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Cooked Red rice -An effective therapeutic diet

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Abstract

Red rice is a traditional crop that has been cultivated in India for centuries and holds significant therapeutic importance according to *Ayurvedic* literature. Numerous *Ayurvedic* scholars have recognized red rice as a beneficial dietary component, particularly for enhancing digestion and promoting strength. This study aimed to standardize a recipe for cooked red rice based on classical *Ayurvedic* texts and evaluate its sensory attributes and nutritional profile. The therapeutic preparation of red rice was formulated following guidelines from *Bhojanakutuhalam*, an ancient text on Indian dietetics. Subsequent analysis revealed that the cooked red rice exhibited favorable levels of carbohydrates and proteins when compared to white rice. Its comparatively lower glycemic response and balanced nutrient content underscore its therapeutic potential and reflect the profound nutritional insight embedded in ancient Indian dietary wisdom.

1. Introduction

According to *Ayurveda*, the traditional Indian system of medicine, food is considered as an excellent form of medicine. Food possesses the power to cure diseases and to prevent them by enhancing immunity. As mentioned in the ancient Indian literature, the *Upanishads*, that human beings originate from food, and therefore, a person's health is intrinsically linked to the quality of the food they consume.

Rice has been a fundamental part of the Indian diet for centuries and remains a staple food across the country. According to *Ayurveda*, aged or well-matured rice is considered highly therapeutic and is recommended for regular consumption due to its curative properties. There exists a wide range of rice varieties, each with distinct characteristics, as well as diverse methods of preparation. Ancient *Ayurvedic* texts offer a comprehensive analysis of how different types of rice and their modes of processing influence the body's constitution (*doshas*) and overall health.

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Several rice varieties are described in ancient *Ayurvedic* texts, each recognized for their role in maintaining health and treating specific ailments. *Bhojanakutuhalam*, a classical text on traditional Indian dietetics, mentions thirteen such rice varieties. Among them, *Raktashali*, commonly known as red rice, stands out for its significant therapeutic value. According to Ayurveda, general properties of Red Rice (*Raktashali*) are as follows:

Table 1: Properties of Red rice (*Raktashali*) according to *Ayurveda*

Rasa (taste)	Sweet
Virya (potency)	Cooling
Vipaka (post digestive effect)	Sweet
Guna (qualities)	Unctuous, light, nourishing, strengthening, diuretic, good for eyes, good for heart, wound healing, improves semen quality.

This study was undertaken to standardize the preparation and evaluate the nutritional qualities of red rice (*Raktashali*) when served at a lukewarm temperature. The rice was cooked following the traditional method outlined in the ancient Ayurvedic text *Bhojanakutuhalam*, with necessary modifications made for practical application. The primary objective of the study is the development of the recipe, along with the nutritional and sensory analysis of the prepared food product.

2. Aim and Objectives

2.1 Aims

The aim of the study was to analyze the Proximate and Sensory analysis of the Cooked Red Rice (*Raktashali*) at lukewarm temperature.

2.2. Objectives

The objectives of this study were-

- To prepare a therapeutic food product- cooked red rice, as mentioned in ancient *Ayurvedic* literature.
- To conduct proximate analysis of the food product.

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- To conduct sensory analysis of the food product.
- To study the properties of the product as per *Ayurveda* and Modern Nutrition Science.

3. Materials & Methods

3.1 Materials

- Red Rice (*Raktashali*) – 250 g (procured from an authentic source)
- Water – 650 ml (added gradually during cooking)
- Cooking Apparatus – Heavy bottom vessel, stove

➢ **Property of Red Rice as per *Ayurveda***

The *Ayurvedic* treatise *Bhojanakutuhalam* highlights the therapeutic and nutritional superiority of the red rice variety known as *Raktashali*.

रक्तशालिस्तुमधुरोलघु: स्निग्धोबलावह: |
रुचिकृद्दीपन: पथ्य: पित्तदाहानिलास्त्रजित||

[भोजनकुतूहलम् Ch-1 Pg- 6, 2012]

This verse describes *Raktashali* as being sweet in taste (*madhura*), light to digest (*laghu*), mildly unctuous (*snigdha*), and strength-promoting (*balāvahaḥ*). It enhances taste and appetite (*ruchikṛd*, *dīpanaḥ*), is considered wholesome (*pathyaḥ*), and is particularly effective in alleviating imbalances of *pitta*, internal burning sensations, disorders of *vata*, and blood-related conditions[1].

रक्तशालिर्वरस्तेषूबल्योवर्ण्यस्त्रिदोषजित|
चक्षुष्योमूत्रल: स्वर्य: शुक्रलस्तृडज्वारपह: ||

[भोजनकुतूहलम् Ch- 1 Pg -7, 2012]

According to this verse, *Raktashali* is regarded as the superior among all rice varieties. It enhances bodily strength (*balya*), improves complexion (*varṇya*), and balances all three *doshas*—*vata*, *pitta*, and *kapha* (*tridoṣajit*). Additionally, it benefits the eyes (*cakṣuṣyaḥ*), acts

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as a diuretic (*mūtralaḥ*), improves vocal clarity (*svaryaḥ*), supports reproductive health by increasing semen production (*śukralaḥ*), and helps in alleviating thirst and fever (*tṛḍ-jvarāpahaḥ*) [1].

- **Nutritional Value of Red Rice**

Table 2: Nutritional Value of Red Rice per 100g[2]

Nutrient	Nutritional Value
Carbohydrates	9.1 g
Fat	2.6 g
Ash	1.1 g
Sucrose	0.74 g
Mono-unsaturated Fatty Acids	40.7%
Poly- unsaturated Fatty Acids	31%

In India, red rice holds a special place in history. In their respective treaties, ancient Ayurveda's founding fathers – *Susruta* (c. 400 BC), *Charaka* (c. 700 BC), and *Vagbhata* (c. 700 AD) – refer to the medicinal value of *shali*, *vrihi*, and *shastika* rice, and enumerate the rice according to their relative pharmaceutical value, with the most convenient type at the head of the list. *Charaka*, the author of *Charaka* Samhita, and other, later authorities classify the *Raktashali* or *Lohit shali* rice (with red husk and grain) as the superior; this variety is considered the most efficacious, and subdues the three unbalanced doshas [3].

Red rice may serve as an effective dietary supplement for individuals with diabetes, helping to maintain stable blood sugar levels. Its high dietary fiber content slows the absorption of carbohydrates, thereby reducing postprandial glucose spikes. Additionally, the presence of anthocyanins—natural pigments found in red rice—contributes to its hypoglycemic effect, further supporting its role in glycemic control.

Red rice contains approximately 24% of proteins which is also hypoallergenic in nature and reduces the allergic conditions in the human body [4].

It is a rich source of calcium, vitamin B complex and iron [5].

3.2 Methodology

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As per the aim and objectives of the study, the methodology was designed as follows:

The rice was cooked using the *Ayurvedic* standard method as outlined in classical texts, *Bhojankutuhalam* [4]:

1. 100 g of red rice was washed thoroughly.
2. It was placed in a heavy-bottom vessel and 400 ml of water (4 times that of rice) was initially added.
3. The vessel was kept uncovered and placed over a medium flame.
4. Additional water (in increments of 100 ml) was added as needed until the rice was perfectly cooked.
5. The rice was allowed to cool to lukewarm temperature before analysis.

- **Sensory Analysis-** The cooked, lukewarm temperature red rice (*Raktashali*) was evaluated for key sensory attributes including appearance, aroma, taste, texture (mouthfeel), and overall acceptability by a panel of five semi-trained judges. A structured five-point hedonic scale was used for the sensory analysis, with each attribute being rated individually. The scale used for scoring was as follows:
  - 5 – Like very much
  - 4 – Like a little
  - 3 – Not sure
  - 2 – Dislike a little
  - 1 – Dislike very much

Each score reflected the panelists' degree of liking or disliking for the specified characteristic, enabling a comprehensive sensory evaluation of the product.

- **Proximate Analysis-** The proximate analysis was conducted on a 100 g sample of cooked red rice (*Raktashali*), which was preserved at room temperature prior to testing. Standardized laboratory procedures were employed to determine the levels of macronutrients including protein, fat, carbohydrates, starch, and crude fibre. Each parameter was analyzed using established national and institutional testing protocols, ensuring reliability and accuracy in the results. The methods used for each analysis are detailed in the table below:

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Table 3: Test method used for proximate analysis

Test Done	Test Method
Protein	IS 7219 (Modified method by FOSS Kjeltec)
Total Fat	IS 6287
Carbohydrate	FHHL/SOP/CHEM/F/17(f)
Starch	FHHL/SOP/CHEM/F/78
Crude Fiber	IS 10226 (Part 1)

4. Result and Discussion

4.1 Analysis of cooked red rice (*Raktashali*):

4.1.1 Sensory analysis of cooked red rice (*Raktashali*): The sensory evaluation of the cooked red rice (*Raktashali*) at room temperature revealed favorable responses across all key organoleptic parameters. Based on the five-point hedonic scale, the mean scores for each characteristic were as follows:

Table 4: Mean scores for the sensory analysis of cooked red rice (*Raktashali*)

Appearance	Aroma	Taste	Texture/ mouthfeel	Overall Acceptability
4.5	3.7	4	4.5	4.4

*Mean values of 5 judges using five point hedonic scale (5 Excellent – 1 Poor)

[Key Points: Liked very much: 5, Like a little: 4, Not sure: 3, Disliked a little; 2, Disliked a very much: 1]

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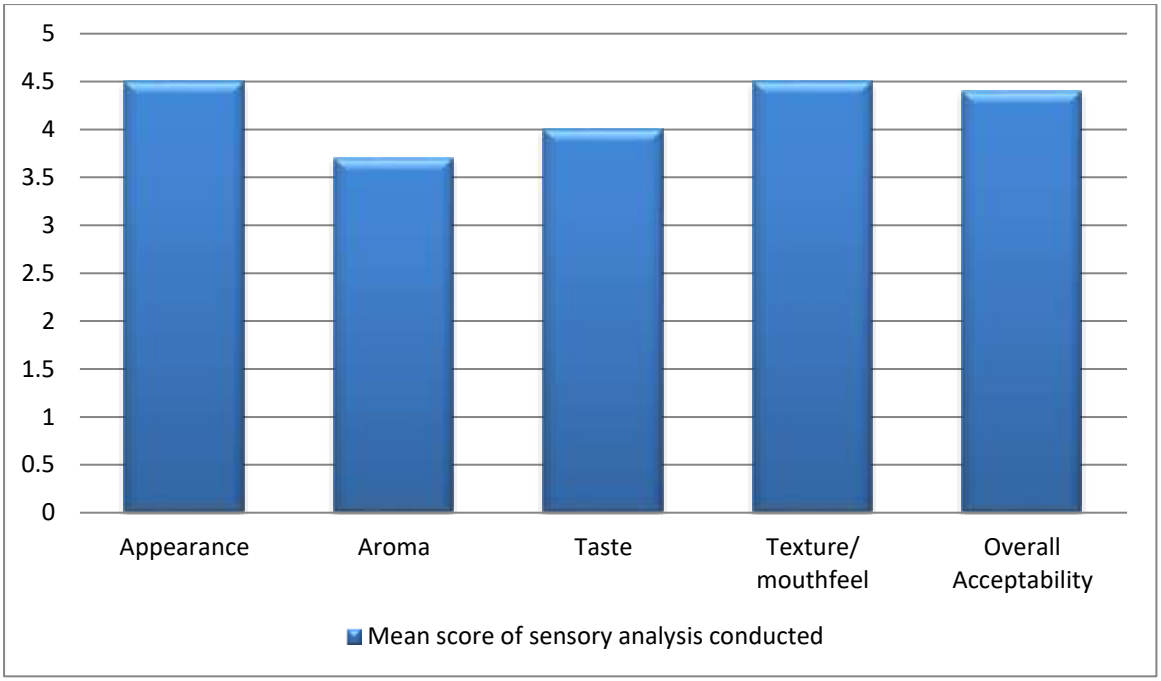

Figure 1: Mean score of sensory analysis conducted

These findings support the notion that cooked red rice (*Raktashal)i*, when prepared following traditional Ayurvedic methods, holds strong potential as a wholesome and acceptable dietary option, both nutritionally and sensorially.

4.1.2 Proximate analysis of cooked red rice (*Raktashali*): The proximate analysis was conducted on a 100 g sample of cooked red rice (*Raktashali*), which was preserved at lukewarm temperature prior to testing. The sample underwent evaluation for key macronutrients using standardized methods. The detailed results of this proximate analysis are presented in Table 5.

Table 5: Proximate analysis of cooked red rice (*Raktashali*)

Test done	Result	Unit	Test Method
Protein	4.22	g/100g	IS 7219 (Modified method by FOSS Kjeltec)
Total Fat	0.75	g/100g	IS 6287
Carbohydrate	18.53	g/100g	FHHL/SOP/CHEM/F/17(f)
Starch	17	g/100g	FHHL/SOP/CHEM/F/78
Crude Fiber	<0.1	g/100g	IS 10226 (Part 1)

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4.2 Discussion

This study was conducted to evaluate the nutritional composition and palatability of red rice (*Raktashali*) when served at a lukewarm temperature. Diabetic patients are often advised to consume rice at room or lukewarm temperatures to help prevent sharp postprandial blood sugar spikes. The primary objective of this research was to assess the starch, carbohydrate, and protein content of cooked red rice under these conditions.

The sensory evaluation revealed that the cooked red rice had high acceptability, with favorable scores for appearance, texture, and aroma. Nutritional analysis of the sample showed that it contained approximately 18 grams of carbohydrates per 100 grams, which is lower compared to conventional white rice. Additionally, it demonstrated a notable protein content of 4.22 grams per 100 grams, indicating superior protein levels in comparison to white rice.

These findings highlight the potential of red rice as a valuable dietary component for individuals with metabolic disorders such as Diabetes Mellitus. When consumed at a lukewarm temperature, red rice not only provides essential nutrients but also promotes satiety, making it a suitable choice for patients with dietary restrictions related to diabetes.

5. Conclusion:

The therapeutic preparation of red rice was successfully developed and standardized. When served at a lukewarm temperature, the red rice demonstrated excellent sensory attributes, particularly in terms of taste, aroma, and overall acceptability. Nutritional analysis further highlighted its therapeutic potential, revealing a moderate content of carbohydrates and starch, along with a significantly higher protein level compared to the white rice variety.

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7. Annexure

Figure 2: Raw Red Rice (*Raktashali*)

Figure 3: Red Rice during cooking

Figure 4: Cooked Red Rice (Raktashali