

## Kālabōjanam and the Science of Timed Eating: An Indian Knowledge Systems Perspective on Sustainable Health

C. Vanisree<sup>1</sup>, S. Glory Faith<sup>2</sup>, Ms. B. Tejasree<sup>3\*</sup>

<sup>1</sup> Assistant Professor, Department of Biochemistry, St. Pious X Degree & PG College for Women

<sup>2</sup> II M.Sc. Biochemistry, St. Pious X Degree & PG College for Women

<sup>3</sup> II M.Sc. Biochemistry, St. Pious X Degree & PG College for Women

*Corresponding Author:* Vanisree.ch@stpiouscollege.org

### Abstract

Indian Knowledge Systems (IKS) provide a holistic framework for understanding health through the integration of diet, lifestyle, environmental harmony, and mental well-being. Among the various dietary principles discussed in Ayurveda, *Kālabōjanam*—the practice of eating at the proper time—occupies a significant position in maintaining physiological balance and preventing disease. Classical Ayurvedic literature repeatedly emphasizes that food consumed according to proper timing sustains digestive fire (*Agni*), supports tissue nourishment, regulates metabolism, and promotes mental clarity. In contrast, untimely eating (*Akālabōjanam*) is identified as an important cause of impaired digestion, toxin accumulation (*Āma*), and disease manifestation.

This review article examines the Ayurvedic foundations of *Kālabōjanam* using primary textual sources including the *Caraka Saṃhitā*, *Suśruta Saṃhitā*, and *Aṣṭāṅga Hṛdaya*. Relevant Sanskrit verses are interpreted in relation to digestion, biological rhythm, and preventive healthcare. The review also correlates Ayurvedic dietary principles with contemporary scientific evidence from chronobiology and chrononutrition. Recent studies indicate that meal timing significantly influences insulin sensitivity, endocrine regulation, circadian rhythm, gut microbiota, and metabolic homeostasis. These observations demonstrate notable parallels between traditional Ayurvedic concepts and modern physiological understanding.

The article further discusses the relevance of *Kālabōjanam* in sustainable healthcare, responsible consumption, and lifestyle disease prevention. As a low-cost and culturally rooted health practice, timely eating offers a practical strategy for improving public health while promoting harmony between human behaviour and natural biological cycles. The integration of Ayurvedic dietary wisdom with contemporary nutritional science may contribute significantly to preventive and sustainable healthcare approaches in modern society.

### Keywords:

Indian Knowledge Systems, Ayurveda, Kālabōjanam, Chrononutrition, Circadian Rhythm, Agni, Preventive Healthcare, Sustainable Health, Timed Eating, Lifestyle Disorders

## 1. Introduction

The incidence of lifestyle-related disorders has increased considerably during recent decades. Obesity, diabetes mellitus, cardiovascular diseases, gastrointestinal disturbances, sleep disorders, and psychological stress have become common global health concerns. Irregular eating patterns, late-night meals, sedentary lifestyles, disrupted sleep cycles, and excessive dependence on processed foods are recognized as major contributors to metabolic imbalance and circadian disruption. Contemporary nutrition research increasingly acknowledges that health is determined not only by the quality and quantity of food consumed, but also by the timing of food intake.

Long before the development of modern chronobiology, Ayurveda emphasized the importance of disciplined dietary timing through the principle of *Kālabōjanam*. Ayurveda considers food (*Āhāra*) one of the three essential supports of life (*Trayopastambha*), along with sleep (*Nidrā*) and regulated conduct (*Brahmacharya*).

### Śloka: Trayopastambha

#### Sanskrit:

आहारस्वप्नब्रह्मचर्याणि त्रयोपस्तम्भाः।

#### Transliteration:

Āhāra-svapna-brahmacaryāṇi trayopastambhāḥ.

#### Meaning:

Food, sleep, and disciplined living are the three supporting pillars of life.

(*Caraka Saṃhitā, Sūtrasthāna*)

Ayurveda views digestion as a dynamic physiological process influenced by time, environmental rhythm, mental state, and digestive strength. Food consumed without regard to digestive capacity or proper timing is believed to impair metabolism and disturb bodily equilibrium. In this context, *Akālabōjanam* (untimely eating) is repeatedly described in classical texts as a major etiological factor in disease development.

Modern scientific studies on circadian rhythm, chrononutrition, and time-restricted feeding now provide evidence supporting many of these traditional observations. This review therefore explores the Ayurvedic concept of *Kālabōjanam* and examines its relevance in relation to contemporary nutritional science, preventive healthcare, and sustainability.

## 2. Conceptual Foundations of Kālabōjanam in Ayurveda

Ayurvedic dietary principles extend beyond nutritional composition alone. Equal emphasis is placed on the timing of meals, method of eating, food compatibility, quantity, and the psychological condition of the individual during consumption. Among these factors, *Kālabōjanam* refers specifically to consuming food at appropriate and regular intervals according to digestive capacity and biological rhythm.

Classical Ayurvedic texts consistently emphasize that properly timed eating supports longevity, strength, complexion, immunity, and mental balance.

### Śloka: Importance of Timely Eating

**Sanskrit:**

कालभोजनमायुष्यं बलवर्णकरं परम्।  
अकालभोजनं रोगान् जनयत्यचिरेण तु॥

**Transliteration:**

Kālabhojanam āyusyaṁ bala-varṇa-karaṁ param |  
Akālabhojanam rogān janayaty acireṇa tu ||

**Meaning:**

Eating at the proper time promotes longevity, strength, vitality, and healthy complexion, whereas untimely eating quickly leads to disease.

This verse reflects the preventive orientation of Ayurveda, where disciplined dietary behavior is regarded as essential for maintaining physiological balance. Unlike modern nutritional approaches that historically focused mainly on calories and nutrient composition, Ayurveda integrated temporal regulation into dietary practice centuries ago.

Ayurveda also associates digestive activity with environmental rhythms, especially solar movement. Digestive fire (*Agni*) is believed to be strongest during midday, corresponding to peak solar intensity.

### Śloka: Midday Digestive Strength

**Sanskrit:**

मध्याह्ने वर्धते वह्निः सूर्यतेजः समाश्रितः।

**Transliteration:**

Madhyāhne vardhate vahniḥ sūryatejaḥ samāśritaḥ.

**Meaning:**

Digestive fire becomes strongest during midday under the influence of the sun's energy.

(*Aṣṭāṅga Hṛdaya*)

This principle demonstrates an advanced understanding of biological synchronization and temporal physiology that remarkably parallels modern circadian science.

### 3. Agni and the Ayurvedic Understanding of Metabolism

The concept of *Agni* occupies a central place in Ayurvedic physiology. *Agni* refers not merely to digestive activity, but to the entire process of digestion, absorption, assimilation, tissue nourishment, and metabolic transformation. Balanced *Agni* is considered essential for maintaining health, immunity, and vitality.

## Śloka: Central Role of Agni

### Sanskrit:

अग्निः सर्वेषां देहिनां मूलम्।

### Transliteration:

Agniḥ sarveṣāṁ dehināṁ mūlam.

### Meaning:

Agni is the foundation of all bodily functions.

(*Caraka Saṁhitā*)

Ayurveda explains that when food is consumed before previous food is digested, or at irregular times, digestive efficiency declines. As a result, partially digested substances accumulate in the body as *Āma* (metabolic toxins), contributing to disease progression.

## Śloka: Untimely Eating and Disease

### Sanskrit:

अकालभोजनं तीक्ष्णं शीतं चातिप्रमाणतः।  
अग्निं दूषयते शीघ्रं तस्माद्रोगाः प्रवर्तन्ते॥

### Meaning:

Untimely, excessive, incompatible, or improperly consumed food rapidly disturbs digestive fire and initiates disease processes.

Ayurvedic scholars viewed digestion as highly responsive to behavioral rhythm. This understanding appears remarkably dynamic when examined in the context of modern metabolic science. Rather than viewing digestion as a purely mechanical process, classical Ayurveda associated it with environmental cycles, psychological balance, and lifestyle discipline.

## 4. Correlation with Modern Chronobiology and Chrononutrition

Recent scientific research has increasingly demonstrated that physiological processes operate according to circadian rhythms regulated by internal biological clocks. Hormonal secretion, glucose metabolism, digestive enzyme activity, sleep cycles, and cellular repair mechanisms all follow temporal patterns linked to light-dark cycles.

Studies in chrononutrition indicate that meal timing significantly affects metabolic health. According to Panda (2018), circadian alignment plays a critical role in regulating energy metabolism and endocrine function. Irregular eating patterns and late-night meals contribute to circadian misalignment, insulin resistance, inflammation, obesity, and metabolic syndrome.

Chaix et al. (2019) reported that time-restricted eating improves metabolic outcomes even without significant calorie restriction. Similarly, Pot (2018) emphasized that meal timing influences glucose tolerance, lipid metabolism, and cardiometabolic health.

Interestingly, these findings closely parallel Ayurvedic recommendations regarding *Kālabōjanam*.

### Śloka: Timely Eating and Tissue Nourishment

**Sanskrit:**

काले भुक्तं समग्र्युक्तं धातूनां पुष्टिकारकम्।

**Transliteration:**

Kāle bhuktaṁ samagryuktaṁ dhātūnām puṣṭikārakam.

**Meaning:**

Food consumed at the proper time with balanced digestive fire effectively nourishes bodily tissues.

(*Suśruta Saṁhitā*)

The similarities between Ayurveda and contemporary chronobiology suggest that traditional dietary principles may possess substantial physiological relevance. While Ayurveda described these concepts using the language of *Agni*, *Doṣa*, and *Āma*, modern science explains similar observations through circadian rhythm, hormonal regulation, metabolic entrainment, and gastrointestinal homeostasis.

### 5. Kālabōjanam and Mental Well-being

Ayurveda recognizes a strong relationship between digestion and mental health. Proper digestion is believed to support *Sattva*, a balanced mental state characterized by emotional stability, clarity, and calmness. Disturbance of digestion, in contrast, affects both physical and psychological equilibrium.

### Śloka: Definition of Health

**Sanskrit:**

समदोषः समग्निश्च समधातुमलक्रियः।  
प्रसन्नात्मेन्द्रियमनाः स्वस्थ इत्यभिधीयते॥

**Transliteration:**

Samadoṣaḥ samāgniśca samadhātu-malakrīyaḥ |  
Prasannātmendriya-manāḥ svastha ityabhidhīyate ||

**Meaning:**

A person whose doshas, digestive fire, tissues, and waste elimination are balanced, and whose mind and senses remain pleasant, is considered healthy.

(*Suśruta Saṁhitā*)

Current research on the gut–brain axis supports this Ayurvedic understanding. Meal timing influences sleep quality, neurotransmitter regulation, cognitive function, stress response, and

emotional stability. Irregular eating patterns are increasingly associated with anxiety, mood fluctuations, fatigue, and impaired sleep.

Thus, *Kālabōjanam* contributes not only to metabolic regulation but also to psychological well-being.

## 6. Kālabōjanam as a Sustainable Health Practice

Indian Knowledge Systems view sustainability as harmony between human behavior, health, society, and nature. In this context, *Kālabōjanam* promotes disciplined living, mindful consumption, and ecological balance.

Timely eating discourages overeating and unnecessary food consumption, thereby reducing food wastage and excessive dependence on processed foods and supplementation. Its preventive orientation also reduces long-term healthcare burden and pharmacological dependence.

### Śloka: Moderation in Eating

#### Sanskrit:

मात्राशी स्यात्।

#### Transliteration:

Mātrāśī syāt.

#### Meaning:

One should consume food in proper quantity.

(*Caraka Saṃhitā*)

The principle strongly aligns with Sustainable Development Goal 3 (Good Health and Well-being) and Sustainable Development Goal 12 (Responsible Consumption and Production). By synchronizing dietary practices with biological and environmental rhythms, *Kālabōjanam* supports both individual wellness and ecological sustainability.

## 7. Limitations and Future Scope

Although the conceptual similarities between Ayurveda and modern chronobiology are significant, many Ayurvedic principles related to meal timing still require extensive clinical validation through interdisciplinary scientific studies. Most available correlations remain conceptual and interpretative rather than experimentally established. Future research integrating molecular biology, nutrition science, chronobiology, and Ayurvedic physiology may provide stronger evidence regarding the therapeutic role of *Kālabōjanam* in preventive medicine and metabolic health.

Further investigation into gut microbiota, chrono-metabolic adaptation, endocrine regulation, and circadian synchronization may also strengthen the scientific understanding of traditional Ayurvedic dietary principles.

## 8. Conclusion

*Kālabōjanam* represents one of the most profound preventive dietary principles described in Ayurveda and Indian Knowledge Systems. Classical Ayurvedic texts consistently emphasize that timely eating preserves digestive fire, prevents toxin accumulation, maintains metabolic balance, nourishes bodily tissues, and supports mental well-being. The remarkable conceptual parallels between Ayurvedic wisdom and modern chronobiological research highlight the enduring scientific relevance of these traditional practices.

In the context of increasing lifestyle disorders, circadian disruption, and rising healthcare burdens, integrating principles such as *Kālabōjanam* into modern nutritional and preventive healthcare strategies offers considerable promise. As a low-cost, culturally rooted, and ecologically sustainable lifestyle practice, timely eating contributes not only to individual health but also to broader public health and sustainability goals.

The Ayurvedic understanding of digestion appears remarkably sophisticated when examined through the lens of modern metabolic science. Its emphasis on biological rhythm, moderation, and mindful living provides valuable insights for developing holistic and sustainable healthcare approaches for the future.

## References

- Chaix, A., Manoogian, E. N. C., Melkani, G. C., & Panda, S. (2019). Time-restricted eating to prevent and manage chronic metabolic diseases. *Annual Review of Nutrition*, 39, 291–315.
- Froy, O. (2007). The relationship between nutrition and circadian rhythms in metabolism. *Endocrine Reviews*, 28(6), 727–738.
- Longo, V. D., & Panda, S. (2016). Fasting, circadian rhythms, and time-restricted feeding in healthy lifespan. *Cell Metabolism*, 23(6), 1048–1059.
- Panda, S. (2018). *The circadian code: Lose weight, supercharge your energy, and transform your health from morning to midnight*. Rodale Books.
- Pot, G. K. (2018). Chrononutrition and metabolic health. *Proceedings of the Nutrition Society*, 77(4), 399–406.
- Reddy, K. R. C. (2011). *Concepts of Agni and Ama in Ayurveda*. Chaukhamba Orientalia.
- Sharma, P. V. (2010). *Suśruta Saṃhitā* (Vol. 1). Chaukhamba Visvabharati.
- Sharma, R. K., & Dash, B. (2009). *Caraka Saṃhitā*. Chowkhamba Sanskrit Series Office.
- Turek, F. W., Joshi, C., Kohsaka, A., et al. (2005). Obesity and metabolic syndrome in circadian clock mutant mice. *Science*, 308(5724), 1043–1045.
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.

**St. Ann's Cognitive Chronicles**  
**Volume III / Issue 1 / 2026**

  
**Online Journal**  
**Annual - Open Access**

**<https://stannscollgevizag.org/homejournal/>**  
**Multidisciplinary Journal**  
**ISSN - 3049-0790**