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**REVIEW ARTICLE**

# Analytical Evaluation of *Trina Dhanya* in the Management of *Prameha*: A Comprehensive Literary Review and Scientific Synthesis

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**ABSTRACT**

**Objectives:** This research evaluates the clinical relevance and therapeutic mechanisms of Trina Dhanya (millets) in managing Prameha (Diabetes Mellitus) by synthesizing classical Ayurvedic principles with contemporary nutritional science.

**Methods:** A comprehensive literary review was conducted using the Brihattrayi (Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya) and various Nighantus. Scientific validation was performed through a meta-analysis of current nutritional data, focusing on glycemic index (GI), fiber content, and bioactive phytochemicals.

**Results:** Ayurvedic texts categorize millets as Kudhanya or Kshudradhanya, attributing to them Lekhana (scraping) and Kledashoshaka (moisture-absorbing) properties that directly counteract the Kapha-Meda dominant pathogenesis of Prameha. Modern analysis confirms that millets possess a mean GI of 52.7 ± 10.3, significantly lower than refined rice (71.7) and wheat (74.2). Clinical data demonstrate that regular millet consumption reduces fasting blood sugar by approximately 12% and post-prandial blood sugar by 15%.

**Conclusion:** Trina Dhanya represents an evidence-based functional food group that facilitates metabolic homeostasis. Its integration into modern diabetic diets offers a sustainable strategy for the prevention and management of metabolic syndrome.

## 1. INTRODUCTION

The global health landscape is currently contending with an unprecedented rise in metabolic disorders, with diabetes mellitus serving as a primary contributor to morbidity and mortality worldwide. Within the holistic framework of Ayurveda, this condition is meticulously detailed under the rubric of Prameha, a term derived from the prefix "Pra" meaning excess and the root "Miha" meaning to micturate, thus signifying a disease characterized by the excessive and frequent passage of turbid urine. Ayurveda, as an ancient life science, emphasizes that the preservation of health and the management of disease are intrinsically linked to diet and lifestyle. Prameha is categorized as a Santarpana-janya vyadhi, a disease of over-nutrition resulting from a sedentary lifestyle and an anabolic excess, primarily involving the vitiation of Kapha and Medas (fatty tissue).[1] Central to the Ayurvedic therapeutic strategy for Prameha is the administration of Pathya (wholesome diet), specifically the Trina Dhanya varga, or the category of small-seeded grass cereals known as millets. These grains, traditionally referred to as Kudhanya or Kshudradhanya, possess unique pharmacodynamic properties such as Lekhana (scraping) and Kledashoshaka (moisture absorption) that directly counteract the pathophysiology of insulin resistance and metabolic stagnation. As the modern world returns to these "nutri-cereals," a critical synthesis of classical Ayurvedic literature and contemporary nutritional science becomes essential to validate and optimize their clinical application in metabolic health.[2]

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## 2. METHODS

This research utilizes a dual-methodology approach:

1. Literary review: A systematic extraction of data from classical Ayurvedic scriptures, including the *Charaka Samhita*, *Sushruta*

*Samhita*, and *Ashtanga Hridaya* (*Brihattrayi*), as well as pharmacological lexicons such as *Bhavaprakasha Nighantu* and *Kaiyadeva Nighantu*.

2. Scientific synthesis: Analysis of modern nutritional profiles, including macronutrient density and glycemic response, based on systematic reviews and meta-analyses from Scopus and PubMed-indexed journals published between 2017 and 2024.

### 2.1. Literary Review

#### *2.1.1. The pathophysiological framework of prameha and metabolic syndrome*

The Ayurvedic conceptualization of Prameha is not limited to a single symptom but describes a systemic metabolic failure. Acharya Charaka, in the Nidana Sthana, elaborates on the etiology of Prameha as being rooted in specific dietary habits: The pleasure of sitting (Asyasukham), excessive sleep (Swapnasukham), the consumption of curd (Dadhini), the use of newly harvested grains (Nava-anna), and the frequent intake of sugar-based products (Gudavikriti). These factors lead to the aggravation of the Kapha dosha, which subsequently vitiates the Medas (adipose tissue), Mansa (muscle), and the Kleda (body fluids).[1] When these vitiated elements reach the Basti (urinary system), they manifest as turbid urination. This classical samprapti (pathogenesis) mirrors the modern understanding of metabolic syndrome, where caloric excess and physical inactivity lead to hyperinsulinemia and the subsequent failure of glucose homeostasis.[3]

The disease is classified into twenty distinct types based on the dominance of doshas: Ten types of Kaphaja Prameha, six types of Pittaja Prameha, and four types of Vataja Prameha. Kaphaja Prameha is generally considered Sadhya (curable) when managed early, whereas the progression to Vataja Prameha, characterized by profound Dhatu-kshaya (tissue depletion), is often Yapya (manageable) or Asadhya (incurable). The hallmark of Prameha is its ability to affect multiple Dhatus (tissues), including Medas (fat), Rakta (blood), Shukra (semen), Ambu (body fluids), Vasa (fatty exudates), Lasika (lymph), Majja (marrow), Rasa (plasma), and Mansa (muscle), eventually leading to the depletion of Ojas (vital essence). This exhaustive tissue involvement explains why chronic diabetes leads to multi-organ complications in modern medicine, such as nephropathy, neuropathy, and retinopathy.[4]

*Acharya Sushrut* emphasizes that Prameha can also be Sahaja (congenital/hereditary), resulting from the Beeja-dosha (genetic defects) of the parents, or Apathya-nimittaja (lifestyle-induced), resulting from unwholesome diet and habits.[5] The Sahaja variety is often associated with Krisha (thin) patients and is harder to treat, correlating with type 1 diabetes or certain genetic forms of maturity-onset diabetes of the young (MODY), while the Apathya-nimittaja variety is associated with Sthula (obese) patients, correlating with type 2 diabetes mellitus.[6] This binary classification allows for a personalized approach to therapy, where the obese patient requires Shodhana (purification) and Apatarpana (depletion), while the thin patient requires cautious nourishment and lifestyle modification [Table 1].[7]

#### *2.1.2. Classification and Botanical Identity of Trina Dhanya[8]*

The category of Trina Dhanya, also known as Kudhanya or Kshudradhanya, represents a group of cereals derived from grass species that have been staples in the Indian subcontinent for thousands of years. These grains are characterized by their small seed size, rapid growth cycle, and high resilience to drought and poor soil conditions. In the classical texts of Ayurveda, such as the Charaka Samhita, Sushruta Samhita, and various Nighantus (pharmacological lexicons), these grains are meticulously classified according to their properties and therapeutic indications.

Archaeological excavations at Harappan sites have unearthed remnants of these millets, confirming their use as food as early as 2500 BCE. Acharya Charaka identifies sixteen types of Trina Dhanya, describing them as kashaya-madhura (astringent-sweet) in taste and sheeta (cold) in potency. Acharya Sushrut, however, categorizes them as Kudhanya and notes that they are generally ushna (hot) in potency and possess a katu vipaka (pungent post-digestive effect), which helps in clearing the excess phlegm and metabolic fluids. These minor variations in classical opinion highlight the versatility of these grains across different clinical contexts and processing methods [Table 2].

#### *2.1.3. Pharmacodynamics of Millets in the Management of Prameha*

The therapeutic use of Trina Dhanya in Prameha is governed by the Ayurvedic principles of Guna (quality) and Karma (action). Because Prameha is a disease of excess anabolic load (Santarpana), characterized by heaviness (Guru), unctuousness (Snigdha), and excessive fluid (Drava), the millets are chosen for their opposite qualities.

2.1.3.1. *Rasa* (Taste)

The primary tastes of millets are kashaya (astringent) and tikta (bitter), often with a secondary madhura (sweet) taste. The kashaya rasa is particularly vital for diabetes management because it has shoshana (absorbing) and stambhana (stabilizing) effects on the body's liquid elements. This helps in reducing the volume and frequency of urination, which is the primary symptom of Prameha. The tikta rasa assists in purifying the blood (Raktashodhana) and stimulating the tissue metabolism (Dhatvagni) to burn off excess Medas.

2.1.3.2. *Guna* (Qualities)

Millets are predominantly laghu (light) and ruksha (dry). The laghu guna ensures that the diet does not overwhelm the jatharagni (digestive fire), which is often compromised in metabolic disorders. The ruksha guna acts as a desiccant, absorbing the excess kleda (moisture) and medas (fat) that characterize the pathogenesis of Prameha. Furthermore, some varieties like Gavedhuka are noted for their karshana (emaciating) action, which is highly beneficial for obese diabetics.

2.1.3.3. *Vipaka* and *Virya*

The katu vipaka of most millets ensures that after digestion, they provide a pungent effect that clears the srotas (channels) and prevents the accumulation of waste (mala). While Charaka describes many as sheeta virya (cold), Sushrut often categorizes them as ushna virya (hot), suggesting that the hot potency is more effective in pacifying the aggravated Kapha and stimulating the metabolic processes required to reverse insulin resistance.

#### *2.1.4. Specific Karma (Therapeutic Actions)*

1. *Lekhana* (Scraping): The ability to scrape away morbid fatty tissue and accumulated metabolic waste from the arterial and tissue channels.
2. *Kledashoshaka* (Moisture Drying): The unique property of absorbing pathological fluids, thereby reducing the "fluidity" of the tissues.
3. *Sangrahi* (Absorptive/Binding): Promoting consolidated excretion and reducing the excessive flow of urine.
4. *Bhagnasandhanakrit* (Bone Healing): Foxtail millet (Kangu) and Finger millet (Ragi) are specifically noted for their ability to heal

fractures and strengthen the skeletal system (Asthi-dhatu), which is crucial for diabetic patients prone to osteoporosis and poor wound healing.

5. *Vatala* (Vata-increasing): Due to their dry and light nature, excessive or unconditioned use can increase Vata. This is why Ayurveda advises that they should be prepared with specific processing methods, such as soaking and adding healthy fats or spices, to balance their effects.

### 2.2. Modern Nutritional Profiling and Metabolic Mechanisms

Contemporary nutritional science validates the classical Ayurvedic use of millets through the identification of their complex carbohydrate structure, high fiber content, and density of micronutrients and minerals. Millets are now recognized as "nutri-cereals" because they offer a nutritional profile that is significantly superior to refined staples like white rice or maize.[9]

### 2.3. Scientific Synthesis

#### *2.3.1. Dietary fiber and glycemic index (GI)*

The hallmark of millets in diabetes management is their high dietary fiber content, which includes both soluble and insoluble fibers. Fiber slows down the rate of digestion and the absorption of glucose into the bloodstream, thereby preventing the sharp post-prandial spikes in blood sugar that are detrimental to diabetic patients.

Scientific studies consistently show that the mean GI of millets is approximately 52.7, which is nearly 36 lower than that of milled rice or refined wheat. This low GI is partly due to the presence of resistant starch (RS) and slowly digestible starch (SDS), which are not fully broken down in the small intestine, thus providing a sustained release of energy and improving insulin sensitivity [Table 3].[10]

#### *2.3.2. Protein and essential minerals*

Millets are excellent sources of plant-based protein, with varieties like Foxtail and Proso millet offering significantly higher protein content than most cereals.[11] They are rich in essential amino acids, particularly methionine and cysteine, which are crucial for metabolic health but often deficient in rice-based diets. The mineral density of millets is another key factor in their anti- diabetic effect. Magnesium, found in high concentrations in millets such as Ragi and Kodo, is a cofactor for more than 300 enzymes, including those involved in glucose metabolism and insulin secretion. Zinc, also abundant in millets, is essential for the synthesis and storage of insulin.

Furthermore, Finger millet (Ragi) contains nearly 344 mg of calcium/100 g, which is nearly ten times higher than that of wheat or corn, providing vital skeletal support for diabetic patients.[11]

#### *2.3.3. Pharmacological evidence and molecular mechanisms*

Beyond macronutrients, millets contain a wide array of bioactive phytochemicals that impart therapeutic properties. These include phenolic acids, flavonoids, tannins, and phytosterols, most of which are concentrated in the seed coat or bran.

#### *2.3.4. Inhibition of digestive enzymes*

Modern pharmacology identifies alpha-amylase and alpha-glucosidase as the key enzymes responsible for breaking down carbohydrates into simple sugars. Synthetic anti-diabetic drugs often target these enzymes to prevent hyperglycemia. Studies have shown that polyphenolic extracts from millets, particularly Sorghum and Foxtail millet, exhibit potent inhibitory effects on these enzymes. This biochemical inhibition effectively slows glucose entry into the systemic circulation, a molecular mechanism that aligns with the Ayurvedic concept of Lekhana (scraping away excess nutritive load).[12]

#### *2.3.5. Antioxidant and anti-glycation activity*

Diabetes is characterized by chronic oxidative stress, which leads to the formation of Advanced Glycation End-products (AGEs). These AGEs damage the vascular endothelium and are responsible for the long-term complications of the disease. The polyphenols in millets, such as ferulic acid and quercetin, have been shown to scavenge free radicals and inhibit the formation of AGEs. Molecular docking studies have even identified specific compounds, such as Diosgenin found in Barnyard millet, that can interact with the insulin receptor (IR) and tyrosine phosphatase 1-beta (PTP-1β) to improve insulin signaling and reduce resistance [Table 4].[13]

#### *2.3.6. Clinical efficacy and meta-analysis results*

The clinical utility of millets in managing diabetes mellitus is supported by a growing body of human trials and systematic reviews. Meta-analyses comparing millet-based diets to standard staple diets have provided statistically significant evidence of their benefit.

2.3.6.1. Glycemic control indicators

1. Fasting blood sugar (FBS): Consumption of millets has been shown to reduce FBS levels by 11.8–12 compared to regular refined staples.
2. Post-prandial blood sugar (PPBS): PPBS levels show an even more significant reduction, often decreasing by 15–15.1 in subjects consuming millets long-term.
3. Glycated hemoglobin (HbA1c): In pre-diabetic individuals, long-term millet consumption has been associated with a significant reduction in HbA1c, often moving subjects from the pre-diabetic range back to normal levels (e.g., from 6.65 to 5.67).

Another study noted a 2.7 reduction in HbA1c within just 6 weeks of dietary intervention.

2.3.6.2. Lipid profile and weight management

Millet consumption is also associated with a significant improvement in the lipid profile, reducing total cholesterol and low-density lipoprotein levels while increasing high-density lipoprotein. The high fiber content and satiety-inducing effects of proanthocyanidins in millets contribute to weight management and a reduction in body mass index, which are critical goals in the management of type 2 diabetes.

2.3.6.3. Personalized clinical application in Ayurveda

Ayurvedic therapeutics are intrinsically personalized. The application of Trina Dhanya must therefore consider the patient's Vaya (age), Prakriti (constitution), and Agni-bala (digestive strength).

2.3.6.3.1. Stage of Life (Vaya)

- Balyavastha (Childhood): Ragi (Finger Millet) is highly recommended for children due to its calcium and protein content, supporting growth and teaching the value of traditional grains early.
- Yuva and Madhyamavastha (Adulthood): Kodo and Barnyard millets are ideal for managing the metabolic excesses typically seen in the working age group.
- Vriddhavastha (Old Age): Grains such as Little millet and Proso millet, which are easily digestible and provide sustained energy,

are preferred for geriatric care to prevent the catabolic wasting seen in advanced diabetes.

2.3.6.3.2. Constitution and Dosha Balance

- Kapha Prakriti: Individuals with a dominant Kapha constitution benefit most from the Ruksha (dry) and Lekhana (scraping) properties of Kodo and Barnyard millets to combat obesity and lethargy.
- Pitta Prakriti: Sheeta-virya millets such as Shyamaka and Nivara are excellent for Pitta constitutions, as they provide nutrition without aggravating the internal heat associated with chronic inflammation.
- Vata Prakriti: While millets are generally Pathya for Prameha, those with a Vata constitution must use them cautiously. Proper processing, such as soaking for 6–8 h and cooking with warming spices (cumin, turmeric) and small amounts of healthy fats (ghee), is necessary to prevent excessive dryness and digestive discomfort.

2.3.6.3.3. Dietary guidelines for practice

For effective integration into the management of Prameha, millets should be consumed as whole grains. Excessive processing or refining removes the fiber-rich bran and the polyphenols that provide the anti-diabetic effect. Starting with one millet-based meal per day, replacing white rice or refined wheat, and ensuring adequate hydration is the recommended approach for clinical practice.

## 3. ENVIRONMENTAL SUSTAINABILITY AND FUTURE OUTLOOK

The clinical significance of millets is complemented by their role in sustainable agriculture and food security. As the world faces climate change and water scarcity, millets provide a resilient alternative to water-intensive crops like rice. They can survive in temperatures where other crops fail and require minimal chemical inputs, thus having a significantly lower carbon and water footprint. The declaration of 2023 as the "International Year of Millets" by the United Nations and the World Health Organization underscores the global shift toward recognizing these ancient grains as the future of metabolic health. For India, often cited as the "Diabetes Capital," the resurgence of Trina Dhanya represents a vital public health strategy. By aligning the ancient wisdom of the Charaka and Sushruta Samhitas with modern biochemical evidence, millets offer a powerful, evidence-based tool for the prevention, management, and potential reversal of Prameha.

## 4. DISCUSSION

### 4.1. Pharmacodynamic Correlation: *Lekhana* versus Enzymatic Inhibition

The Ayurvedic concept of *Lekhana* (scraping) aligns with the modern pharmacological inhibition of alpha-amylase and alpha-glucosidase. Polyphenols in millets, such as ferulic acid and quercetin, effectively slow the breakdown of starch into simple sugars, preventing post-prandial spikes.

### 4.2. *Kledashoshaka* and RS

The Ayurvedic property of *Kledashoshaka* (moisture absorption) finds a scientific parallel in the high content of RS and SDS in millets. These starches are not fully broken down in the small intestine, providing sustained energy and improving insulin sensitivity.

### 4.3. Personalized Application

Ayurvedic clinical practice requires tailoring millet choice to the patient's *Prakriti* (constitution) and *Agni* (digestive fire). For *Kapha*-dominant individuals, *Kodrava* and *Shyamaka* are ideal for their drying properties. Conversely, *Vata*-dominant individuals should consume millets after proper soaking (6–8 h) and with warming spices to mitigate excessive dryness.

## 5. CONCLUSION

The analytical review of Trina Dhanya in the context of Prameha demonstrates a remarkable convergence between classical Ayurvedic observation and modern clinical evidence. The Ayurvedic concepts of Lekhana, Shoshana, and Katu-vipaka find their scientific counterparts in the inhibition of carbohydrate-digesting enzymes, the modulation of IRs, and the stabilization of glycemic response through dietary fiber and RS. Millets are not merely ancient grains but also functional foods that address the root causes of metabolic syndrome, including hyperinsulinemia, oxidative stress, and adiposity.

Clinical evidence supports the long-term use of millets for reducing fasting and post-prandial blood glucose and lowering HbA1c levels, effectively mitigating the risks of diabetic complications. When applied through the personalized Ayurvedic lens considering age, constitution, and digestive capacity, these grains provide a safe, effective, and sustainable dietary intervention. As global health strategies move toward holistic and preventative models, the integration of Trina Dhanya into the management of Prameha stands as a cornerstone for metabolic health in the 21st century.

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## 7. AUTHOR CONTRIBUTION

All authors give equal contribution in making of this manuscript.

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## 9. ETHICAL STATEMENT

Ethical approval was not required for this study as it was a review article with data obtained through a literature search.

## 10. CONFLICT OF INTERESTS

The authors declare no conflicts of interest regarding the publication of this paper.

## 11. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible via databases.

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## REFERENCES


1. Aacharya JT. Charaka, Sutra sthana, Chikitsa sthana. In: Charaka samhita. 1st ed., Ch. 6, 27., Ver. 16-18, 20. Varanasi: Krishnadas Academy; 2000.
2. Murthy KR. Bhavamishra, Purva khanda, Dhanya varga. In: Bhavaprakasha. 1st ed., Vol. I., Ch. 9., Ver. 74-75. Varanasi: Krishnadas Academy; 2000.
3. Murthy KR. Madhavakara. In: Madhava nidanam roga vinischaya. 8th ed., Ch. 33., Vers. 1-4. Varanasi: Chaukhambha Orientalia; 2007.
4. Aacharya JT. Sushruta, Sutra sthana, Nidana sthana. In: Sushruta samhita. 8th ed., Ch. 6, 46., Ver. 12-14, 20-22. Varanasi: Chaukhambha Orientalia; 2005.
5. Aacharya JT. Sushruta, Sutra sthana, Nidana sthana. In: Aacharya JT, editor. Sushruta samhita. 8th ed., Ch. 6, 46., Ver. 11-13, 20-22. Varanasi: Chaukhambha Orientalia; 2005.
6. Alkhatib A, Tsang C, Tiss A, Bahorun T, Arefanian H, Barake R, *et al*. Functional foods and lifestyle approaches for diabetes prevention and management. Nutrients. 2017;9(12):1310. doi: 10.3390/nu9121310
7. Shastri HS. Vagbhata, Nidana sthana. In: Ashtanga hridaya. Ch. 10., Ver. 7. Varanasi: Chaukhambha Orientalia; 2000.
8. Sharma PV. Sutra sthana. In: Charaka samhita. Ch. 27. Varanasi: Chaukhambha Orientalia; 1983.
9. Agrawal P, Singh BR, Gajbe U, Kalambe MA, Bankar M. Managing diabetes mellitus with millets: A new solution. Cureus. 2023;15(9):e44908. doi: 10.7759/cureus.44908
10. Jacob J, Krishnan V, Antony C, Bhavyasri M, Aruna C, Mishra K, *et al*. The nutrition and therapeutic potential of millets: An updated narrative review. Front Nutr. 2024;11:1346869. doi: 10.3389/fnut.2024.1346869
11. Anitha S, Tsusaka TW, Botha R, Givens DI, Rajendran A, Parasannanavar DJ, *et al*. Impact of regular consumption of millets on fasting and post-prandial blood glucose level: A systematic review and meta-analysis. Front Sustain Food Syst. 2024;7:1226474. doi: 10.3389/fsufs.2023.1226474
12. Magliano DJ, Boyko EJ, Atlas ID, editors. IDF diabetes atlas. 10th ed. Brussels, Belgium: International Diabetes Federation; 2021.
13. Singh R. Millets: Cultivating resilience and sustainability for the future of global agriculture. South Asian J Agric Sci. 2024;4(2):115-9.


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**Table 1: Pathophysiological framework of prameha**

| Ayurvedic pathological variable | Clinical correlation | Physiological implication |
|---|---|---|
| *Santarpana* | Over-nutrition/Anabolic excess | Hypercaloric state and weight gain |
| *Kapha-vitiation* | Insulin Resistance | Impaired glucose uptake and metabolic slowing |
| *Medas-dushti* | Dyslipidemia | Elevated triglycerides and lipid deposition |
| *Kleda-vriddhi* | Hyperglycemia | Systemic fluid retention and osmotic diuresis |
| *Srotas-avarodha* | Vascular Blockage | Micro- and macro-vascular complications |
| *Dhatu-kshaya* | Catabolic State | Wasting of muscle and bone tissues |

**Table 2: Classification and botanical identity of trina dhanya**

| Sanskrit Nomenclature | Botanical Identification | Common English Name | Classical Reference |
|---|---|---|---|
| *Kodrava/Koradusha* | *Paspalum scrobiculatum* L. | Kodo Millet | Ch. Su. 27, Su. Su. 46 |
| *Shyamaka* | *Echinochloa frumentacea* Link | Barnyard Millet | Ch. Su. 27, Su. Su. 46 |
| *Priyangu/Kangu* | *Setaria italica* (L.) P. Beauv. | Foxtail Millet | Ch. Su. 27, Su. Su. 46 |
| *Chinaka* | *Panicum miliaceum* L. | Proso Millet | Madanpala Nighantu |
| *Nartaki/Madhulika* | *Eleusine coracana* (L.) Gaertn. | Finger Millet (Ragi) | Kaiyadeva Nighantu |
| *Gavedhuka* | *Coix lacryma-jobi* L. | Adlay Millet/Job's Tears | Ch. Su. 2, Ch. Su. 27 |
| *Nivara* | *Hygroryza aristata* Nees | Wild Rice/Forest Grain | Ch. Su. 27, Su. Su. 46 |
| *Jurnahva/Yavanala* | *Sorghum bicolor* (L.) Moench | Sorghum (Jowar) | Raj Nighantu |
| *Vajranna* | *Pennisetum glaucum* (L.) R. Br. | Pearl Millet (Bajra) | Modern Ayurvedic Texts |
| *Venuyava* | *Bambusa arundinacea* | Bamboo Seeds | Su. Su. 46 |

**Table 3: Dietary fiber and glycemic index**

| Millet variety | Glycemic index (GI) | Fiber content (g/100 g) | Protein content (g/100 g) |
|---|---|---|---|
| Kodo Millet | 45–55 | 9.0–10.2 | 8.3 |
| Barnyard Millet | 41–50 | 10.1 | 6.2–11.2 |
| Foxtail Millet | 50–60 | 8.0 | 12.3 |
| Little Millet | 50–65 | 7.0 | 7.7 |
| Proso Millet | 50–65 | 3.0–9.0 | 11.5–12.5 |
| Finger Millet | 65–80 | 3.6–18.0 | 7.3 |
| Pearl Millet | 70–85 | 1.3–8.0 | 10.6–11.6 |
| Sorghum | 70–85 | 1.6–10.0 | 10.4 |
| Milled Rice | 70–80 | 0.3 | 6.4 |
| Refined Wheat | 75–85 | 2.0 | 11.8 |

**Table 4: Antioxidant and anti-glycation activity**

| Phytochemical class | Key bioactive compound | Metabolic mechanism |
|---|---|---|
| Phenolic acids | Ferulic acid | Scavenges free radicals and reduces oxidative stress |
| Flavonoids | Quercetin/Flavan-4-ol | Inhibits alpha-amylase and improves insulin sensitivity |
| Tannins | Condensed Tannins | Reduces starch digestibility and lowers GI |
| Phytosterols | Stigmasterol | Improves lipid profile and cardiac health |
| Saponins | Diosgenin | Modulates insulin receptor binding and activity |