

## **THE WHITE PEARL: A COMPREHENSIVE STUDY OF BASMATI RICE**

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### **Abstract:**

Basmati rice, often referred as “*the white pearl*,” is renowned for its distinctive aroma and exquisite taste that resonate within the diverse culinary traditions of India. Despite its prominence, consumer understanding of Basmati rice is often clouded with misconceptions and knowledge gaps regarding its authentic qualities, production regions, and cooking applications. The aim of this research paper is to delve deeper into consumer beliefs and define the gap between perception and the factual characteristics of Basmati rice.

This research paper examines the disparity between consumer perceptions and the actual qualities of different Basmati rice varieties. Despite being renowned for its distinctive long grains, rich aroma, and exceptional cooking attributes, many consumers are not informed about the diversity among Basmati rice cultivars. There exists a common misunderstanding that all Basmati varieties share identical quality and flavor profiles; however, genetic variation and agricultural methods result in significant differences in grain size, scent, cooking properties, and taste. Nutritional value is also mistakenly believed to be uniform across all varieties. The article advocates for enhanced consumer education on the refinement of Basmati rice, aiming to rectify the misconceptions and bring to light the unique characteristics of each strain, enabling more informed purchasing decisions. This educational approach endeavors to broaden consumer appreciation for the distinctiveness inherent in each variety of Basmati rice.

**Key words:** Basmati Rice, Consumer Perceptions, Rice Varieties, Market Misconceptions, Consumer Beliefs

**What is Rice?**

“Rice is a staple food grain for a significant portion of the world's population”<sup>1</sup>. “Rice is mainly composed of carbohydrates, but also contains proteins, fats, vitamins, and dietary fibers.

Rice, scientifically known as *Oryza sativa*, is one of the world's most important staple foods, especially in Asia and parts of Africa”<sup>2</sup>. “It serves as the primary food source for over half of the global population”<sup>3</sup>. “Rice farming goes through several stages in the supply chain, including agriculture, harvesting, packaging, and transportation”<sup>4</sup>. “The world's growing population and improving living standards, the demand for rice is increasing, necessitating developments in rice breeding for high-yield and superior-quality varieties”<sup>5</sup>. “Rice is also crucial from an economic perspective, holding a strategic position in national economies due to its significance in both consumption and marketing systems”<sup>6</sup>.

**Background of Basmati Rice:**

Basmati rice is highly regarded for its superior quality and desirable characteristics, such as extra-long grains, pleasant aroma, and excellent cooking quality. However, there are several misconceptions and awareness gaps among consumers regarding Basmati rice varieties. Many consumers believe that all Basmati rice varieties are the same and offer the same level of quality and taste. “The reality is that there are significant differences among Basmati rice varieties in terms of grain size, aroma, cooking qualities, and taste”<sup>7</sup>. This can be attributed to the genetic variations and cultivation practices used for different Basmati rice varieties. Consumers may also have misconceptions about the origin of Basmati rice. “The perception is that Basmati rice only comes from India and Pakistan, when in reality, Basmati rice can be grown in other countries as well”<sup>8</sup>. The perception is that the crossbred varieties lack the desirable characteristics of traditional Basmati rice, such as the classic aroma. However, the reality is that crossbred Basmati varieties can exhibit superior characteristics in terms of shorter cooking time, higher elongation ratio, and lower solid loss. This is supported by a study that found the “crossbred Basmati varieties to have these qualities, although they may lack the classic aroma compared to traditional varieties”<sup>9</sup>.

Furthermore, the perception among consumers is that all Basmati rice varieties have the same nutritional value. However, the reality is that there may be variations in the nutritional content of Basmati rice varieties based on factors such as cultivation practices and milling processes. Overall, there is a need for consumer education and awareness regarding the different varieties of

Basmati rice and their characteristics. Consumers need to be informed about the genetic variations, cultivation practices, and characteristics of different Basmati rice varieties. Hence the present research paper is undertaken. This will allow consumers to make more informed choices when purchasing Basmati rice and appreciate the unique qualities of each variety. In conclusion, consumer misconceptions and awareness gaps exist regarding Basmati rice varieties. Despite consumer misconceptions, the reality is that there are significant differences among Basmati rice varieties in terms of grain size, aroma, cooking qualities, taste, and nutritional content.

#### **Standard Set By Food Safety and Standards Authority of India (FSSAI) on Basmati Rice:**

The Food Safety and Standards Authority of India has set specific rules for Basmati rice to protect consumers and make sure trade is fair. These rules, which will be applied starting August 1, 2023, include guidelines on the size and quality of the rice grains, such as how much they should elongate after cooking, moisture levels, and starch content.

The FSSAI guidelines also state that Basmati rice should not contain artificial colors, polish, or fragrances, and sometimes DNA tests are used to confirm its Basmati.

The key qualities of Basmati rice, as outlined by FSSAI, include its natural aroma, long grain size, and fluffy texture when cooked, which make it a premium variety of rice. Grown mainly in the foothills of the Himalayas, Basmati rice has a unique aroma and flavor that make it popular in India and around the world.

Because Basmati rice is considered premium and is more expensive, there's a higher risk of it getting mixed with other types of rice. This is why it's important to have these FSSAI standards to ensure people are getting real Basmati rice both within India and in international markets.

#### **A Marketer's Perspective on Varieties of Basmati Rice:**

“Basmati rice, known for its long, slender grains and exquisite aroma, occupies a prime position among the over 5000 varieties of rice available”<sup>10</sup>. Marketers have recognized the demand for Basmati rice and have introduced various blends of this popular variety. These “blends are created by packaging different recognized and unrecognized varieties of basmati rice together. By blending different varieties of basmati rice, marketers are able to offer consumers a unique and diverse product”<sup>11</sup>. This allows consumers to experience different flavor profiles, textures, and cooking properties. Additionally, the blending of different basmati rice varieties provides marketers with the opportunity to cater to specific consumer preferences. For example, some blends may prioritize a stronger aroma, while others may focus on elongation during cooking.

Overall, the blending of different varieties of basmati rice adds value to the market and provides consumers with a wider range of options to choose from.

**Objectives of the Study:**

1. To explore and characterize the range of consumer beliefs regarding the taste, aroma, and cooking qualities of Basmati rice.
2. To assess the level of consumer knowledge about the geographic origin, cultivation practices, and unique properties that define Basmati rice.
3. To analyze the disparity between consumers perceptions of Basmati rice quality and the actual characteristics.
4. To develop educational materials and strategies aimed at correcting misconceptions and enhancing consumer awareness of Basmati rice attributes.
5. To propose improvements to product labeling that provide clearer information to consumers about the quality and origin of Basmati rice.
6. To encourage the use and understanding of authenticity verification methods, such as traceability systems or certification marks.
7. To foster informed decision-making among consumers, empowering them to distinguish and select high-quality, authentic Basmati rice products.

**Methodology:**

This study makes use of secondary data analysis approach to understand consumer perceptions and the actual attributes of Basmati rice. The secondary data is collected from various sources, such as academic databases, market research firms, government agriculture reports, Identified relevant datasets, research papers, industry reports, market analyses, consumer surveys, and other publications related to Basmati rice, consumer perceptions, and published consumer studies.

**Significance of the Study:**

In the global rice market, Basmati rice holds a special place due to its unique aroma, flavor, and long-grain characteristics. While it commands a premium price and cultural significance, there is a growing concern that consumers' perceptions of Basmati rice varieties may not align with their actual qualities. Misconceptions can arise from various factors, including misleading marketing, lack of knowledge about the rice's origin and production, and the influence of branding efforts.

These misconceptions may influence buying behavior, leading consumers to make choices that do not reflect the authentic value and characteristics of Basmati rice.

The problem is compounded by the fact that consumer education on the attributes of Basmati rice is often limited, leading to a significant gap between consumers' perceived understanding and the documented realities. This research seeks to explore the nature of these perceptions, the reality behind them, and the awareness gaps that need to be addressed. The implications of such a mismatch in perceptions versus reality are wide-ranging, impacting consumer satisfaction, agricultural practices, and the economic stability of the Basmati rice industry. Therefore, it is imperative to investigate and understand these dynamics to propose effective measures to reconcile consumer perceptions with the authentic properties of Basmati rice.

**Table No. 01**

**CHARACTERISTICS OF BASMATI RICE**

The comparative table aims to provide an overview and comparison of various varieties of Basmati rice including traditional Basmati, 1121, Pusa, Sharbati, Parmal, Sugandha, and Chauba.

<b>Rice Variety</b>	<b>Shapes of Basmati Rice</b>	<b>Grain Length</b>	<b>Aroma</b>	<b>Texture</b>	<b>Cooking Method</b>
<b>Traditional Basmati</b>	Sword Shape Width increase from Beginning to end	Long	Aromatic	Fluffy	Steaming, Stir-frying
<b>1121</b>	Long, More thick compared to Pusa, Flat tail, Flat and thick compared to Sugandha	Extra Long	Mild	Soft	Steaming, Biryani
<b>Sugandha</b>	Long & Cylindrical	Long	Fragrant	Firm	Pulao, Biryani
<b>Pusa</b>	Width same all across curve at end, length more than Basmati, Thin compared to Basmati, straight at lower portion, will have	Medium	Fragrant	Sticky	Fried Rice, Pulao

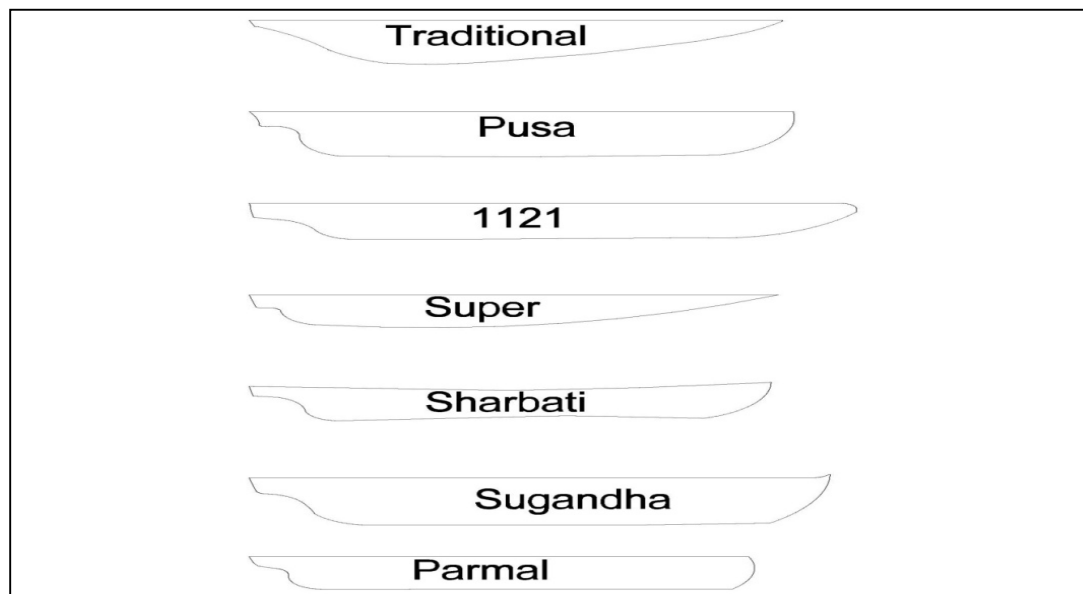
	chowki				
<b>Parmal</b>	Small Grain & Thick	Medium	Neutral	Sticky	Biryani, Fried Rice
<b>Sharbati</b>	Cylindrical but Curve in the middle	Long grains	Strong	Fluffy	Biryani or pilafs
<b>Chauba</b>	Small & Thick	Short grains	Mild	Fluffy	Biryani or pilafs

(Source: Training Manual, Veetee Fine Foods Ltd.)

The table above provides a comparison of various varieties of Basmati rice including traditional Basmati, 1121, Pusa, Sharbati, Parmal, Sugandha, and Chauba. It outlines their grain characteristics, aroma, cooking quality, and size. This information can be helpful for consumers or chefs who are looking to select the right variety of Basmati rice based on their preferences and requirements and the choice of rice variety ultimately depends on personal preference and the desired outcome for a specific dish.

**Figure No. 01**

**Different Shapes of Basmati Rice**



(Source: Training Manual, Veetee Fine Foods Ltd.)

“Basmati rice is primarily cultivated in the states of Punjab, Haryana, Himachal Pradesh, Delhi, Uttarakhand, Western Uttar Pradesh, and Jammu and Kashmir in India. These regions have the

ideal climatic and soil conditions for basmati rice cultivation”<sup>15</sup>. The cultivation of basmati rice follows certain guidelines to ensure optimal growth and yield. These guidelines include selecting “the right variety of basmati rice, preparing the field, sowing the seeds, proper irrigation management, timely application of fertilizers and pesticides, and careful harvesting.

In addition, it is important to provide the crop with adequate sunlight for proper growth and development. Using high-quality seeds is essential for successful basmati rice cultivation”<sup>16</sup>. The proverb “a picture is worth a thousand words” is quite appropriate here. Figure No. 01 serves as a valuable visual aid enabling customers to easily recognize and choose the genuine rice they wish to buy and enjoy.

### **THE MAGIC OF RAW, STEAMED AND SELLA RICE**

“Rice is a demanded product in the world”<sup>17</sup>. It is available in various forms such as raw rice, steam rice, and sella rice. Raw rice refers to unprocessed grains of rice that have been harvested and dried. “Steam rice, on the other hand, is raw rice that has been soaked, cooked with water, and steamed until it becomes tender and fluffy”<sup>18</sup>. “Steam rice, on the other hand, is rice that has been cooked through the process of steaming”<sup>19</sup>. Sella rice, also known as parboiled rice, is a type of rice that has been partially boiled in the husk before being milled, resulting in a firmer texture and a higher nutrient content compared to raw or steam rice. These different forms of rice cater to various preferences and cooking methods, offering options for rice dishes across cultures and cuisines. These forms of rice also have different cooking times and textures, with raw rice typically being firmer and chewier, steam rice being softer and fluffier, and sella rice having a firmer texture with a slightly nutty taste.

Moreover, each form of rice has its own nutritional composition, with raw rice containing more dietary fiber compared to steam rice and sella rice due to the removal of the outer bran layer in the processing of steam rice and sella rice. Furthermore, each form of rice can be used in a variety of dishes, from traditional rice-based recipes to modern fusion cuisines. Overall, raw rice, steam rice, and sella rice are distinct forms of rice that cater to different preferences, cooking methods, textures, and nutritional compositions. They provide options for diverse rice dishes worldwide and contribute to the overall economic significance of the rice industry.

**Table No. 02**  
**GRADING OF BASMATI RICE BASED ON GRAIN SIZE AND BREAKAGE**

Full Length	Head Rice
If Edge is broken	Tibar
If it is $\frac{3}{4}$	Dubar
If half Broken	Mogra
Broken more than $\frac{1}{2}$	Mini Mogra
Only Edge	Kinki

(Source: Training Manual, Veetee Fine Foods Ltd.)

“Rice grading standards are a set of guidelines and criteria used to determine the quality and characteristics of rice grains”<sup>20</sup>. Basmati rice is graded on the basis of grain size and its breakage, with specific terms used to classify the different levels of grain integrity. Full-length grains are considered “Head Rice,” while partially broken grains have distinct classifications: “Tibar” if an edge is broken, “Dubar” for three-quarter size, “Mogra” for half-broken grains, and “Mini Mogra” when broken more than half. The term “Kinki” refers to rice grains that are only edge-broken. This grading system ensures that consumers and traders are aware of the quality and type of Basmati rice being sold or purchased.

**Table No. 03**  
**JOURNEY FROM RAW TO FINISHED GRAIN**

Break of Basmati Rice	Percentage
Finished Product	45%
Broken	22%
Bran	10%
Husk	23%

(Source: Training Manual, Veetee Fine Foods Ltd.)



Basmati rice paddy passes through various stages still it reaches customers. The breakdown of Basmati rice processing yields different components in varying percentages. The primary output is the finished product, which constitutes 45 percent of the total, consisting of whole, intact grains ready for the market. Broken grains, which are fragments of the rice, account for 22 percent, often used in different culinary applications. Rice bran, the nutrient-rich outer layer, makes up 10 percent; it can be used for oil extraction or as animal feed. Finally, the husk, which is the protective covering of the grain, represents 23 percent and is typically utilized for biomass fuel or in industrial applications. This breakdown underscores the multiple uses of each part of the rice harvested.

**Table No. 04**  
**MARVELOUS USES OF BASMATI RICE BY-PRODUCTS**

By Products	Uses
<b>Dust &amp; Husk</b>	Boilers
<b>Rice Bran</b>	Solvent Plants
<b>Kinki</b>	Poultry Farms

(Source: Training Manual, Veetee Fine Foods Ltd.)

The by-products of Basmati rice milling have various practical applications. Dust and husks are utilized as fuel in boilers due to their high energy content. Rice bran, which is rich in oil, is valuable to solvent plants for extracting rice bran oil, popular cooking oil. Lastly, Kinki, the smaller fragments of broken rice grains, serve as an economical and nutritional feed in poultry farms. These uses contribute to waste minimization and financial gains in associated industries, making the entire process of rice milling more sustainable and efficient.

### **The Shift to Alternative Rice:**

In recent agricultural practices, farmers have shown a inclination towards cultivating non-traditional varieties of rice such as Pusa, 1121, Sharbati, and Parmal instead of traditional Basmati rice. This shift can be attributed to several factors that impact their decision-making process regarding crop selection.

Firstly, Traditional Basmati gives about 10-12 quintals per acre, but farmers are looking at other rice types that could give more.

**Table No. 05**  
**COMPARING RICE VARIETY YIELD**

<b>Rice Variety</b>	<b>Yield per Acre (quintals)</b>
Traditional Basmati	10-12
Pusa	15-17
1121	17-21
Sharbati	20-22
Parmal	25-30

(Source: Basmati Rice a Class Apart (A review), 2015, <https://www.omicsonline.org/open-access/basmatirice-a-class-apart-a-review-2375-4338-1000156.php?aid=63974>)

“The higher yield per acre of these non-traditional varieties results in potentially higher revenue for farmers, providing a compelling reason to favor these variants over traditional Basmati”<sup>21</sup>.

Secondly, the unique aroma of Basmati rice, while a valued quality trait, also makes it more susceptible to insect infestations. “This increases the risk factor in cultivating Basmati, as it may result in a higher likelihood of crop damage and loss when compared to less fragrant varieties that may not attract as many insects”<sup>22</sup>.

Furthermore, the demand dynamics in the international market also influence the farmers' choice of crops. Though Basmati rice has enjoyed high demand in the European market, recent trends have indicated a preference for varieties like Pusa, which can erode the market share of Basmati. This shift in demand is significant as it can impact the profitability and export potential of farmers specializing in Basmati rice.

Lastly, “the post-cooking attributes such as elongation, taste, appearance, and other sensory qualities are vital aspects that influence consumer choice. Non-aromatic varieties like Pusa are perceived to be similar to Basmati rice in these aspects after cooking, aside from the distinctive Basmati aroma. If consumers regard these varieties as comparable in quality, it might reduce the unique selling proposition of Basmati”<sup>23</sup>.

In essence, the decision to cultivate non-traditional rice varieties over Basmati is driven by economic, agronomic, and market-based concerns. While traditional Basmati rice has its own remarkable characteristics and holds a unique texture.

**Table No. 06****SOAKING AND COOKING TIME OF BASMATI RICE**

Crops	Type	Type	Type	Raw/Steam Soaking Time		Sella Soaking Time		Cooking Time		
	Raw	Steam	Sella	New	Old	New	Old	Raw	Steam	Sella
<b>Traditiona I</b>	Yes	--	--	10-15 min	30 Min	30 min	60 min	10-12 Min	-	-
<b>1121</b>	Yes	Yes	Yes	10-15 min	30 Min	30 min	60 min	10-12 Min	10-12 Min	13-15 Min
<b>Pusa</b>	Yes	Yes	Yes	10-15 min	30 Min	30 min	60 min	10-12 Min	10-12 Min	13-15 Min
<b>Sugandha</b>	--	Yes	--	10-15 min	30 Min	30 min	60 min	12-15 Min	12-15 Min	16-18 min
<b>Sharbati</b>	Yes	Yes	Yes	10-15 min	30 Min	30 min	60 min	12-15 Min	12-15 Min	16-18 min
<b>PR 11</b>	Yes	Yes	Yes	10-15 min	30 Min	30 min	60 min	12-15 Min	12-15 Min	16-18 min
<b>PR 14</b>	Yes	Yes	Yes	10-15 min	30 Min	30 min	60 min	12-15 Min	12-15 Min	16-18 min
<b>PR 6</b>	Yes	--	Yes	10-15 min	30 Min	30 min	60 min	15 min	-	18-20 min

(Source: Training Manual, Veetee Fine Foods Ltd.)

**THE BLENDING TREND**

Traditionally, rice was sold in its pure form, without any mixing. Nowadays, blending different types of rice is common. This involves mixing two or three types of rice that look similar and have similar cooking times. Typically, this mixing occurs between expensive (premium) and less expensive (lower value) rice. The aim is to provide customers with good value for their money while ensuring the company remains profitable.

Blending was initially started by rice distributors to increase their profits. Interestingly, most rice products are sold below their maximum retail price (MRP). For premium rice, the difference is usually 20-30 percent less than the MRP, while for cheaper rice; it can be 40-60 percent less.

Today, it's rare to find pure and traditional rice, especially the variety known as Basmati. This is because blending different types of rice has become the standard method of selling and distributing rice, offering consumers more variety and affordable options.

**Table No. 07**  
**POSSIBLE BLENDS**

Position	Range	Crop Types	Blend Possible
1	Basmati	Raw	Pepsi, Sabnam, Anguri, Sharbati, Pusa
2	1121	Raw, Steam & Sella	PR11, Sugandha, RH10
3	Pusa	Raw, Steam & Sella	Sharbati, PR11
4	Sharbati	Raw, Steam & Sella	PR11, PR14

(Source: Training Manual, Veetee Fine Foods Ltd.)

The concept of blending Basmati rice involves a strategic combination of different varieties, aiming to balance length, aroma, and taste while maintaining key characteristics such as grain consistency, texture, and the famed non-sticky, fluffy outcome upon cooking. “These blends may feature a mix of traditional Basmati types from countries like India and Pakistan with newer hybrids, each selected to enhance the overall consumer-desired qualities of Basmati rice. Crucially, any blend must safeguard against adulteration by preserving the characteristic length-to-breadth ratio that distinguishes pure Basmati rice”<sup>24</sup> and “meeting defined standards for grain dimensions, aroma, and cooking properties to be classified as Basmati. This process highlights the complicated art and science behind creating the perfect blend to meet the expectations of Basmati rice enthusiasts”<sup>25</sup>.

### **Conclusion:**

There is in reality a gap between consumer perceptions and the actual qualities of Basmati rice, influenced strongly by factors such as marketing, brand image, and packaging, rather than factual knowledge about the rice's characteristics and origins.

Educational interventions and transparent information sharing could effectively bridge the awareness gap, leading to more informed consumer choices and potentially influencing market trends towards authentic and quality-based Basmati rice purchasing.

Improved consumer understanding may result in increased demand for genuine Basmati varieties, support for sustainable farming practices, and greater recognition of the value of traditional cultivation methods.

The study also provides actionable recommendations for stakeholders in the Basmati rice industry to improve communication with consumers and enhance the overall market positioning of this unique variety of rice.

**Suggestions to Marketers:** here are some suggestions to ensure that their promotional strategies align with consumer knowledge and product authenticity:

1. **Enhance Transparency:** Implement labeling that clearly differentiates Basmati rice varieties, indicating origin, quality, and specific characteristics.
2. **Consumer Education Initiatives:** Organize campaigns and educational programs to inform consumers about the unique attributes of Basmati rice, its culinary uses, and benefits.
3. **Improved Communication:** Use clear and direct communication strategies to educate consumers about the misconceptions and the realities of Basmati rice.
4. **Traceability Systems:** Employ traceability solutions like QR codes or block chain technology that enables consumers to trace the rice back to its farm of origin.
5. **Engaging Marketing Campaigns:** Create marketing that is both informative and appealing, focusing on storytelling to convey the heritage and authenticity of Basmati rice.

By examining these impacts, stakeholders can gain insights into how misconceptions potentially twist the market's functioning. Addressing these misconceptions effectively might lead to more informed consumer choices, fairer market competition, and the preservation of the cultural and biological diversity associated with Basmati rice

**Suggestions to Consumers:** here are some suggestions to help navigate misconceptions and improve their awareness about Basmati rice:

1. **Educate Yourself:** Learn about Basmati rice's unique characteristics, such as aroma, grain length, flavor, and cooking qualities. Understand what distinguishes authentic Basmati rice from other varieties.
2. **Read Labels Carefully:** Always check the packaging for information about the origin, variety, and any quality assurance marks or certifications that confirm the authenticity of the Basmati rice.
3. **Research Brands:** Look into the reputation of the brands available in the market. Read reviews and testimonials from other consumers about their experiences with the product.
4. **Understand Pricing:** Be aware that a higher price does not always equate to better quality. Understand what factors contribute to the price of Basmati rice and decide what is important to you.
5. **Support Ethical Practices:** Choose brands that are transparent about their sourcing and processing methods and are committed to ethical practices in farming and trade.
6. **Ask Questions:** If you are in doubt, ask the retailer or producer for more information about the product. A credible business should be willing to provide consumers with details about their Basmati rice.
7. **Nutritional Information:** Pay attention to the nutritional content of the rice, as different varieties can have varying levels of nutrients.

By following these suggestions and becoming more informed, consumers can make better choices that align closely with the quality and authenticity of Basmati rice, leading to a more satisfying and authentic cooking experience.

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