

From Shastra to Storefront: A Critical Review of Classical Ayurvedic Sweets in Comparison with Market-Prepared Sweets

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ABSTRACT

Background: Sweets have traditionally occupied an important place in Indian dietary, cultural, and religious practices. Ayurveda recognizes *Madhura Rasa* as nourishing and supportive of tissue development, while emphasizing moderation and individual suitability. In contrast, increasing consumption of commercially prepared sweets, refined sugars, and energy-dense foods, together with sedentary lifestyles, has contributed to the growing burden of obesity, diabetes, and other metabolic disorders.

Objective: To review classical Ayurvedic principles of *Madhura Rasa* and sweet preparation and compare them with contemporary market-prepared sweets, with emphasis on *Prakriti*, *Agni*, *Prakshepa Dravyas*, and metabolic health.

Methods: A structured literature review informed by PRISMA 2020 was conducted. Classical references were identified from *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Bhavaprakasha Nighantu* using E-Samhita. Contemporary evidence was obtained from scientific journals, research articles, and relevant electronic sources. Fourteen references, comprising seven classical Ayurvedic and seven contemporary scientific sources, were narratively synthesized.

Results: Classical texts describe *Madhura Rasa* as nourishing and strength-promoting when appropriately consumed, while excessive intake is associated with *Kapha* and *Meda* accumulation, *Agnimandya*, *Sthaulya*, and *Prameha*. Traditional preparations such as *Lapsika* and *Rasala* incorporate digestive adjuncts including *Maricha*, *Ela*, and *Lavanga*. Contemporary evidence suggests potential metabolic effects of selected bioactive compounds such as piperine.

Conclusion: Ayurvedic sweet preparations emphasize formulation, moderation, digestive compatibility, and individual suitability. Integrating these principles with contemporary nutritional knowledge may support healthier sweet consumption, although their metabolic benefits require further clinical validation.

Keywords: *Madhura Rasa*; Ayurvedic sweets; *Prakriti*; *Agni*; *Prakshepa Dravyas*; metabolic health; *Agni*; Classical sweets; *Madhura Rasa*.

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INTRODUCTION

Sweets have historically held a central place in Indian dietary practices, religious observances, and social traditions. Traditionally, their consumption was largely confined to ceremonial occasions, including

weddings and major festivals, and was therefore relatively infrequent. These sweets were commonly prepared from gram flour, jaggery, or modest quantities of sugar, often combined with ingredients such as ghee and milk. Traditional lifestyles were also characterized by considerable physical activity through agricultural labour, walking long distances,

manual household tasks, and other energy-demanding activities. Consequently, energy intake was generally balanced by energy expenditure, and occasional consumption of sweets was less likely to contribute to metabolic disturbances.

In contrast, contemporary dietary practices have witnessed a substantial increase in both the frequency and quantity of sweet consumption, particularly in urban populations. This transition has been driven by the widespread availability of commercially prepared sweets, bakery products, confectioneries, and sugar-sweetened beverages. Many of these products are rich in refined carbohydrates, added sugars, and energy-dense fats and are increasingly consumed in the context of sedentary lifestyles.

Epidemiological evidence has associated excessive consumption of sugar-rich foods with the increasing burden of metabolic disorders, including diabetes mellitus, obesity, dyslipidaemia, and cardiovascular disease. A nationally representative survey reported that 19.8% of Indian adults aged 45 years and above are affected by diabetes mellitus (1). Excessive intake of refined sugars, together with declining physical activity, may contribute to this growing public health burden. In the Ayurvedic context, *Charaka Samhita* describes *Madhura Rasa* (sweet taste) as *Swadu* and places it first among the six *Rasa* (2). *Swadu Rasa* is described as *Sarvadhatuvardhana*, supporting the development and nourishment of body tissues, *Kaphakara*, increasing *Kapha*, and *Pitta* and *Vata* *Shaamaka*, alleviating *Pitta* and *Vata* (3).

Globally, the prevalence of obesity and type 2 diabetes has increased substantially, with the trend being particularly evident in urban populations in India (4). Estimates from the International Diabetes Federation have reported a diabetes prevalence of approximately 9.2% among Indians aged 20–79 years (5). The burden is also reported to be considerably higher among urban populations, with approximately 15% of Indian adults in urban settings estimated to have type 2 diabetes (6). These trends highlight the importance of reassessing dietary patterns and identifying culturally appropriate approaches to healthier food choices.

Ayurveda provides a comprehensive and individualized framework for dietary regulation, considering not only the inherent properties of food but also its ingredients, method of preparation, combinations, quantity (*Matra*), timing (*Kala*), and individual suitability. Although *Madhura Rasa* is recognized for its role in nourishment, growth, and tissue development, classical Ayurvedic texts emphasize moderation and caution against its excessive or indiscriminate consumption.

Despite the extensive description of *Madhura Rasa* and sweet preparations in classical Ayurvedic literature, there remains limited scientific synthesis

comparing traditional Ayurvedic formulations with contemporary market-prepared sweets from the perspective of metabolic health. The present review addresses this gap by integrating classical principles of ingredient selection, preparation, *Prakshepa Dravyas*, *Matra*, *Kala*, *Prakriti*, and *Agni* with contemporary understanding of glucose homeostasis and metabolic disorders. This integrated perspective may help elucidate the relevance of traditional formulation principles to healthier sweet consumption while identifying areas requiring further scientific validation.

Accordingly, this review aims to develop and evaluate sweet preparations based on Ayurvedic principles, considering individual *Prakriti* and *Agni*, and to promote their appropriate preparation and judicious consumption as part of healthier dietary practices.

METHODOLOGY

A structured literature review informed by the **PRISMA 2020 reporting framework** was undertaken to identify and synthesize classical Ayurvedic references and contemporary scientific evidence related to *Madhura Rasa*, Ayurvedic sweet preparations, and their appropriate consumption. The review incorporated classical Ayurvedic texts alongside relevant scientific literature to provide an integrated perspective on traditional sweet preparation and its contemporary metabolic relevance.

Sources of Information

A total of **14 references** were included in the final review. The sources comprised **8 classical Ayurvedic references** and **6 contemporary scientific references**. Classical references were obtained from *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and *Bhavaprakasha Nighantu*, with electronic searching facilitated through **E-Samhita**. Contemporary evidence was obtained from published scientific articles, including literature identified through electronic databases and relevant internet-based sources.

The classical literature was consulted primarily for information regarding *Madhura Rasa*, its properties and effects, Ayurvedic principles of sweet consumption, and the ingredients and methods of preparation of traditional sweet preparations. Contemporary literature was reviewed to provide scientific evidence regarding diabetes, urbanization, metabolic health, insulin signalling, and the potential metabolic effects of dietary components relevant to sweet consumption.

Search and Selection Process

Relevant sources were identified using combinations of keywords and related terms, including *Madhura Rasa*, *Swadu*, Ayurvedic sweets, sweet preparations, traditional sweets, *Prakriti*, *Agni*, Ayurvedic diet, sugar consumption, diabetes, obesity, insulin resistance, and metabolic health. Reference lists of relevant publications were also examined to identify additional pertinent sources.

The identified literature was screened for relevance to the objectives of the review. Sources were included when they provided information relevant to the classical description, preparation, properties, consumption, or health implications of sweet preparations, or when they provided contemporary scientific evidence relevant to the metabolic effects of sweet consumption. Sources that were unrelated to the objectives of the review were excluded.

Data Extraction and Synthesis

Relevant information was extracted from the included sources and organized according to **source**, **Ayurvedic description**, **ingredients**, **preparation methods**, **properties of *Madhura Rasa***, **relationship with *Prakriti* and *Agni***, **recommended consumption**, and **contemporary metabolic implications**.

The evidence was synthesized narratively, integrating classical Ayurvedic concepts with contemporary scientific literature. Particular emphasis was placed on comparing traditional sweet preparations with modern commercially prepared sweets and on developing an Ayurvedic perspective for their appropriate preparation and consumption according to individual *Prakriti* and *Agni*.

The identification and selection of literature were presented using a **PRISMA 2020-informed flow diagram**, adapted to include both classical Ayurvedic sources and contemporary scientific literature. As this was a structured literature review rather than a formal systematic review, the PRISMA framework was used to enhance transparency in the reporting of source identification, screening, selection, and final inclusion.

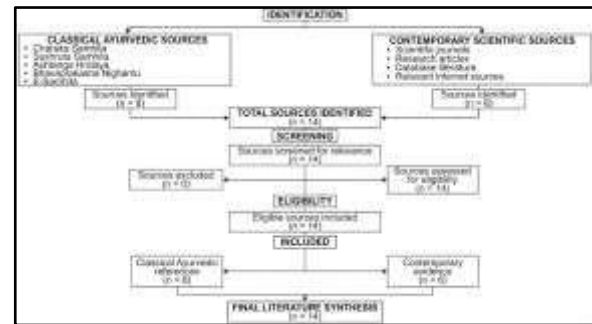


Figure 1: PRISMA 2020-Informed Flow Diagram for the Identification, Screening, and Inclusion of Literature in the Structured Review

DISCUSSION

The present review highlights a fundamental distinction between classical Ayurvedic sweet preparations and contemporary market-prepared sweets, particularly in terms of **formulation, ingredient selection, preparation methods, frequency of consumption, and potential metabolic consequences**. Although modern nutritional science often emphasizes the adverse effects of excessive intake of sugar-rich foods, Ayurveda adopts a more contextual approach. It recognizes *Madhura Rasa* as an important component of a balanced diet while emphasizing appropriate quantity, preparation, timing, individual constitution (*Prakriti*), digestive capacity (*Agni*), and overall lifestyle. Thus, the Ayurvedic perspective is not one of complete avoidance of sweets but of **judicious selection, appropriate formulation, and moderation**.

Madhura Rasa: Ayurvedic Perspective

According to *Charaka Samhita*, *Madhura Rasa* is associated with attributes such as *Balya* (strength-promoting), *Jeevana* (life-sustaining), *Tarpana* (nourishing), *Brimhana* (promoting growth and tissue development), and *Sarvathatu Poshana* (nourishment of all body tissues). When consumed in an appropriate quantity and within a suitable dietary context, it is considered beneficial for growth, tissue nourishment, vitality, and maintenance of physiological functions. It is also described as alleviating *Vata* and *Pitta Dosha* (7).

Similarly, *Vagbhata Samhita* describes *Madhura Rasa* as promoting tissue strength and nourishment (*Dhatunam Pravalam Balam*), *Brimhana* (anabolic/nourishing), *Kanthya* (beneficial to the throat), *Ayushya* (supportive of longevity), *Jeevana* (life-sustaining), and *Snigdha* (unctuous). It is also

described as capable of alleviating *Pitta* and *Vata* (*Pittanilavishapaham*) (8). These descriptions suggest that Ayurveda does not regard sweet taste as intrinsically harmful; rather, its effects are understood to depend on **quantity, composition, individual suitability, and digestive capacity**.

However, classical Ayurvedic literature also emphasizes the adverse consequences of excessive intake of *Madhura Rasa*. Overconsumption is associated with aggravation of *Kapha* and accumulation of *Meda Dhatu*, with subsequent manifestations such as *Sthaulya* (obesity), *Agnimandya* (impaired digestive function), *Prameha* (a group of metabolic disorders including diabetes), and other metabolic disturbances (9). This principle closely corresponds with the contemporary understanding that excessive intake of energy-dense, sugar-rich foods, particularly when combined with physical inactivity, may promote obesity, insulin resistance, dysglycaemia, and related metabolic disorders. Therefore, both frameworks emphasize **moderation rather than absolute elimination**.

Classical Ayurvedic Sweet Preparations

Classical Ayurvedic literature describes a variety of sweet preparations under *Kritanna Varga* and related categories, wherein palatability is integrated with considerations of digestibility, nourishment, and physiological suitability. Unlike many contemporary commercially manufactured sweets, traditional preparations were generally formulated from recognizable food ingredients and incorporated specific preparation techniques and adjuncts intended to influence their digestibility and functional properties.

Lapsika (laapsi), described in *Bhavaprakasha*, is prepared by roasting semolina in ghee, followed by the addition of milk and sugar and the incorporation of spices such as *Lavanga* and *Maricha*. It is described as *Brimhana*, *Balya*, *Vrishya*, and *Rochana*, indicating nourishing, strength-promoting, and appetite-enhancing attributes. The incorporation of digestive spices may provide a traditional means of balancing the potentially *Kapha*-promoting effects of a nutrient-dense sweet preparation (10).

Similarly, *Rasala* (shrikhand), prepared using curd, milk, sugar, and aromatic spices such as *Ela*, *Lavanga*, and *Maricha*, is traditionally described as nourishing and suitable in conditions associated with debility and tissue depletion. The formulation illustrates the Ayurvedic practice of combining sweet and nourishing

ingredients with aromatic and digestive substances rather than relying solely on concentrated sweetness (11).

These preparations therefore demonstrate that the classical Ayurvedic concept of a “sweet” extends beyond its sugar content. **The complete formulation—including the base ingredients, fat source, dairy components, spices, preparation method, quantity, and suitability to the individual—is considered in determining its overall effect.** This holistic formulation principle represents an important distinction from many modern commercially prepared sweets.

Role of *Prakshepa Dravyas*

An important characteristic of several classical preparations is the incorporation of *Prakshepa Dravyas*, which may be broadly understood as adjunctive ingredients added to a formulation to modify its characteristics, palatability, stability, digestibility, or overall properties. In pharmaceutical formulations, additives or excipients may serve functional purposes such as improving stability, appearance, consistency, and acceptability, although their role and pharmacological significance vary according to the formulation (12).

In Ayurvedic sweet preparations, substances such as *Maricha* (*Piper nigrum*), *Ela* (*Amomum* spp.), *Lavanga* (*Syzygium aromaticum*), and *Trikatu*—comprising *Shunthi*, *Maricha*, and *Pippali*—are traditionally incorporated as adjuncts. From an Ayurvedic perspective, these substances are associated with *Deepana* (enhancement of digestive function), *Pachana* (support of digestion and metabolism), and *Kapha-Vata Shamana*. Their incorporation may therefore be interpreted as an attempt to improve the digestibility and physiological compatibility of sweet preparations.

However, the traditional Ayurvedic rationale should not be equated directly with established clinical pharmacological effects. Rather, contemporary evidence provides a plausible biological basis for some of these traditional observations, particularly with respect to glucose metabolism, oxidative stress, inflammation, and insulin signalling.

Market-Prepared Sweets and Metabolic Implications

Contemporary market-prepared sweets differ substantially from many classical preparations in terms of **ingredient quality, degree of processing, energy density, portion size, and frequency of consumption**. Commercial sweets and confectioneries may contain substantial amounts of refined sugar, refined flour, saturated or partially hydrogenated fats, and other processing ingredients. Repeated consumption of such energy-dense foods, particularly in the context of sedentary lifestyles, can contribute to excess energy intake and an increased risk of obesity and metabolic dysfunction.

This distinction is particularly relevant in the Indian context, where increasing urbanization, dietary transition, reduced physical activity, and greater availability of commercially prepared foods have accompanied a growing burden of diabetes and other metabolic disorders. The nationally representative evidence cited in the introduction demonstrates the substantial burden of diabetes among Indian adults aged 45 years and above (1). Earlier evidence has similarly demonstrated an association between urbanization and increased prevalence of diabetes and cardiovascular risk factors in India (4). These observations reinforce the importance of considering not merely the presence of sweets in the diet, but also **their composition, portion size, frequency of consumption, and the lifestyle context in which they are consumed**.

At the molecular level, insulin signalling plays a central role in maintaining glucose homeostasis. Binding of insulin to the insulin receptor initiates downstream signalling through pathways including phosphatidylinositol-3-kinase (PI3K)/Akt, which contributes to glucose uptake through GLUT4 translocation and regulation of hepatic glucose metabolism. Impairment of insulin signalling can lead to reduced glucose disposal, increased hepatic glucose production, hyperglycaemia, and associated metabolic abnormalities (13). Persistent exposure to excessive energy intake and repeated glycaemic excursions may further contribute to adiposity, inflammation, and progressive insulin resistance.

Bioactive constituents present in certain *Prakshepa Dravyas* have attracted increasing scientific interest because of their potential effects on metabolic pathways. Piperine, a major bioactive component of *Piper nigrum*, has been investigated for its potential influence on glucose homeostasis and insulin sensitivity. Recent experimental evidence has reported metabolic effects of piperine relevant to glucose regulation and insulin action (14). These findings

provide a possible biological basis for investigating the traditional inclusion of pungent and aromatic spices in sweet preparations. Nevertheless, such findings should be interpreted cautiously, as evidence from experimental or mechanistic studies cannot be directly extrapolated to clinical benefits from the quantities of spices consumed in traditional sweets.

The conceptual similarity between Ayurvedic descriptions such as *Deepana*, *Pachana*, and *Medohara* and contemporary mechanisms involving glucose metabolism, insulin sensitivity, and energy homeostasis is scientifically intriguing. However, these concepts arise from different theoretical frameworks and should not be considered equivalent. Rather, the available evidence suggests that **selected traditional formulation principles may warrant further biochemical and clinical investigation**.

Importance of *Matra*, *Kala*, *Prakriti*, and *Agni*

Another important distinction between traditional and contemporary dietary practices is the emphasis placed by Ayurveda on **quantity (*Matra*), timing (*Kala*), individual constitution (*Prakriti*), and digestive capacity (*Agni*)**. In the Ayurvedic framework, the same food may not produce identical effects in every individual because dietary response is influenced by constitution, digestive capacity, quantity, timing, and prevailing physiological conditions.

Traditional sweet consumption was also generally embedded within specific cultural and social occasions rather than being an everyday dietary component. In contrast, the contemporary food environment has increased the accessibility and frequency of sweet consumption through commercially available sweets, bakery products, confectioneries, and sugar-sweetened beverages. Consequently, the metabolic concern may arise not simply from the consumption of a sweet food but from the **cumulative effect of frequent consumption, excessive portions, high energy density, and insufficient physical activity**.

This perspective is particularly relevant to the increasing burden of diabetes and obesity described in the introduction. The classical Ayurvedic emphasis on moderation and individualized dietary selection therefore provides a culturally relevant framework that can complement, rather than replace, contemporary nutritional recommendations.

Classical Formulation versus Modern Market-Prepared Sweets

The comparison between classical Ayurvedic and modern market-prepared sweets can therefore be understood across several dimensions. Classical formulations emphasize **ingredient selection, preparation technique, combination of ingredients, digestive adjuncts, quantity, timing, and individual suitability**, whereas commercially prepared sweets are primarily designed for taste, appearance, convenience, shelf life, and consumer acceptability. The latter may also encourage frequent consumption because of their widespread availability and marketing.

Importantly, this comparison should not imply that all traditional sweets are metabolically beneficial or that all commercially prepared sweets are inherently harmful. Traditional preparations may also contain substantial sugar, fat, and calories, and excessive consumption may produce adverse metabolic effects. Similarly, the metabolic impact of a commercially prepared sweet depends on its composition, portion size, frequency of intake, and the individual's overall dietary and activity pattern. The principal distinction is therefore **the formulation philosophy and context of consumption rather than the simple classification of a food as “traditional” or “modern.”**

Overall Interpretation

Overall, the classical Ayurvedic approach to sweet preparation represents a **food-based, individualized, and formulation-oriented model** in which the properties of ingredients, method of preparation, digestive adjuncts, quantity, timing, and individual *Prakriti* and *Agni* are considered together. The classical recognition that excessive *Madhura Rasa* may contribute to *Kapha* and *Meda* accumulation and eventually to *Prameha* demonstrates an important emphasis on moderation and metabolic balance (9).

The contemporary rise in diabetes, obesity, and related metabolic disorders highlights the need to reconsider dietary patterns in the context of both food composition and lifestyle. Integrating selected principles of traditional Ayurvedic sweet preparation—particularly **appropriate ingredient selection, moderation, incorporation of suitable digestive adjuncts, individualized dietary consideration, and avoidance of excessive frequency**—may provide a culturally acceptable framework for healthier sweet consumption.

Nevertheless, the proposed metabolic benefits of specific Ayurvedic formulations and *Prakshepa Dravyas* require validation through **standardized**

compositional analysis, glycaemic-response studies, controlled feeding studies, and appropriately designed clinical trials. Future research should therefore move beyond textual comparison and investigate whether modifications based on *Prakriti*, *Agni*, ingredient composition, and preparation methods produce measurable improvements in postprandial glucose response, insulin sensitivity, lipid metabolism, and other metabolic outcomes.

Thus, rather than advocating complete avoidance of sweets, the Ayurvedic perspective supports a more nuanced principle: **the health impact of a sweet preparation depends on what it contains, how it is prepared, how much is consumed, when it is consumed, how frequently it is consumed, and for whom it is appropriate.** This approach provides a meaningful conceptual bridge between classical dietary wisdom and contemporary concerns regarding metabolic health.

CONCLUSION

The escalating burden of metabolic disorders underscores the need for a critical reassessment of contemporary dietary practices, particularly the frequency, quantity, and quality of sweet consumption. Classical Ayurvedic sweet preparations reflect a holistic approach in which ingredient selection, method of preparation, *Prakshepa Dravyas*, quantity (*Matra*), timing (*Kala*), individual *Prakriti*, and digestive capacity (*Agni*) are considered collectively. When prepared according to classical principles and consumed judiciously, these formulations may offer a more balanced approach to sweet consumption compared with frequently consumed, highly processed market-prepared sweets. Integrating evidence-informed Ayurvedic dietary principles with contemporary nutritional knowledge may provide a culturally relevant strategy for **preventive healthcare and promotion of healthier dietary practices.** However, these potential benefits require validation through systematic nutritional analysis, glycaemic-response studies, and well-designed clinical trials before definitive health claims can be made.

Limitations

This structured review was informed by PRISMA 2020 but was not a formal systematic review or meta-analysis. Limited contemporary evidence on Ayurvedic sweet preparations restricts definitive conclusions. The proposed metabolic benefits of *Prakshepa Dravyas* and individualized dietary

principles require validation through standardized nutritional and clinical studies.

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