Khadira, Bijsara, Pata,Kushta, Manjishta, Devdaru,Vidanga, Madhuka,Bharangi, Kapittha,Bibhitaki, Punarnava,Chavya, Jatamansi,Priyangu, Sariva,Trivruta, Nirgundi,Rasana, Puga,Shati,Haridra,</i>	<i>Dhataki</i>	<i>Madhu+ Jaggery</i>	<i>Kankola, Chandana, Jatiphala, Lavanga,Twak, Ela, Tamrapatra Katkaphala</i>	<i>Arsha, Bhangandra, Pandu, Kamla, Udara, Mutravibandha, Agnimandya, Aruchi, Chardi, Grahani, Gulma,Kasa, Shawasa, Vatvadh, Kushta,Meha, Ashmari,</i>

	<i>Shatpushpa, Padmaka, Nagkeshra, Musta, Indravaya, Karkatshrungi, Jivka, Rishabhaka, Meda, Mameda, Kakoli, Ksheerakakoli, Riddhi, Draksha, Vriddhi,</i>				<i>Vandhytva, Karshya, Dorbalya & shukrashaya</i>
Babularishta (13)	<i>Babul twak</i>	<i>Dhatki</i>	<i>Jaggery</i>	<i>Pippali, Jatiphala, Kankola, Ela, Twak, Patra, Nagkeshkar, Lavanga, Maricha</i>	<i>Kashaya, Kushta, Atisara, Prameha, Shwasa, Kasa</i>
Punarnavadyarishta (14)	<i>Shwetapunarnava, Rakta Punarnava, Bala, Atibala, Danti, Guduchi, Chitraka, Nidigadhika.</i>	<i>Nil</i>	<i>Madhu+ Jaggery</i>	<i>Twak, Patra, Ela, Maricha, Hrivera, Agaru.</i>	<i>Hrudaroga, Pandu, Jwara, Pliha, Aruchi, Meha, Gulma, Bhagandara, Jathararoga, Kasa, Shwasa, Kushta, Kandu, Hikka, Kilasa Halimaka.</i>
Ashokarishta (15)	<i>Ashoka, Ajaji, Mustaka, Shunthi, Daruharidra, Vtphala, Amrasthi, Jeeraka, Vasa, Chandana</i>	<i>Dhataki</i>	<i>Jaggery</i>	<i>Nil</i>	<i>Jwara, Arsha, Aruchi, Prameha, Shotha, Rakta pitta.</i>
Madhvasava (16)	<i>Lodhra, Shati, Puskaramoola, Murva, Vidanga, Triphala, Yavani, Chavya, Priyangu, Kramuka, Vishala, Kiratikta, Katurohini, Nata, Chitraka, Kushta, Ativisha, Patha,</i>	<i>Nil</i>	<i>Madhu</i>	<i>Ela, Pippali, Patra, Maricha.</i>	<i>Kaphaja and Pittika types of meha, Pandu, Arsha, Aruchi, Grahanidosha, Kilasa, Different types of Kushta.</i>

	<i>Kalingaka, Kesara,Indrasahva, Nakha,Plava</i>				
Dantyasava (16)	<i>Danti,Lodhra,Shati, Puskaramoola, Murva, Vidanga,Triphala, Yavani,Chavya, Priyangu, Kramuka,Vishala, Kiratikta,Katurohini, Nata, Chitraka,Kushta, Ativisha,Patha, Kalingaka, Kesara,Indrasahva, Nakha,Plava.</i>	<i>Nil</i>	<i>Madhu+Sarkara</i>	<i>Ela,Pippali, Patra, Maricha</i>	<i>Kaphaja and Pittika types of meha, Pandu,Arsha, Aruchi, Grahani-dosha, Kilasa, Different types of Kushta.</i>

A review of nine *Ayurvedic* formulations reveals that honey (*madhu*) is used as the *Madhura dravya* in six formulations, while jaggery is employed as the *madhura dravya* in five formulations. In two formulations, *Dantyasava* and *Devadarvarishta*, both honey and jaggery have been utilized as the *madhura* (sweetening) agents. Notably, four formulations do not mention any fermentation agents, neither *dhataki* nor *madhuka*, as part of their composition.

2.1.1. Innovative products

For the treatment of *Diabetes Mellitus*, the *Jamun* fruit and its seed (*Eugenia jambolana*) are well-known for their ability to reduce blood sugar levels. Two formulations containing

Jamun seeds and/or fruit are already available in the market; these represent novel formulations, not derived from traditional *Granthas*.

- *Jambavasav* (*Abhay* pharmaceutical)
- *Jambhulasav* (*Vaidya Khadiwale*)

Jambvasav(17):- *Jambavasava* of *Abhay* Pharmaceuticals is a well-known and widely marketed polyherbal *Ayurvedic* formulation, recognized for its significant role in managing diabetes. This formulation demonstrates satisfactory therapeutic outcomes, thanks to its synergistic blend of herbal extracts, each contributing to blood sugar management. The key ingredients of *Jambavasava* include *Jamun*, *Neem*, *Methi Beej*, *Karela*, *Shuddha Shilajeet*, *Gudmar*, *Triphala*, *Kutki*, *Belpatra*, *Kavach Beej*, *Haridra*, *Triwang Bhasma*, *Dhataki*, *Gokharu*, *Chirayta*, *Kalijiri*, *Lodhra*, *Rasana*, *Shatavari*, *Sunthi*, *Askand*, *Dalchini*, *Erandmul*, and *Punarnava*.

Note- Many anti-diabetic drugs are included. *Dhatki* has been incorporated as a *Sandhan Dravya*.

Jambhulasav (*Vaidya Khadiwale*)(18):- The key herbal components of *Jambhulasav* include:- *Jambhul Kalk*, *Bedki Pala*, *Asana*, *Saptkapi*, *Avalakathi*, *Haridra*, *Jitsaya*, *Jambhul Saal*, *Khadir*, *Sunthi*, *Marich*, *Pippali*, *Tamalpatra*, and *Dhataki* used as a natural fermenting agent, and *madhu* as *Madhura dravya*.

In this formulation, both the *Jambu* fruit and bark (*phala* and *twak*) have been utilized, with *Dhatki* serving as the fermenting agent. This is an experience-based, innovative formulation by *Vaidya Khadiwale*.

2.2. Therapeutic Uses

Jambhulasav is primarily indicated in the treatment of *Prameha*, being especially beneficial for *diabetes mellitus*. The formulation works by regulating blood sugar levels, improving digestion, and supporting overall metabolism. The herbs

in *Jambhulasav* collectively enhances the body's ability to metabolize glucose, cleanse the urinary system, and reduce symptoms associated with *Prameha*, such as excessive urination and thirst.

The fermentation process in *Jambhulasav*, facilitated by *Dhataki*, enhances the bioavailability and potency of its ingredients, making it more effective in managing *Madhumeha*. This formulation balances *Kapha* and *Pitta Doshas*, which are often aggravated in diabetic conditions. *Jambhulasav* represents a time-honored *Ayurvedic* approach to managing *Prameha*, particularly diabetes. By harnessing the properties of its carefully selected herbs and the fermentation process, this formulation offers a potent and natural therapeutic option for maintaining healthy glucose levels and overall well-being. Further standardization and research into its pharmacological properties would enhance its clinical application and recognition in both *Ayurvedic* and modern medical practices.

3. Discussion

3.1. Properties of *Kapha Dosha*

The qualities of *Kapha Dosha* play a crucial role in the progression of diabetes (*Prameha*). *Kapha* is heavy in nature, referring to high molecular weight substances like saliva and phlegm. It is cold, acting as the body's cooling agent and balancing *Pitta Dosha*. It is unctuous, causing it to adhere to surfaces, and greasy, allowing selective permeability. Its mild and soft nature is gentle on mucosal linings, while its sweet quality increases the body's calorific value. Additionally, it is solid, stable, and sedentary, meaning it is less active and tends to remain in one place. Its sticky, slimy nature causes it to cling to surfaces(19). These properties are detailed in the *Charaka Samhita, Sutra Sthana*, Chapter 1, Verse 61. According to *Acharya Charaka*, excessive *Kapha* should be treated with drugs or food preparations that possess opposing qualities.

3.2. Properties of Alcohol

Ayurveda describes alcohol as light, hot, penetrative, subtle, sour, permeable, rough, and rapidly dispersing. Its lightness allows it to permeate membranes easily, while its heat promotes metabolic activity and molecular breakdown. Alcohol's penetrative nature enables it to pass through oily and sticky surfaces or thick membranes. Being subtle, alcohol has a fine molecular structure, and its sour quality does not add calorific value to the body. Due to these attributes, alcohol is capable of rapidly disseminating throughout the body, crossing membranes and overcoming barriers. Alcoholic fermentation products ie *asava* and *arishta* share the same properties as alcohol, making them effective in treatment(20).

3.3. Causative Factors of Diabetes (*Prameha*) in *Ayurveda*

Ayurveda identifies unhealthy eating habits, a sedentary lifestyle with minimal physical activity, excessive daytime sleeping, and overconsumption of jaggery-based products and dairy products as contributing factors to diabetes (*Prameha*)(21). These habits aggravate *Kapha Dosha*, leading to its accumulation and stagnation in the *srotasas* (channels).

3.4. Principles of Diabetes Treatment in *Ayurveda*

Ayurvedic treatment for diabetes involves both *Panchakarma* (purification) and medicinal management, depending on the patient's constitution and the disease's progression. The decision to employ *Shodhana* (cleansing) or *Shamana* (pacification) is based on individual patient assessment. A study on the efficacy of integrated *Ayurvedic* treatment in Type 2 diabetes concluded that *Ayurvedic* therapy had a beneficial effect on most parameters of *Prameha* over a 90-day period(22). This highlights the effectiveness of *Ayurvedic* medicines in managing diabetes.

3.5. Current Diabetes Prevalence in India

According to a recent study, 11% of the Indian population is diabetic. The Indian Council of Medical Research (ICMR) estimates that India, the world's most populous country, now has 101 million people with diabetes—an increase of 36% from the 74.2 million estimated in 2021 by the International Diabetes Federation(23). *Statista* reports that diabetes is a global health crisis, and India has the second-highest number of diabetics worldwide. In 2021, over 74 million Indians were diagnosed with diabetes, with the number projected to exceed 124 million by 2045(24).

By *yukti praman* and by guidelines of *Charaksamhita*, it is possible to formulate innovative *asava arishta* formulations for *prameha chikitsa* by using anti-hyperglycemic medicinal plants.

4. Conclusion

A comprehensive review of the literature reveals a significant relationship between diabetes (*Prameha*) and Alcoholic fermentation formulations as a potential treatment, these formulations are fast acting and have better bioavailability due to presence of alcohol. This suggests that Alcoholic fermentations may play a promising role in halting the progression of diabetes (*Prameha*). To this end, Alcoholic fermentation products containing anti-diabetic herbs, widely documented in *Brihatrayi* and *Lagutrayi*, may be effective in managing the disease. The activity of *Asava-Arishta* in *Prameha Chikitsa* can be understood through several therapeutic pathways. In *Ayurveda*, *Sthula Pramehi* and *Krishna Pramehi* represent two distinct categories of *Prameha* patients. For *Sthula Pramehi*, *Aptarpana* serves as the primary line of treatment, aimed at reducing excess *Kapha* and fat. The alcohol generated through the fermentation process in *Asava-Arishta* formulations can support this action by enhancing metabolism and aiding in the breakdown of excess tissues. The active principles of medicinal plants get extracted in *asava – arishta*. In the case of *Jambhulasav*, its anti-hyperglycemic effect plays a crucial role in managing elevated blood glucose levels, offering an effective natural intervention for *Prameha*, particularly in conditions like *Madhumeha*. During the process of *Sandhan* (fermentation) for preparing new formulations, sugar or *jaggery* is converted into alcohol. For such preparations, it may be preferable to use *jaggery* instead of sugar. This review comprehensively examines *Madhyanjanak Sandhan* formulations for *Prameha Chikitsa*. Treatment decisions should be based on *Rugna Nidan* (differentiating *Sthula Pramehi* and *Krishna Pramehi*).

Compliance with ethical standards- Not applicable

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The Authors declare that there are no conflicts of interest.

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