Indian J. Applied & Pure Bio. Vol. 41(3), 1429-1436 (2026). **ISSN: 0970-2091**

A critical appraisal of Ikshu Vikar: Relevance in Diet and Ayurvedic Treatment

[1]Shreyasee Paul and [2]Ashwini K. Patil

[1,2]Department of Samhita Siddhant & Sanskrit, Parul Institute of Ayurved, Parul University, Vadodara - 391760 (India)

Abstract

Contemporary nutritional discourse often reduces sweeteners to a simplistic binary—either entirely harmful or inherently natural and safe. This has led to the misconception that all sugars have uniformly negative health effects, fostering a generalized avoidance without evaluating their source, processing, or therapeutic value. Ayurveda, however, presents a more nuanced understanding of Ikshu (sugarcane) and its derivatives (Ikshu Vikaras), emphasizing their distinct physiological properties. For example, jaggery is described as guru (heavy) and ushna (heating), whereas refined sugar is considered sheeta (cooling) and laghu (light), influencing their effects on doshas differently. In the context of rising metabolic disorders linked to excessive refined sugar intake, revisiting these traditional insights becomes essential. Modern research supports some Ayurvedic claims, noting that unrefined sweeteners contain trace minerals and antioxidants and may exhibit lower inflammatory potential. This integrated perspective promotes a mindful, individualized approach to sweetener consumption, bridging classical Ayurvedic wisdom with contemporary nutritional science.

Key words : Ayurveda; Jaggery; Mishri; Sugarcane (Ikshu); Refined sugar; Nutritional comparison; Glycemic index; Anti-inflammatory.

Today, many people are worried about sugar because it's clearly linked to health problems like obesity, diabetes, heart disease, and tooth decay[3,4]. Because of this, sweeteners are often seen in black and white either completely bad or totally safe if they're called "natural" or "organic." But this kind of thinking is too simple. It ignores the fact that sweeteners can affect our bodies in very different ways depending on where they come from, how they're made, and what they contain.

As conversations around sugar continue to grow, Ayurveda India's ancient system of medicine offers a deeper and more holistic view of sweet foods, especially those made

from sugarcane (Ikshu). These sugarcane-based products, known as Ikshu Vikara, include jaggery (Guda), rock sugar (Sharkara or Mishri), and similar items. Ayurveda doesn't just see them as sources of calories. Instead, it classifies them based on their taste (rasa), qualities (guna), strength or energy (virya), how they act after digestion (vipaka), and special effects (prabhava). These properties influence how they affect the body's three doshas Vata, Pitta, and Kapha and guide how they should be used in diet and medicine[1].

Modern research adds a new dimension to this understanding. Analytical studies show that unrefined sugarcane products like jaggery retain important micronutrients iron, calcium, magnesium, and potassium as well as antioxidants that are absent in refined white sugar[5]. Experimental studies also suggest that such products may help reduce oxidative stress and inflammation[6,14]

To provide a comprehensive and balanced understanding of *Ikshu* (sugarcane) and its derivatives, we employed a two-fold review strategy integrating classical Ayurvedic literature with contemporary scientific evidence.

For the Ayurvedic component, primary texts such as the *Charaka Samhita*[1], *Sushruta Samhita*[12], and *Ashtanga Hridaya*[15] were thoroughly examined, along with authoritative *Nighantus* including *Bhavaprakasha*[9] and *Dhanvantari Nighantu*. Verses relevant to the properties, applications, and physiological effects of sugarcane and its by-products particularly *guda* (jaggery) and *sharkara/ mishri* (crystallized sugar), were analysed. Emphasis was placed on their dietary functions, therapeutic benefits, *dosha* interactions, seasonal considerations, and traditional cautions. Classical commentaries were referenced to ensure accurate interpretation and contextual depth.

At the same time, a review of modern scientific research was done using trusted sources like PubMed and PMC. The search focused on terms like "jaggery," "mishri," "refined sugar," "glycaemic index," "antioxidant potential," "nutritional composition," and "health effects[1,7,11,12,13]." Only high-quality, peer-reviewed studies were included.

Findings from both Ayurvedic and modern sources were synthesized into comparative tables to illustrate convergences and divergences in their perspectives on health benefits, risks, and therapeutic roles.

Ayurvedic Perspective on Sugarcane and its Derivatives :

Ayurvedic literature emphasizes the dual significance of *Ikshu* (sugarcane) as both a nourishing dietary substance and a potent medicinal agent. The *Charaka Samhita* classifies sugarcane under the *Ikshuvarga* [(1)], a group of vital food items, indicating its esteemed role in classical Ayurvedic nutrition. Even earlier mentions in the *Yajurveda* and *Atharva Veda* affirm sugarcane's deep-rooted presence in Indian cultural and medicinal traditions.

Over centuries, Ayurvedic scholars have described various derivatives of sugarcane collectively termed *Ikshu Vikaras* based on the specific methods of juice processing. These include:

- **Ikshu Rasa**: Fresh sugarcane juice, either consumed directly or incorporated into medicinal formulations.
- **Phanita**: A viscous syrup or molasses obtained by boiling the juice.
- **Guda (Jaggery)**: A solid, unrefined sugar formed by boiling and cooling the juice into blocks.
- **Sharkara (Crystallized Sugar or Mishri)**: Semi-refined or raw sugar crystals, usually white or lightly tinted.

Each of these transformations is recognized in Ayurveda as yielding distinct *guna* (qualities) and *karma* (therapeutic actions)[1]. This understanding is rooted in the Ayurvedic maxim: ***"Samskāro hi gunāntarādhanam"—*** *processing alters the inherent properties of a substance*. Accordingly, the different forms of sugarcane possess varying *virya* (potency) and influence the body's *doshas* (Vata, Pitta, and Kapha) in unique ways.

These sugarcane derivatives were never viewed merely as sweeteners or nutritional items; rather, they played specific roles in Ayurvedic formulations, chosen deliberately for their physiological and therapeutic impact. This sophisticated classification underscores Ayurveda's holistic perspective: sweeteners are not simply energy sources, but dynamic substances whose therapeutic potential varies based on their form, method of preparation, and application. Such depth of understanding remains relevant even today as modern nutritional science seeks healthier alternatives to refined sugar.

Sugarcane (Ikshu) & Fresh Juice (Ikshu Rasa): In classical Ayurvedic texts, *Ikshu* (sugarcane) is characterized by *madhura rasa* (sweet in taste), *madhura vipaka* (sweet post-digestive effect), *sheeta virya* (cooling potency), and *snigdha-guru guna* (unctuous and heavy qualities). These attributes contribute to its *brimhana* (nourishing), *balya* (strength-promoting), and *tridosha-shamaka* (primarily Vata-Pitta pacifying) effects.

Clinical Utility in Ayurveda :

- ***Ikshu Rasa*** : the fresh juice of sugarcane is especially esteemed for its *trishnani-grahana* (thirst-quenching), *pittashamana* (Pitta-alleviating), and *mutrala* (diuretic) actions. It is particularly beneficial in conditions aggravated by heat, such as *amlapitta* (hyperacidity), *jwara* (fever), and *mutrakricchra* (burning micturition). Due to its alkalizing and cooling nature, it is commonly prescribed in Pitta-dominant disorders and during hot seasons for maintaining hydration and systemic balance.

- ***Sharkara / Mishri (Rock Sugar)*** : *Sharkara*[1] crystallized sugar, particularly in the form of *Mishri* (rock sugar) is regarded in Ayurveda as the most *sheetala* (cooling), *laghu* (light to digest), and *ruchya* (palatable) among the various *Ikshu Vikaras* (sugarcane derivatives). It effectively pacifies *Vata* and *Pitta* doshas while being relatively mild on *Kapha*, especially when consumed in moderation.

- ***Mishri*** **:** is traditionally recognized as *shukrakaraka* (rejuvenative for reproductive tissues) and *chakshushya* (beneficial for ocular health). It is therapeutically employed to manage symptoms such as *trishna* (excessive thirst), *bhrama* (dizziness), *daha* (burning sensations), *chhardi* (nausea),

and *jwara* (fever)[15]. Notably, *Mishri* features prominently in numerous classical Ayurvedic formulations—such as *Sitopaladi Churna* and *Talisadi Churna* where it enhances palatability and provides a *sheetala* and *kapha-anulomana* (mucus-regulating) effect, particularly for respiratory and throat conditions.

- ***Guda (Jaggery)*** : *Guda* (jaggery), a key derivative of sugarcane, displays a markedly different profile from *Sharkara*. Freshly prepared jaggery (*navina guda*)[1] is considered *guru* (heavy to digest), *ushna virya* (hot in potency), and mildly *Vata* and *Pitta* pacifying. However, due to its heaviness and warming nature, it may aggravate *Kapha*, particularly when consumed in excess or when of poor quality.

Classical Ayurvedic texts caution against the use of inferior or improperly processed jaggery (*kshudra guda*)[9], citing adverse effects such as *krimi janana* (promoting intestinal worms), *pumsatva nāśana* (reduction of reproductive vitality), and even potential cardiac implications.

In contrast, *pūrna guda* (well-aged jaggery, stored for at least one year)[9] is highly esteemed in Ayurveda. With aging, jaggery becomes *laghu* (lighter to digest), more *agni-dīpana* (digestive fire-stimulating), and capable of balancing all three *doshas*. It is credited with *rakta-shodhana* (blood purification), *mutra-vishodhana* (urinary tract cleansing), and mild *rasayana* (rejuvenative) properties.

Aged jaggery plays a vital role in Ayurvedic pharmaceutics. It serves as a base in numerous *guda*-based formulations (*e.g.*, *Kalyanaka Guda*) and as a binding agent in *vati* (pills), demonstrating both therapeutic and practical utility in classical medicine preparation.[4]

Micronutrient Profile :

While all forms of sugar are rich in calories, jaggery stands out for offering more than just energy. Unlike refined sugar or even mishri (rock sugar), jaggery retains a variety of essential micronutrients such as iron, calcium, magnesium, potassium, phosphorus, copper, zinc, and manganese[7] thanks to its minimal processing. Traditionally, jaggery has been given to recovering patients, manual laborers, and postpartum women for strength and recovery an age-old practice now supported by modern nutrition science. It also contains natural antioxidants from molasses and phenolic compounds, offering some additional therapeutic benefits[7].

Preservatives: Traditional Wisdom and Modern Practice :

In classical Ayurveda, sugarcane derivatives such as *Guda* (jaggery) and *Sharkara* (mishri) are inherently self-preserving to some extent due to their high sugar concentration, which creates a **hyperosmotic environment** naturally inhibiting microbial growth[16]. This property makes them suitable for long-term storage and use in Ayurvedic formulations without the need for synthetic preservatives[13]. Ayurveda emphasizes **natural preservation through samskara (processing)** such as **Aging (especially for jaggery):** *Pūrna guda* (aged jaggery) naturally stabilizes and develops enhanced medicinal properties over time.

Component	Organic Jaggery	Mishri (Rock Sugar)	Organic Sugar
Main Sugar Type	Sucrose (65–85%), Glucose, Fructose	~97–99% Sucrose	~99.5% Sucrose
Reducing Sugars	10–15%	<1%	<0.05%
Moisture	3–7%	0.5–1%	0.02–0.1%
Minerals (Ash)	0.6–1.0%	Trace	0.02–0.04%
Iron	3–10 mg/100g	Trace	Trace
Calcium	40–100 mg/100g	Negligible	~5–10 mg/100g
Magnesium	70–90 mg/100g	Negligible	~5–10 mg/100g
Potassium	100–500 mg/100g	Negligible	20–30 mg/100g
Antioxidants	Present (natural molasses, phenolics)	Absent	Minimal (depends on processing)
Vitamins (B-complex)	Trace	Absent	Negligible
Color	Golden Brown	White/Clear Crystals	Off-white to white
Processing Chemical	None	Sometimes lime only	None (organic certified)
GI Index	~84	~65–70	~65

Combination with herbs: Ingredients in classical formulations like *Sitopaladi Churna* or *Kalyanaka Guda* also contribute to preservative action due to their antimicrobial and antioxidant properties.

However**,** modern commercial jaggery and sugar products may be adulterated or chemically treated for enhanced shelf life, appearance, or uniformity. Some commonly used modern preservatives and additives in the processing of sugarcane derivatives include:

- **Sulphur dioxide (SO_2):** Commonly used in sugar processing as a bleaching and antimicrobial agent. Though effective, it may cause respiratory or allergic reactions in sensitive individuals.
- **Sodium benzoate or potassium sorbate:** Sometimes added to jaggery-based syrups or soft jaggery products to prevent fermentation or fungal growth.
- **Calcium hydroxide (lime) :** Often used during juice clarification, though not technically a preservative, it alters the pH and can influence shelf stability.
- **Phosphoric acid or other acidity regulators :** Used in refined sugar production, but not traditionally part of Ayurvedic practice.

The review of Ayurvedic classical literature and modern nutritional science yielded the following key findings:

1. *Ayurvedic Classification and Properties:*

- Sugarcane (Ikshu) and its derivatives (Ikshu Vikaras) — including Ikshu Rasa (fresh juice), Phanita (syrup), Guda (jaggery), and Sharkara/Mishri (crystallized sugar) are distinctly categorized in Ayurveda with unique guna (qualities), virya (potency), and dosha-specific actions[1,12,15].
- Guda (jaggery) is described as *guru* (heavy) and *ushna* (heating), useful in Vata-dominant conditions but aggravating for Kapha when fresh. Aged jaggery (*pūrna guda*) becomes lighter, more digestive, and tridosha-balancing.
- Sharkara (mishri/rock sugar) is considered *sheeta* (cooling), *laghu* (light), and *ruchya* (palatable), effective for Pitta-related disorders and widely employed in classical formulations for respiratory and digestive complaints.

2. *Therapeutic Applications in Ayurveda:*

- Ikshu Rasa is highlighted for its *pittashamana* (cooling), *mutrala* (diuretic), and *trishna-nigrahana* (thirst-quenching) properties, particularly beneficial in fever, burning micturition, and hyperacidity[1,12,15].
- Mishri is recognized for *shukrakaraka* (reproductive rejuvenation), *chakshushya* (eye health), and inclusion in formulations like *Sitopaladi Churna* and *Talisadi Churna*.
- Aged jaggery is credited with *rakta-shodhana* (blood purification), *mutra-vishodhana* (urinary cleansing), and mild *rasayana* (rejuvenative) properties.

3. *Nutritional and Biochemical Findings (Modern Research) :*

- Jaggery retains significant amounts of iron (3–10 mg/100g), calcium, magnesium, potassium, and antioxidants, absent in refined white sugar.
- Mishri, while mainly sucrose, has a lower glycemic index (~65–70) compared to jaggery (~84) and refined sugar (~65), making it metabolically less aggressive.
- Modern studies support jaggery's antioxidant and anti-inflammatory potential, as well as its traditional role in convalescence and strength restoration.[11]

4. *Comparative Risks and Cautions :*

- All sugarcane derivatives share a high caloric load and risk of glycemic spikes if consumed excessively.[6]
- Ayurveda warns against impure or poorly processed jaggery (*kshudra guda*), linking it to parasitic infestations and dosha aggravation.[14]
- Modern findings confirm risks of adulteration, contamination, and the health hazards of chemically treated products.[8]

5. *Convergences Between Ayurveda and Modern Science :*

- Both systems recognize that minimally processed, naturally derived sweeteners (jaggery, mishri) offer incremental nutritional and therapeutic benefits compared to refined sugar.
- Both emphasize moderation, quality, and context of use rather than unrestrained

consumption[1,12,15,8].

Holistic Takeaway: Ancient Wisdom, Modern Validation :

Ayurveda encourages *hita-mita ahara* a wholesome, moderate diet. While jaggery and mishri offer trace nutrients, energy, and therapeutic value, they are still sugars and must be consumed mindfully. The key is quality over quantity, using natural sweeteners in harmony with one's *prakriti* (constitution) and *vikriti* (imbalance), not as an excuse to abandon dietary discipline. Ayurveda age-old reverence for unrefined, naturally derived sweeteners gains modern relevance today proving once again that simplicity, when rooted in nature and wisdom, holds timeless value.

The appraisal of *Ikshu Vikaras* sugarcane and its derivatives such as jaggery (guda) and crystallized sugar (sharkara/mishri) underscores Ayurveda's systematic recognition of sweeteners as therapeutic agents, whose effects are determined by processing, intrinsic qualities (guna), potency (virya), and doshic interactions rather than caloric value alone.

Ayurveda's approach to food is highly personalized, integrating factors such as constitution (prakriti), digestive strength (agni), seasonal variation (ritu), and prevailing health conditions. This individualized framework remains highly relevant to modern personalized nutrition. This philosophy closely mirrors today's growing interest in personalized nutrition and could provide a more balanced and culturally relevant way to guide dietary choices especially in communities where refined sugar is widely over used[1,4,7,12,15].

These areas offer rich potential for interdisciplinary collaboration between Ayurvedic scholars, nutrition scientists, pharmacologists, and public health experts. A deeper inquiry into *Ikshu Vikaras* can not only validate traditional practices but also contribute to developing more balanced, therapeutic, and culturally relevant dietary recommendations.

In essence, Ayurveda teaches us that not just what we eat but how, when, and in what form we eat matters. Rediscovering this ancient wisdom can help us sweeten our diets with greater care, consciousness, and cultural pride.

Scope for Future Research :

Although this review demonstrates meaningful intersections between Ayurvedic knowledge and modern nutrition, significant gaps remain that invite further scientific exploration. Future research could focus on:

- **Clinical validation** of Ayurvedic claims regarding *Ikshu Vikaras*, particularly their effects on dosha-specific conditions such as anaemia, respiratory illness, or digestive disorders.
- **Comparative glycaemic response studies** between aged jaggery (*pūrna guda*), fresh jaggery, mishri, and refined sugar across different *prakriti* types.
- **Biochemical profiling** of traditional sweeteners aged under Ayurvedic protocols, to assess changes in nutrient density, bioactivity, and shelf-life.
- **Safety assessments and standardization protocols** for commercial jaggery and mishri products, especially regarding the

use of chemical preservatives and adulterants.

- **Formulation studies** to evaluate the synergistic role of jaggery or mishri as *anupana* (carriers) in polyherbal Ayurvedic medicines and nutraceuticals.

References :

1. Agniveśa. (2023). *Caraka Samhitā*. With Āyurveda-Dīpikā commentary of Cakrapāni Dutta. Edited by Yadavji Trikamji Acharya. Varanasi: Chowkhamba Surabharati Prakashan.
2. Patil A, M. B. Seema, and S. S. Medikeri, (2022). *J Ayurveda Integr Med Sci. 7*(1): 295–302.
3. Brand-Miller, J. C., T. M. S. Wolever, K. Foster-Powell, and S. Colagiuri, (2003). *The New Glucose Revolution: The Authoritative Guide to the Glycemic Index – the Dietary Solution for Lifelong Health.* New York: Marlowe & Company.
4. Dutta, A. J., D. Sinha, S. Konwar, B. K. Pegu, and S. M. Baruah, (2024). *Biosci Biotechnol Res Asia. 21*(4): 1319–27.
5. Ebadi, S., and A. Azlan, (2023). *Int J Prev Med. 14:* 121.
6. Foster-Powell, K., S. H. A. Holt, and J.C. Brand-Miller, (2002). *Am J Clin Nutr. 76*(1): 5–56.
7. Gartaula, H., and R. R. Bhattarai, (2014). *Int J Food Sci Nutr. 2*(5): 90–6.
8. Lamdande, A. G., S. T. Khabeer, R. Kulathooran, and I. Dasappa, (2018). *J Food Sci Technol. 55*(8): 3144–51.
9. Lucas, D. S., (2017). Editor. *Bhavaprakasha Nighantu of Sri Bhavamishra.* Varanasi: Chaukhambha Vishvabharti.
10. Mishra, B. B., S. Gautam, and A. Sharma, (2011). *J Food Sci. 76*(8): M551–6.
11. Rao, G. P., and P. Singh, (2021). *Sugar Tech. 24*(2): 387–94.
12. Shastri, K. A., (2019). Editor. *Sushruta Samhita of Maharshi Sushruta*. With Ayurveda Tantra Sandipika Hindi commentary. Part I. Varanasi: Varanasi Sanskrit Sansthan.
13. Singh, N., D. Kumar, K. Lal, S. Raisuddin, and A. P. Sahu, (2010). *Toxicol Appl Pharmacol. 242*(3): 247–55.
14. Tapia, M., J. Martínez-Medina, A.R. Tovar and N. Torres, (2019). *Nutrients. 11*(4): 880.
15. Tripathi, B., (2013). Editor. *Astanga Hridayam of Srimadvagbhata*. With Nirmala Hindi commentary. Delhi: Chaukhambha Sanskrit Pratisthana.
16. World Health Organization. (2003). *Diet, Nutrition and the Prevention of Chronic Diseases.* Report of a Joint WHO/FAO Expert Consultation. Geneva: World Health Organization.