



NRRI Research Bulletin # 49

TECHNOLOGIES OF RICE VALUE ADDED PRODUCTS



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P. Sanghamitra, P. Panneerselvam, Narayan Borkar, Rubina Khanam
Awadhesh Kumar, Annie Poonam, A.K. Nayak



ICAR-National Rice Research Institute

www.icar-nrri.in



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FOREWORD

Rice has been a staple food in many regions, particularly in Asia, where it plays a vital role in daily diets. Despite its importance, there has been a shift towards more convenient, ready-to-eat products, leading to a decline in the traditional use of rice in everyday meals. This shift is attributed to changing lifestyles, where people have less time for meal preparation, as well as a lack of awareness about the nutritional benefits of rice, especially specialty rice varieties. To address this issue, National Rice Research Institute (ICAR-NRRI) has developed various technologies to develop value-added rice products that are convenient, nutritious, and cater to the consumer's needs. ICAR-NRRI has focused on processing rice into a variety of products that retain the nutritional value while offering ease of preparation. These efforts are part of a broader strategy to revive the consumption of rice by making it more accessible and appealing, especially in urban areas where there is an increasing demand for healthy, convenient food options.

The publication "Technologies of Rice Value Added Products" includes a variety of ready-to-cook and ready-to-eat rice-based products, enriched with essential nutrients and tailored to meet the dietary needs of all the age groups. This book serves as a valuable resource for consumers, small and medium entrepreneurs, and other stakeholders, providing detailed information on the preparation methods, health benefits, and commercial potential of these rice-based products.

I appreciate the efforts of ICAR-NRRI for promoting rice as a versatile and nutritious food source. I also congratulate Dr. A. K. Nayak and his team for their dedicated efforts in bringing out this publication. I hope the book will serve as a ready reference for rice-based products, offering information, and guidance for those interested in the rice value chain.

(Himanshu Pathak)

Dated the 19th August, 2024
New Delhi



PREFACE

Rice is a staple food grown extensively across various agro-climatic regions, and it plays a crucial role in global food security. Rich in carbohydrates and essential nutrients, rice is a primary source of energy and provides key vitamins and minerals, including B-vitamins, iron, and magnesium. Despite its importance, rice consumption patterns and the utilization of its by-products have faced challenges due to changing food preferences, limited processing technologies, and governmental policies favoring refined cereals.

To address these issues and meet the growing demand for nutritious and convenient food options, there is a pressing need to develop value-added rice products that are easy to prepare and accessible at reasonable prices, especially in urban areas where nutritional awareness is on the rise. In response to this need, ICAR-NRRI has developed processing technologies and innovative rice-based products for which FSSAI certification for production has been accorded.

The publication offers a comprehensive overview of the technologies and products developed at NRRI. This book serves as a valuable reference for all stakeholders in the rice industry, including aspiring entrepreneurs interested in starting rice-based processing businesses.

Authors



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INTRODUCTION

In India, rice is cultivated on an impressive 44 million hectares, yet it is often not regarded as a commercial crop. This bulletin aims to change that perception by highlighting how simple rice value-added technologies can empower youth and women, fostering entrepreneurship and opening doors to new ventures.

In today's fast-paced world, where convenience and nutrition are paramount, the demand for innovative food solutions is ever-growing. At NRRI, we are at the forefront of addressing this demand through our cutting-edge technologies in rice value-added products. Our focus is on transforming traditional and popular foods into modern, convenient formats while enhancing their nutritional profiles.

Our diverse range of products exemplifies this commitment.

We have developed Rice Idli Premix and Rice Dosa Premix, simplifying the preparation of traditional South Indian dishes by eliminating lengthy batter preparation processes and offering quick, nutritious meal options. Our Rice and Millet-Based Bakery Cookies showcase the versatility of rice and millet flours, combining them with specialty rice varieties to produce healthful, tasty baked items.

Our efforts extend to Rice Vermicelli, Moringa Rice Noodles, and Beetroot Rice Noodles, which are developed using advanced cold extrusion technology to offer gluten-free, nutrient-rich alternatives. We also formulate Rice Dal Extrudate Snacks and Rice Millet Extrudate Snacks, utilizing twin-screw extrusion technology to deliver protein-packed, flavorful snacks that cater to modern dietary preferences.

Further innovation is seen in our Low-Cost Rice Millet Extrudate Snacks, enriched with by-products from the fruit juice industry to provide a cost-effective, nutrient-dense option. Our Flavored Rice Milk and Ready-to-Use Composite Rice Flour represent the culmination of our technology, offering versatile, nutritious products with enhanced shelf life and convenience.

By focusing on these areas, we are committed to advancing the field of rice value-added products, delivering high-quality, nutritious, and convenient solutions that meet the needs of today's dynamic and health-conscious consumers. This bulletin provides a holistic approach to rice-based entrepreneurship, empowering individuals and communities through simple, effective technologies.

I. Ready-to-Cook (RTC) Extruded Products

1. BLACK RICE VERMICELLI (Anthocyanin Rich)

Description of the Technology (for black rice)

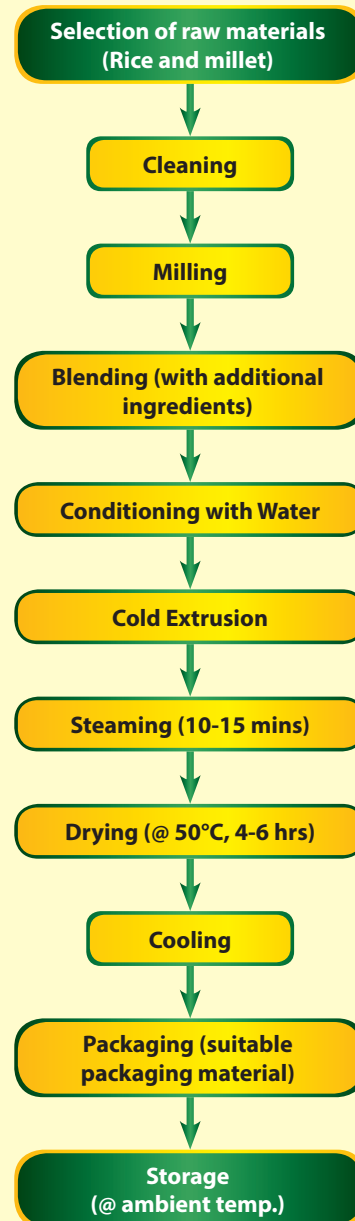
Vermicelli is produced through cold extrusion technology, which has gained popularity in recent years due to its cost-effectiveness and continuous processing capability, making it a highly valuable method in food processing. Black rice flour, prepared using the cold water grinding method, is blended with millet flour in the pasta machine's mixing compartment, combined with water for 30 minutes, and then extruded through a round die. The vermicelli undergoes steaming for 10-15 minutes to achieve gelatinization, followed by drying in a tray drier for 6 hours at 50°C.

Main Product and By-products

The vermicelli yield is 99%, with a negligible by-product yield of 1%.

Benefits and Distinctive Features of Technology/Product

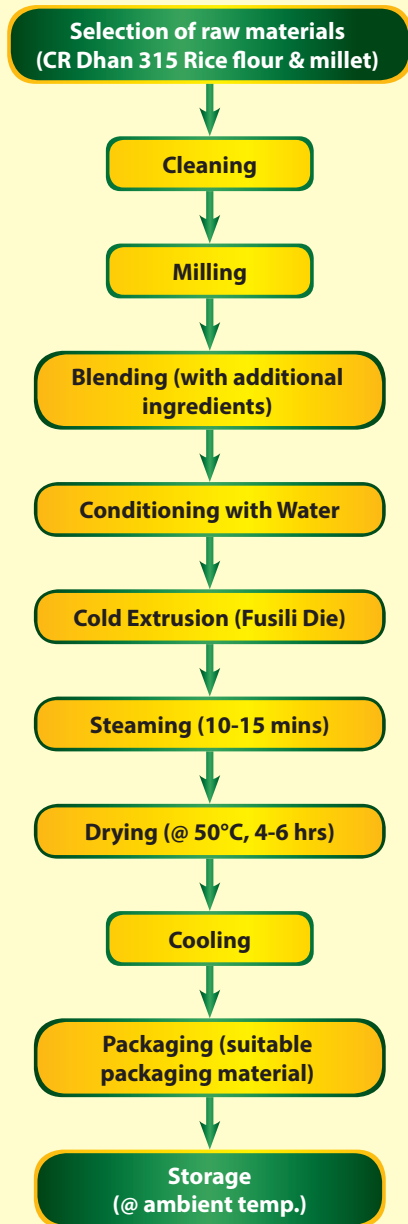
- This product is ideal for making semiya, both sweet and spicy, and can be added to milk.
- Shelf life studies for black rice vermicelli are ongoing.



Process flowchart for production of Black Rice Vermicelli



Process flowchart for production of High Zinc Rice Pasta



2. RICE MILLET PASTA (High Zinc)

Description of the Technology (for high zinc rice)

Pasta is produced using cold extrusion technology, a method that has gained recognition in recent years for its cost-effectiveness and continuous processing capabilities, making it one of the most valuable technologies in food processing. High Zinc rice flour (CR Dhan 315), prepared through cold water grinding, is combined with millet flour in the mixing compartment of the pasta machine. The mixture is then conditioned by adding water and blending for 30 minutes before being extruded using a Fusili Pasta Die. The pasta is subsequently steamed for 10-15 minutes to achieve gelatinization and then dried in a tray drier at 50°C for 6 hours.

Main Product and By-products

The pasta yield is 99%, with a minimal by-product yield of 1%.

Benefits and Distinctive Features of Technology/Product

- The pasta is suitable as a breakfast food and can be stored for up to three months at room temperature
- Shelf life study is in progress

3. PROTEIN RICH RICE VERMICELLI

Description of the Technology (for High Protein Rice)

Vermicelli, a widely used instant Ready-to-Cook (RTC) food, has been a staple in Indian cuisine for centuries, traditionally made from wheat or refined wheat flour to prepare various sweets and savory dishes. Protein rich and gluten free vermicelli can be prepared by incorporation of millet flour (as a source of minerals and other micronutrients) and Rice flour (made from high protein rice variety CR Dhan 311) through cold extrusion process.

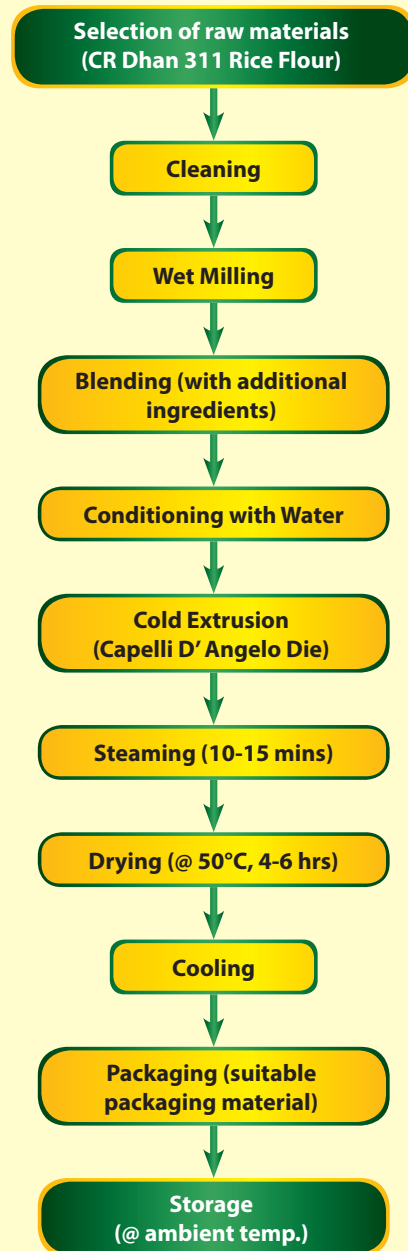
Processing includes wet grinding of the rice and millet to fine flour, conditioning it with the addition of water. It is then used in the production of vermicelli with improved nutritional benefits using Capelli D'Angelo Die in the pasta machine. The Pasta is allowed to be steamed for 10-15 minutes for gelatinization.

Main Product and By-products

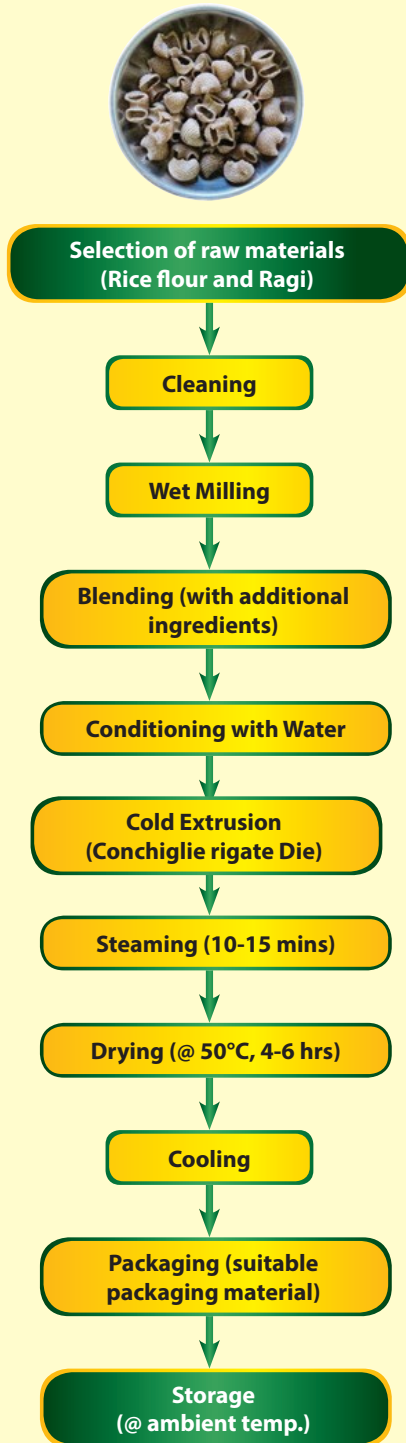
Vermicelli production yields 99%, with a negligible by-product yield of 1%

Benefits and Distinctive Features of Technology/Product

- The CR Dhan 311 rice variety, rich in protein and gluten-free, serves as an excellent raw material for making vermicelli.
- Vermicelli is a convenient product, easy to prepare, highly nutritious, and time-saving.
- It can be stored for up to three months at room temperature, with ongoing shelf life studies.



Process flowchart for production of High Protein Rice Vermicelli



4. RICE RAGI PASTA (Micronutrients Rich)

Description of the Technology

Pasta, a Ready-to-Cook (RTC) product, is traditionally made from wheat semolina using cold extrusion. Advances in technology have now made it possible to commercially produce pasta from rice and millet, offering enhanced nutritional benefits.

Micronutrients rich Rice pasta can be prepared by incorporation of rice flour as a source of gluten free alternative and fortifying with ragi flour to add additional benefits through extrusion process. Processing of rice ragi pasta includes wet grinding of the rice and millet to fine flour, conditioning it with the addition of water. Rice flour from the popular Pooja variety, prepared using the cold water grinding method, is blended with ragi flour in the mixing compartment of a pasta-making machine. The mixture is then conditioned by adding water and mixing for 30 minutes before being extruded through a Conchiglie rigate Die. The Pasta is allowed to be steamed for 10-15 minutes for gelatinization and then dried in a tray drier for 6 hours at 50°C.

Main Product and By-products

The pasta yield is 99%, with a negligible by-product yield of 1%.

Benefits and Distinctive Features of Technology/Product

- This pasta is an excellent choice for individuals who are mindful of their dietary intake.
- Ragi flour provides a rich array of essential nutrients, including vitamin C, vitamin E, B-complex vitamins, iron, calcium, antioxidants, proteins, fiber, sufficient calories, and beneficial unsaturated fats.
- The pasta is convenient and easy to prepare
- Using rice flour instead of wheat or refined wheat flour offers a highly nutritious and suitable alternative for those with gluten sensitivities.
- The product has a shelf life of three months, with ongoing shelf life studies.

5. RICE MILLET PASTA (Micronutrients Rich)

Description of the Technology (for all millets)

Pasta, a Ready-to-Cook (RTC) product, is made using cold extrusion of wheat semolina. Advances in technology have now enabled the production of commercial pasta from rice and millet, enhancing its nutritional benefits.

Micronutrients rich Rice pasta can be prepared by incorporation of rice flour as a source of gluten free alternative and fortifying with composite millet flour like Jowar/Sorghum to add additional nutritional benefits and acceptability through extrusion process. Processing of rice millet pasta includes wet grinding of the rice and millets to fine flour, conditioning it with the addition of water. Rice flour of popular rice variety (Pooja) (prepared using cold water grinding method) and composite millet flour (mixture of sorghum and jowar) are blended in the mixing compartment of the pasta making machine and mixed with water for 30 minutes for conditioning and extruded using a Gemelli Die).

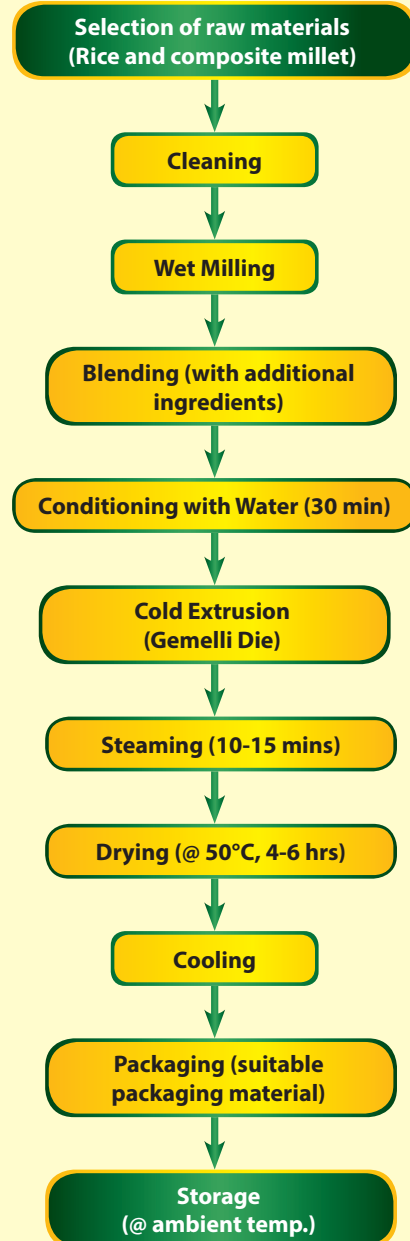
The Pasta is allowed to be steamed for 10-15 minutes for gelatinization and then dried in a tray drier for 6 hours at 50°C.

Main Product and By-products

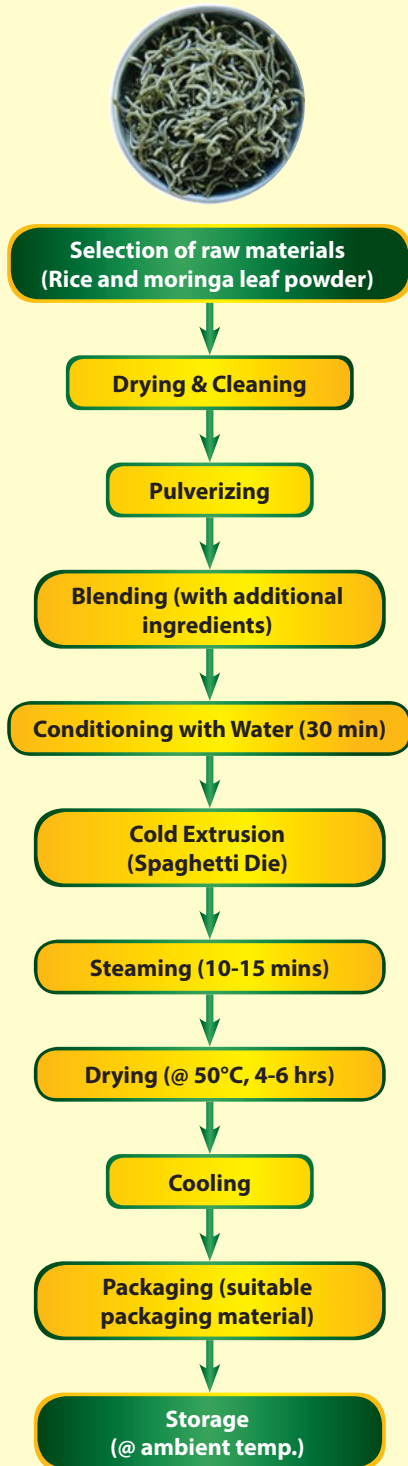
The pasta yield is 99%, with a negligible by-product yield of 1%.

Benefits and Distinctive Features of Technology/ Product

- This pasta is perfect for individuals who are mindful of their dietary intake.
- Composite millet flour contains a wide range of essential nutrients, including vitamin C, iron, and magnesium, Potassium, Sodium, proteins, dietary fibers, sufficient calories and useful unsaturated fats.
- Pasta is one of the convenient product in terms of easy preparation
- Rice flour replaced with wheat/refined wheat flour are highly nutritious and better alternative source for the people allergic to gluten diet.
- It has shelf life of three months and shelf life study is in progress.



Process flowchart for production of Rice Millet Pasta



6. MORINGA RICE NOODLES (Anthocyanin & Micronutrients Rich)

Description of the Technology

Moringa Rice Noodles are a nutritious, gluten-free product prepared by cold extrusion, incorporating rice flour from popular rice variety like Pooja and Moringa leaf powder for enhanced nutritional benefits. The process begins with wet grinding the rice to a fine flour, followed by conditioning with water. The rice flour is blended with Moringa powder in the mixing compartment of the pasta making machine, where it is mixed with water for 30 minutes. The mixture is then extruded using a Spaghetti die, steamed for 10-15 minutes for gelatinization, and dried in a tray dryer at 50°C for 6 hours, resulting in some nutrient-dense noodle rich in vitamins, minerals and antioxidants.

Main Product and By-products

The noodle yield is 99%, with a minimum by-product yield of 1%

Benefits and Distinctive Features of Technology/Product

- Cold Extrusion ensures nutrient retention, making these noodles a unique and healthier choice.
- Ideal for health-conscious individuals, offering a nutrient-rich, gluten-free alternative.
- Enriched with Moringa, providing vitamin A, C, E, calcium, iron, potassium, and dietary fibers.
- Suitable for those with gluten allergies or sensitivities, replacing traditional wheat noodles.
- Easy to prepare, retaining the convenience of conventional noodles
- Three-month shelf life with ongoing studies for further stability.

7. BEETROOT RICE NOODLES (Anthocyanin & Micronutrients Rich)

Description of the Technology

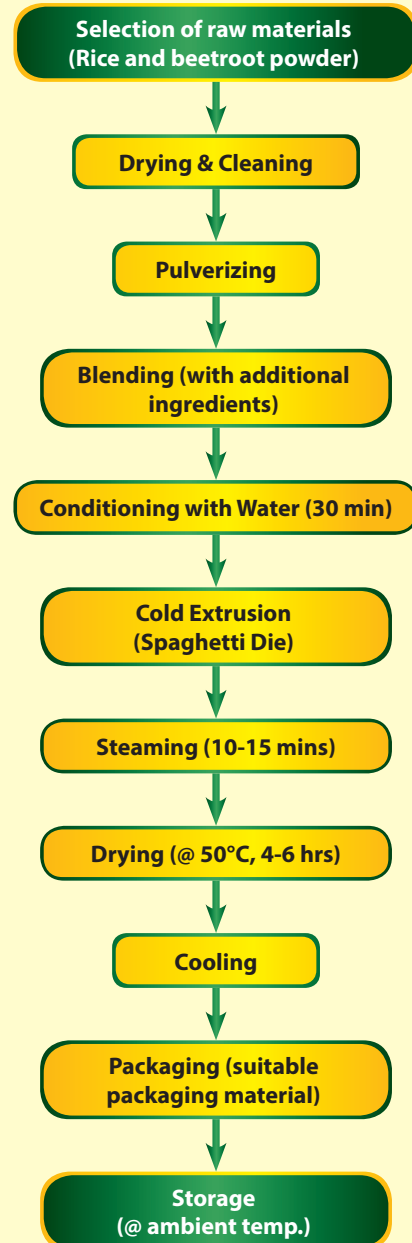
Beetroot Rice Noodles are a wholesome, gluten-free option created using cold extrusion technology, which combines rice flour from the widely-used Pooja variety with beetroot powder to boost nutritional value. The production process involves finely grinding the rice, then conditioning it with water. This rice flour is mixed with beetroot powder in a pasta machine for 30 minutes. The conditioned mixture is then extruded through a Spaghetti die, followed by a steaming process lasting 10-15 minutes to achieve gelatinization. Finally, the noodles are dried at 50°C for 6 hours in a tray dryer, resulting in a product rich in essential nutrients, including vitamins, minerals, and antioxidants.

Main Product and By-products

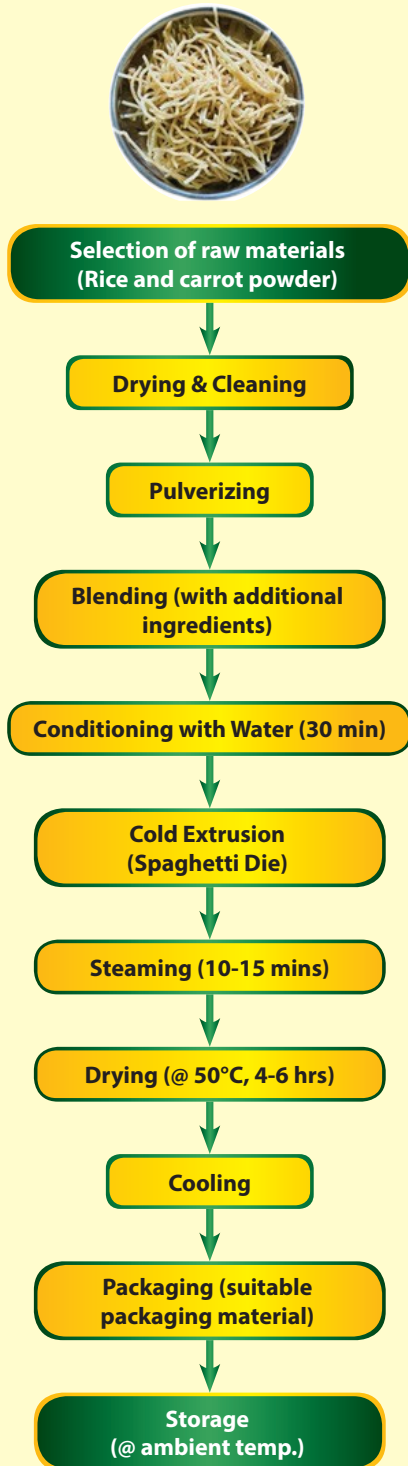
The yield of noodles is 99%, with a negligible by-product yield of 1%.

Benefits and Distinctive Features of Technology/Product

- The cold extrusion process helps preserve vital nutrients, setting these noodles apart as a healthier alternative.
- Ideal for those mindful of their diet, offering a gluten-free option packed with essential nutrients.
- Enhanced with beetroot, delivering a rich supply of vitamins A, C, iron, potassium, and fiber.
- An excellent substitute for conventional wheat noodles, suitable for those with gluten sensitivities.
- User-friendly and convenient to prepare, maintaining the ease of traditional noodle products.
- Stable for up to three months, with further research underway to extend shelf life.



Process flowchart for production of Beetroot Rice Noodles



8. CARROT RICE NOODLES (Anthocyanin & Micronutrients Rich)

Description of the Technology

Carrot Rice Noodles are a healthy, gluten-free alternative, produced through cold extrusion, blending rice flour from the widely preferred Pooja variety with carrot powder to enhance nutritional content. The manufacturing process begins with finely grinding the rice, followed by hydrating it with water. The rice flour is then combined with carrot powder in a pasta-making machine and mixed for 30 minutes. The prepared mixture is extruded using a Spaghetti die, steamed for 10-15 minutes for proper gelatinization, and finally dried in a tray dryer at 50 °C for 6 hours, resulting in noodles that are rich in essential vitamins, minerals, and antioxidants.

Main Product and By-products

The noodle yield is 99%, with a negligible by-product of 1%.

Benefits and Distinctive Features of Technology/Product

- Cold extrusion preserves key nutrients, offering a healthier noodle option.
- Ideal for individuals who prioritize nutrition, providing a gluten-free choice enriched with essential nutrients.
- Enhanced with carrot, supplying ample vitamins A, C, potassium, and fiber.
- Serves as a superior gluten-free alternative to traditional wheat noodles, suitable for those with gluten intolerance.
- Convenient to cook, maintaining the ease of preparation typical of standard noodles.
- Shelf life extends up to three months, with further research being conducted to enhance longevity.

II. Ready-to-Eat (RTE) Extruded Products

9. RICE DAL EXTRUDATE (Protein Rich)

Description of the Technology

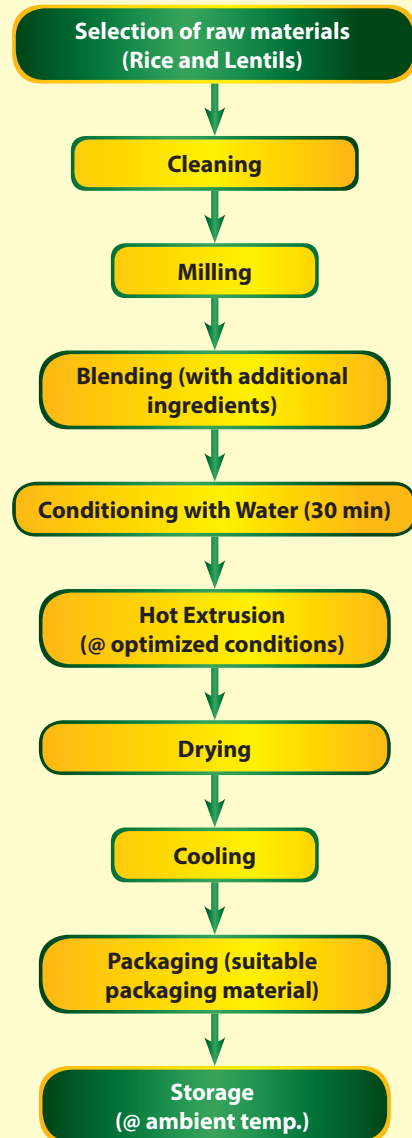
Rice Dal Extrudate Snacks are Ready-To-Eat products made using a twin-screw hot extruder, where heat and extrusion applied together to form a shaped, cooked snack through round dies. Unlike traditional corn-based snacks, these are produced from a combination of rice, and lentils (dal). The mixture is thoroughly blended and processed through the twin-screw extruder, resulting in expanded snacks that are ready to eat and rich in protein content. These snacks can be flavored with a variety of spices to create different taste profiles.

Main Product and By-products

The yield of extrudate snacks is 90%, with a by-product yield of 10%.

Benefits and Distinctive Features of Technology/Product

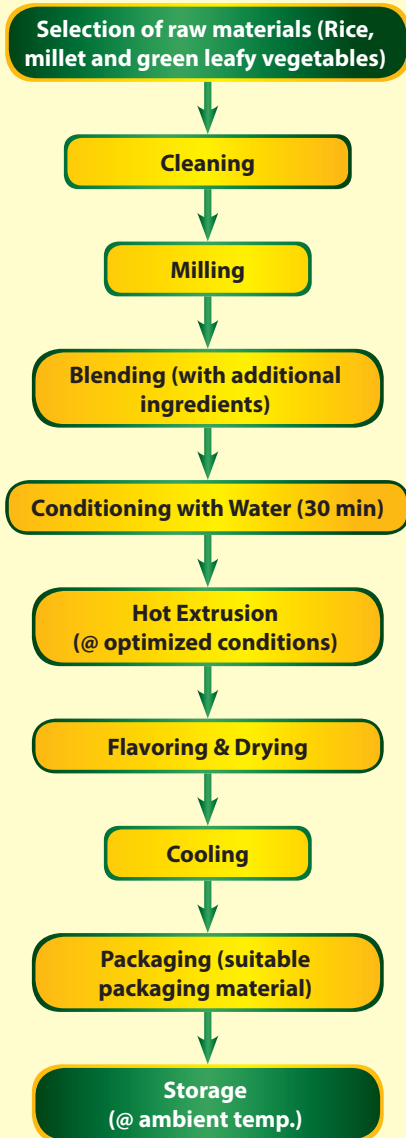
- The extrudates have a color range from light yellow to pale cream due to the addition of dal and has a crispy texture.
- Ideal for evening snacks.
- These snacks are packed with protein, dietary fiber, iron, zinc, and magnesium.
- The product has a shelf life of 6 months, with additional studies underway to further evaluate its shelf stability.
- Available in variants like masala-coated for added flavor.



Process flowchart for production of Rice Dal Extrudate



Process flowchart for production of Rice Millet Extrudate



10. RICE MILLET EXTRUDATE (Anthocyanin Rich)

Description of the Technology

Rice Millet Extrudate Snacks, fortified with green leafy vegetables and rich in anthocyanins, are Ready-To-Eat products created using a twin-screw hot extruder. This technology applies heat and extrusion simultaneously to shape and cook the snacks through round dies. These extrudates are made from a blend of rice and millet, enriched with the nutrients from green leafy vegetables. The mixture is thoroughly blended and processed through the twin-screw extruder, resulting in expanded, nutrient-dense snacks that are ready to eat. They can be seasoned with various spices to provide different flavor profiles.

Main Product and By-products

The yield of extrudate snacks is 90%, with a by-product yield of 10%.

Benefits and Distinctive Features of Technology/Product

- The extrudates feature a range of colors from deep purple to green due to the anthocyanins and green leafy vegetable content, and have a crispy texture.
- Ideal for evening snacks, offering both nutritional benefits and convenience.
- Rich in anthocyanins, protein, dietary fiber, iron, zinc, and magnesium.
- The product has a shelf life of 6 months, with ongoing studies to further evaluate and potentially extend its stability.
- Available in flavor variants, including masala-coated options, for enhanced taste.

11. LOW COST RICE MILLET EXTRUDATE (Nutrient Rich)

Description of the Technology

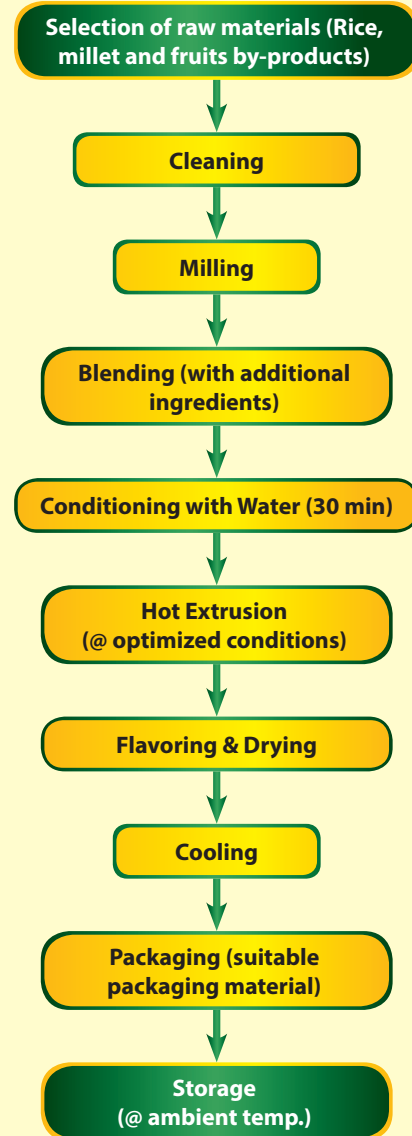
Low-Cost Rice Millet Extrudate Snacks, fortified with by-products from the fruit juice industry, are Ready-To-Eat products produced using a twin-screw hot extruder. This process combines heat and extrusion to shape and cook the snacks through round dies. The snacks are made from a blend of rice and millet, enriched with nutrients from fruit juice by-products. The ingredients are thoroughly mixed and processed through the extruder, resulting in expanded, cost-effective snacks that are rich in nutrients. These snacks can be flavored with various spices to create diverse taste profiles.

Main Product and By-products

The yield of extrudate snacks is 90%, with 10% as by-products.

Benefits and Distinctive Features of Technology/ Product

- The extrudates feature a range of colors influenced by the fruit juice by-products and have a crispy texture.
- Economical production, making it a cost-effective snack option.
- Nutrient-rich, incorporating the benefits of rice, millet, and fruit juice by-products.
- Provides protein, dietary fiber, iron, zinc, and magnesium.
- The product has a shelf life of 6 months, with ongoing research to further assess and enhance stability.
- Available in various flavor variants, including masala-coated options for added taste.



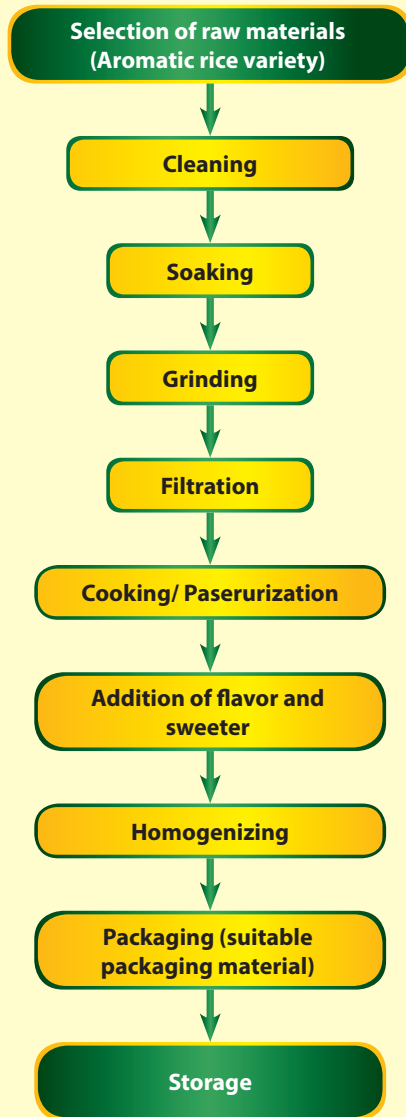
Process flowchart for production of Low Cost Rice Millet Extrudate



III. Ready-to-Serve (RTS) Rice based Beverages



Process flowchart for production of Flavored Rice Milk



12. FLAVORED RICE MILK (All Flavors)

Description of the Technology

Flavored Rice Milk made from aromatic rice varieties of NRR1 is a Ready-To-Serve product developed using a specialized process that extracts and enhances the natural flavors of high-quality aromatic rice. The production begins with soaking and grinding aromatic rice, followed by extraction to obtain a smooth, milk-like liquid. This rice milk is then flavored with different flavors such as cardamom, kesar, chocolate, and vanilla essence to develop a variety of flavor profiles. The resulting product is enriched with the distinctive aroma and taste of the rice, offering a flavorful, dairy-free beverage option.

Main Product and By-products

The yield of rice milk is 90%, with a by-product yield of 10% as residual rice solids.

Benefits and Distinctive Features of Technology/ Product

- Features a distinct aroma and flavor profile from premium aromatic rice varieties.
- Provides a dairy-free alternative suitable for various dietary preferences.
- Enriched with the natural nutrients of rice, including vitamins and minerals.
- Ideal for a refreshing, health-conscious beverage option.
- Shelf life is approximately 3 months, with ongoing studies to further extend stability.
- Available in multiple flavor variants, offering diverse taste experiences.

IV. Bakery Products

13. RICE COOKIES (All Variations)

Description of the Technology

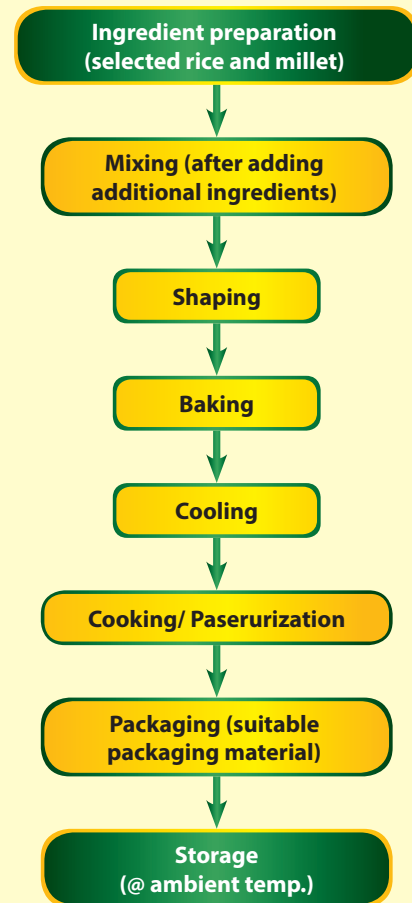
With the modern lifestyle demanding quick and convenient meal options, bakery products like cookies, bread, and cakes have become popular. As consumers increasingly favour healthier alternatives, there is a notable shift towards Rice and millet-based bakery items. At NRRRI, rice cookies have been developed using specialty rice varieties such as high-protein rice, high-zinc rice, and black rice, combined with millet flour to enhance nutritional content. The preparation process involves standardizing the cookies with a blend of these specialty rice varieties and millet flour. The dough is mixed using a planetary mixer, formed into different shapes using cutters, and baked in a conventional oven.

Main Product and By-products

The yield of cookies is 92%, with 8% as by-products, including dough residue, broken cookies, or unbaked portions.

Benefits and Distinctive Features of Technology/Product

- Utilizes specialty rice varieties and millet fortification for improved nutritional value.
- Rich in key nutrients such as protein, zinc, and dietary fiber.
- Lower in sugar and fat compared to traditional market options.
- Packed with magnesium, zinc, iron, and protein.
- Suitable for all age groups, with a shelf life extending up to 6 months.



Process flowchart for production of Rice Cookies

V. Ready-to-Use Instant Mixes

Process flowchart for production of Rice Idli Premix



14. RICE IDLI PREMIX (Selected Rice Varieties)

Description of the Technology

In today's fast-paced world, where time is a precious commodity, "Instant Foods" have become a crucial part of daily life. While instant and ready-to-reconstitute foods are well-established in Western countries, there is a growing need to adapt traditional foods into convenient formats. At NRI, research has focused on developing rice-based instant mixes to meet this demand.

Idli, a traditional South Indian breakfast item, is typically made from rice semolina and ground pulses, and is served with chutney or spiced vegetable fillings. We have developed an instant rice idli premix that simplifies the preparation process. The premix is made using rice semolina, black gram dhal, and salt.

All ingredients are uniformly blended, and the premix is packaged in MPET material to ensure freshness. This instant rice idli mix significantly reduces the time required for batter preparation.

Shelf Life

- 3 months at ambient temperature

Benefits and Distinctive Features of Technology/Product

- Convenient preparation with reduced batter preparation time.
- Ideal for quick and nutritious meal options, preserving the traditional taste and benefits.

15. RICE DOSA PREMIX (Selected Rice Varieties)

Description of the Technology

In today's fast-paced lifestyle, where time is highly valued, "Instant Foods" have become integral to daily living. While instant and ready-to-reconstitute foods are common in Western countries, there is a growing need to convert traditional foods into convenient forms. NRRI has focused on developing an instant rice dosa premix to address this need.

Dosa is a popular South Indian dish, typically made from fermented rice and lentil batter. Our instant rice dosa premix simplifies the preparation process by combining rice flour, urad dal flour, dal, pulse, fenugreek and salt.

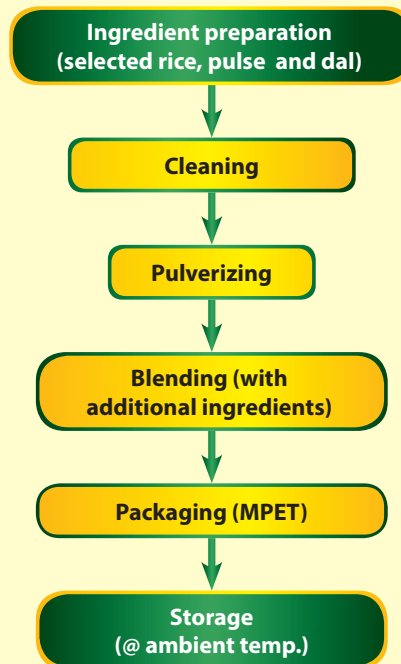
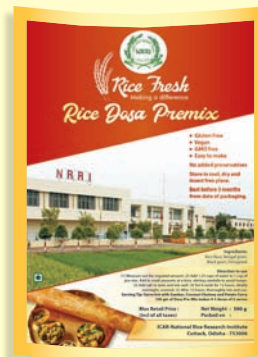
The ingredients are carefully blended, and the premix is packaged in MPET material to maintain freshness. This premix allows for the quick preparation of dosas without the lengthy fermentation process.

Shelf Life

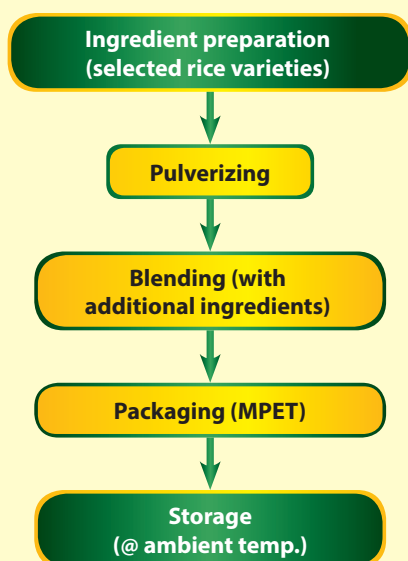
- 3 months at ambient temperature storage

Benefits and Distinctive Features of Technology/Product

- Provides a quick and convenient way to prepare dosas, avoiding the need for batter preparation.
- Enriched with essential nutrients, including calcium, iron, and protein.
- Higher in nutritional value compared to conventional dosa mixes.
- Ideal for busy individuals seeking a nutritious and traditional meal with minimal preparation time.



Process flowchart for production of Rice Dosa Premix



16. COMPOSITE RICE FLOUR (All Varieties)

Description of the Technology

In our fast-paced world, where convenience is key, “Instant Foods” are increasingly important in everyday life. While instant and ready-to-reconstitute products are prevalent in Western markets, there is a need to adapt traditional foods for ease of preparation. At NRRI, we have developed a ready-to-use composite rice flour to meet this demand.

This composite rice flour combines high-quality rice flour with selected nutrient-rich ingredients, such as millets and pulses, to enhance its nutritional profile. The blend is processed to ensure a consistent quality and is packaged in MPET material to preserve freshness and extend shelf life.

Shelf Life

- 6 months at ambient temperature storage

Benefits and Distinctive Features of Technology/Product

- Offers a convenient and versatile alternative to traditional rice flour, suitable for a wide range of recipes.
- Enriched with additional nutrients from incorporating speciality rice varieties like high protein rice and high zinc rice.
- Simplifies traditional pithas preparation with a ready-to-use format, saving time and effort.
- Higher in nutritional value compared to regular rice flour, supporting better overall health.
- Ideal for quick and nutritious cooking, maintaining the traditional taste while enhancing dietary benefits.

WAY FORWARD

As we continue to innovate and expand the horizons of rice value-added products, several key areas offer exciting opportunities for future development:

1. **Enhanced Nutritional Profiles:** We will explore further fortification and enrichment of our products with additional micronutrients and functional ingredients to address specific dietary needs and health benefits.
2. **Sustainability and Waste Reduction:** Future projects will focus on utilizing by-products and waste materials more efficiently, minimizing environmental impact and contributing to sustainable food production practices.
3. **Consumer Preferences and Trends:** Ongoing research will be dedicated to understanding evolving consumer preferences and trends, allowing us to tailor our products to meet diverse tastes and dietary requirements.
4. **Technological Advancements:** We will continue to invest in cutting-edge technology and research to enhance the quality, efficiency, and scalability of our production processes, ensuring that our products remain at the forefront of the industry.
5. **Global Expansion:** Plans are underway to explore and adapting our products to meet global standards and preferences, thereby expanding our reach and impact.
6. **Collaborative Partnerships:** We aim to forge strategic partnerships with industry leaders, research institutions, and culinary experts to drive innovation and bring new, exciting products to the market.

By focusing on these areas, we are committed to further advancing the field of rice value-added products, delivering high-quality, nutritious, and convenient solutions that meet the needs of today's dynamic and health-conscious consumers.









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