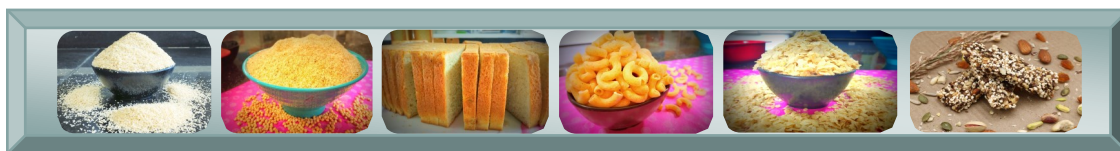


# Millets Based Value Added Product Technologies

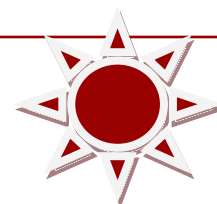
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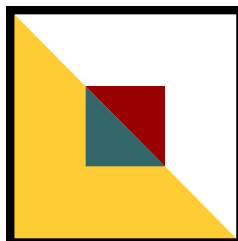
Nutrihub



**Nutrihub**

Rajendranagar, Hyderabad - 500030  
Telangana, India  
<http://www.millets.res.in>





# 1. Main Course

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## 1. JOWAR RICH MULTI GRAIN ATTA

The availability of advanced technology made it feasible to produce commercial products out of multi millets, cereals & pulses. Multigrain atta usage and its availability are also extending day by day and slowly replacing the Wheat Atta, because of its high nutritional benefits. Sorghum rich multigrain atta is developed with multigrain by using milling process/technology. It is recommendable to old age people and obese people.



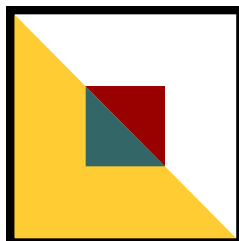
Jowar Rich Multigrain Atta



Proso Millet Rice

## 2. Proso millet rice

Proso millet rice” is prepared with Proso millet grains by using “Dehulling technology.” Dehulling is a process of removing the husk from the starchy endosperm by operating different types of machinery with other sub-technologies like pre-cleaning, dehulling, husk separation & packaging processing. Proso millet consists high amount of lecithin and Niacin, fiber, and antioxidants and acts as prebiotic. These are stored up to 6 months in vacuum packaging. It can consume as main course.



# 1. Main Course

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### 3. Little millet rice

To manufacture little millet rice," "Dehulling technology" is applied using the dehuller machine. Here the husky layer is removed, where it is unpalatable. Sieving is also very important to separate husk and millet rice. This is generally done by the sequence of pre-cleaning, dehulling, husk separation & packaging processing. Little Millet has an excellent B-vitamin source, minerals like calcium, iron, zinc, potassium, and provides essential fats to the body. Its high fiber content is yet another positive, making it an ideal part of curd rice or kheer instead of rice. Its cooked rice is very fluffy, and children can easily consume it. It can be stored in vacuum packaging for six months.



**Little Millet Rice**

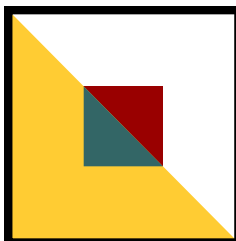


**Kodo Millet Rice**

### 4. Kodo millet rice

Kodo millet rice" is manufactured by removing the Kodo millet's husky layer using small millets dehuller. Kodo millet helps in weight loss. Kodo millet is rich in B vitamins, especially Niacin, B6, folic acid, and minerals like calcium, iron, potassium, magnesium, and zinc, full of help for body metabolism. Kodo millet rice is convenient, easy to cook, low cost, and has a relatively six-months shelf life. It can be consumed as tasty rice items like curry leaves millets rice, flavored millets rice, etc.





# 1. Main Course

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## 5. Barnyard millet rice

Barnyard millet rice is processed by using the dehulling process. This is generally done by the sequence of pre-cleaning, dehulling, husk separation & packaging processing. Barnyard Millet is a fair source of protein, highly digestible, and is an excellent source of dietary fiber with reasonable amounts of soluble and insoluble fractions. It is most effective in reducing blood glucose and lipid levels. Its cooked rice is in fluffy texture. It is useful in making rice items like kheer, pulao, kichadi, methi rice, etc.



**Barnyard Millet Rice**



**Foxtail Millet Rice**

## 6. Foxtail millet rice

Foxtail millet rice is manufactured using “Dehulling technology” using small millets dehuller machine. It is a rich source of protein, fiber calcium magnesium, and vitamins, Foxtail millet, with a sweet, nutty flavor, provides a host of nutrients and is considered one of the most digestible and non-allergic grains available. The scrumptious Bisibele bath and tasty sweet Pongal can be prepared with foxtail millet rice.

## 7. Sorghum Instant Kichidi mix

Instant mixes are needed for all segments of the population, including armies, railways, and even patients. The convenience foods meet the busy lifestyles. In the popularization of millets journey, many millet-based instant products are developed like Sorghum Instant Kichidi mix. It is ready to cook and pack with nutrients like protein, dietary fiber, and other micronutrients. This developed by combining many technologies like soaking, roasting, drying, milling, sieving, dry blending, and packing. It has a very relishing taste and acceptable mouth feel. So, Sorghum Instant Kichidi mix is the best example for quick, healthy, and tasty food.



Sorghum Instant Khichidi Mix

## 2. Breakfast foods

### 8. Finger millet Vermicelli

Cold extrusion technology manufactures the “Ragi Vermicelli” using a blend of ragi semolina and suji rawa. Cold extrusion technology is when a set of mixed ingredients are forced through an opening in a perforated plate or die. Die design is specific to the food and is then cut to a specified size by blades. The procedure of Ragi Vermicelli consists of adding water to the semolina made from whole ragi and wheat to make homogenous mass. The mass is placed in the extruder and moved towards the lower end of the die as an outlet. This moist product should go to the drying process as a shelf-life enhancement. Ragi is exceptionally rich in calcium and iron contents. It is used to make delicious kheer and tasty pulihora. Ragi vermicelli can be stored for six months at ambient temperature



Finger Millet Vermicelli

### 9. Jowar vermicelli

Vermicelli is widely consumed throughout the world, and its global consumption is greater. “Jowar Vermicelli” is prepared with Jowar grains by using “Cold extrusion technology.” It is carried out at room temperature or at marginally elevated temperature. The procedure of Jowar vermicelli consists of adding water to the semolina made from whole sorghum and wheat to make homogenous mass. The mass is then placed in the extruder and moved towards the perforated die. It is the fast-growing sector of the food industry due to its convenience, ease of cooking, low cost, and relatively good shelf life of 6 months. Jowar vermicelli usage and its availability are also extending day by day and slowly replacing the Wheat Vermicelli. The use of Jowar Vermicelli is in everyday foods such as healthy breakfast, delicious sweets, and desserts.



Jowar Vermicelli



## 2. Breakfast foods

### 10. Jowar pasta

With an increase in popularity worldwide, pasta has crossed all the borders and is now a popular form of fast food. “Jowar Pasta” is manufactured with Jowar grains by using “Cold extrusion technology.” It is carried out room temperature and no external application of heat. It falls under the category of cold-extruded products. It is a beneficial product due to its convenience, ease of cooking, low cost, and relatively good shelf life for six months at ambient conditions.



Jowar Pasta

### 11. Foxtail millet Vermicelli

Vermicelli in India is pretty pervasive as a traditional dish. Challenges are heading in the development of millet foods with value addition, convenience, and health promotion. In that foxtail, millet-based vermicelli is one of them and developed using cold extrusion technology in cold extruder equipment. It has an excellent nutritional profile and health benefits. The textural properties and mouthfeel of foxtail vermicelli are par good. The use of Foxtail millet vermicelli is in everyday foods such as healthy breakfast, delicious sweets, and desserts.



Foxtail millet vermicelli

## 2. Breakfast foods



**Foxtail Millet Pasta**

### 12. Foxtail millet Pasta

Pasta's unique profile as a low-cost, convenient, versatile, nutritious food with a longer shelf-life, and it is consumed globally. In the current generation and future, a healthy based pasta will gain good demand and marketing. So, according to this, foxtail millet pasta is the best example and is hugely accepted by the people due to its excellent health benefits. It is a blend of wheat and foxtail millet. It is rich in protein, fiber, and iron. The texture characteristic is worthy, and it has the right appealing yellow color. It can serve as a good breakfast with cheese or any masala flavors.

### 13. Jowar Instant Idli mix

Jowar coarse semolina is made through milling and blending technology. This is generally done by the sequence of cleaning, soaking, drying, grinding, sieving, roasting & cooling processing. This comes under instant products; the cooking time is just 30 minutes from mixing to serving idlis. It has reduced the regular idli making process. It can serve as a healthy and tasty product for all age group people. Its visibility is coming in the market and best replacer of rice idlis. It has a good shelf life for nearly six months.



**Jowar Instant Idli Mix**





Foxtail Millet Pasta

#### 14. Millet Instant idli mix

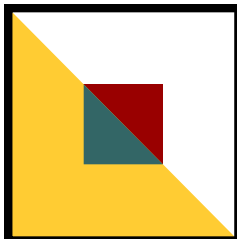
Instant Multi millet idli mix is developed by milling and roasting processes. Multi millet grain products must be, of course, offers maximum nutritional health benefits. It is rich in protein and dietary fiber levels. It is a convenient food that can readily cooked and beneficial for current generation people. A product is packed with a combination of packed nutrients and taste. These idlis are soft in texture like rice idli.



Instant Jowar Pongal Mix

#### 15. Instant Jowar Pongal mix

Instant Jowar Pongal mix is made through different food processing technologies. Likewise, soaking, milling, roasting by using various equipment. Instant Jowar Pongal mix is available in the market, gradually gaining a keen interest in consumption by people. Its texture is soft as well as grainy. It resembles like rice and tastes good with a peppery flavour. The cooking time is minimum and healthy. It suggestable product for diabetic people and obese persons. Its storage time is 12 months at ambient conditions.



## 2. Breakfast foods

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### 16. Instant Jowar Upma mix

Upma is a very regular breakfast and consumed mainly by the Indians. So, to make it healthier, Jowar has been replaced with wheat with minimum cooking time using various technologies like milling and roasting techniques. Instant Jowar Upma mix is highly nutritious, balances the sugar levels and feels fullness. Its taste is good with aromatic flavors.



Instant Jowar Upma Mix



Sorghum Muesli

### 17. Sorghum Muesli

The "Sorghum Muesli" is manufactured through mainly "Extrusion Flaking technology." The necessary process involves pre-cleaning, conditioning of grains, flaking & roasting of Sorghum, and blending with nuts & honey coating. Here, the product's specialty is 100 % natural, preservative-free product, a gluten-free, right amount of dietary fiber that is beneficial to health-conscious consumers. So, any age group people consumers can rely on this particular health-based Sorghum Muesli. It comes under healthy based Ready-to-eat (RTE) and specialty product category, which has high demand in the world. They have good demand in the market.

### 3. Snack foods

#### 18. Jowar Puffs

“Jowar Puffs” are prepared with Jowar grains by using “Popping technology.” The process requires decorticated grains, and the resulting product has highly desirable functional and sensory qualities. Puffing is an inexpensive processing method that can be employed to make sorghum-based novel foods suitable for human consumption for use. Pops is a pack of nutrients with improved starch and more protein digestibility. High digestibility of Sorghum puffs may be part of the rationale for the traditional use of flour from popped sorghum as easily-digested food for young and older people. Its shelf life is 2-3 months. Flavors like cream onion, tomato, turmeric & salt, mint, chat masala were acceptable for these sorghum puffs.



Jowar Puffs

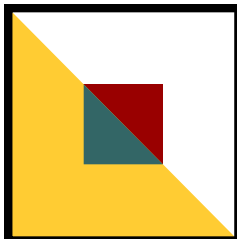
#### 19. Pearl millet Puffs

The "Pearl millet Puffs" are manufactured through "Puffing technology." Puffing is a similar process; it differs from popping as a process in which controlled expansion of kernel is carried out, while the vapor pressure escapes through the grain structure's microspores due to high pressure. Popping and puffing impart pleasant taste and desirable aroma to the snacks. There are different popping/puffing methods used viz., the conventional method of dry heat, sand and salt-treated, hot air popping, gun puffing, popping in hot oil, and microwave heating. Therefore, puffing and popping using advanced technologies are processes, which can accomplish all these targets. So, any age group people consumers can rely on these particular health-based snacks. It comes under Ready-to-eat (RTE) product category, which has high demand in the world. They are relatively lightweight, and convenient to shipping.



Pearl Millet Puffs





## 3. Snack foods

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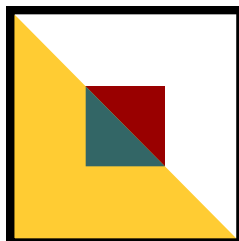
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### **20. Sorghum extrudate snack**

Especially children and young people mostly prefer Ready to eat (RTE) extrudate snacks. A healthy addition to these snacks makes excellent support to their well-being status. Hot extrusion cooking is a high-temperature short-time (HTST) process that reduces microbial contamination and inactivates enzymes. So, developed and standardized Sorghum extrudate snacks using hot extrusion technology. It is cooked during processing at higher temperatures. It has excellent starch, protein, and fiber digestibility nature. It is tasty, light in texture snack, and can be irresistibly yummy with cheese, mint masala, and creamy flavors.



**Sorghum Extrudate Snack**



## 4. Bakery & Confectionery

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### 21. Finger millet cookies

The “Ragi cookies” are manufactured through “Baking technology.” The necessary process involves mixing ingredients until the flour is converted into a stiff and soft dough, followed by baking where the dough is transferred into crispy Ragi cookies. Ragi cookies are rich in minerals like calcium and iron. Ragi cookies are popular RTE bakery products. Their usage and availability are also ranging day by day, which delivers in both taste and health. It can be stored for up to six months. So, any age group people consumers can rely on these particular health-based cookies.

### 22. Ragi Cake

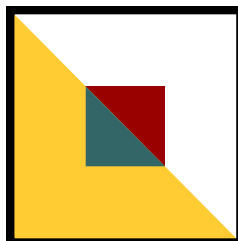
Ragi is super healthy and equally tasty grains, also functions as alternatives to cereals. The increase in society's awareness about lifestyle disorders has created a new trend in which consumers are starting to demand healthier products like Ragi cake, which is one of them. This is pure millet-based cake, and it is loaded with the right amount of nutrients like calcium. The sensory profile of ragi chocolate cake is highly acceptable with its spongy texture and rich chocolaty flavor. The shelf life of this cake is five days with sealing conditions.



**Finger Millet Cookies**



**Ragi Cake**



## 4. Bakery & Confectionery

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### 23. Ragi Pizza Base

Pizza is one of the most common foods due to its wonderful taste. To satisfy modern people and with a health point of view, Ragi pizza has been developed with a convenience concept. This pizza processing time has reduced to a minimum. It is packed with functional proteins and dietary fiber. The texture of this product is soft and pliable. Its taste will improve after topping with cheese and veggies. Its shelf life is about six days at chilling temperature.



**Ragi Pizza Base**

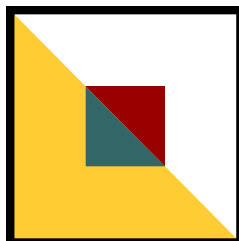
### 24. Ragi Bread

In the bakery division, Ragi's processed food products are emerging, such as bread, bun, cookies, and some other multiple varieties, mainly to provide a healthy diet to emerging health-conscious consumers. Ragi Bread is made through Baking technology. Baking is a process of cooking food that uses prolonged dry heat, usually in ovens. Heat is generally transferred from the surface to its center. This is generally done by the sequence of sieving, mixing, baking, and cooling. It has spongy texture and good mouth feel. Ragi bread is loaded with many nutrients, which are beneficial to all kinds of age-people.



**Ragi Bread**





## 4. Bakery & Confectionery

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### 25. Jowar Bread

Jowar is rich in fiber; it helps lower the LDL (bad cholesterol) and, in turn, reduces cardiovascular diseases. There is an urge to make millets inclusion in the food basket to eradicate these diseases. Jowar bread is one of the finest products in millets value-added products and rich in protein and dietary fiber. This is generally done by the series of processing's like sieving, mixing, double proofing, kneading, shaping, baking, cooling, and slicing. The sensory characteristics of Jowar bread are par good. Its texture is soft, and the taste is acceptable. It contains vanilla flavor, where it masks the grainy millet flavor. Tutti Frutti can also be added to improve its acceptance. This is mainly to provide a healthy meal to emerging health-conscious consumers.



**Jowar Bread**

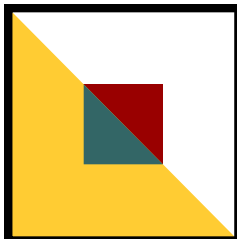


**Jowar Jeera cookies**

### 26. Jowar Jeera cookies

Cookies are baked delights. A cookie is a small sweet, crispy, most often made with flour, sugar, fat, and some other leavening ingredients using baking techniques. It is a popular snack in the world. So, Jowar jeera cookies are developed to include healthy based cookies in the bakery goods. These cookies are gluten-free, rich in protein and dietary fiber. Its taste is bit salty & sweet and has an excellent crispy bite. It can serve as a generic evening snack.

loaded with many nutrients, which are beneficial to all kinds of age-people.



## 4. Bakery & Confectionery

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### 27. Multi millet bread

The main aim of Multi millet bread is to expand the millet-based products and increase its market availability. It is developed by using baking technologies and proofing technologies. It has numerous health benefits. Multi millet grain bread has high dietary fiber, and so it is healthier than cereal bread. The texture properties are moderately good with a sweet taste. Multi millet bread is much recommended for obese people.



**Multi Millet Bread**

### 28. Jowar choco chip cookies

Celiac disease is one of the serious global health issues. Here, millets can be the best food resources for the Celiac people. Choco chips are super delicious, and the world's favorite snack. By combining, millets with choco chips results in super healthy and chewy choco-chip cookies. These cookies are gluten-free and high in protein profiles. The texture of the cookies are crispy and has appetizing flavor.



**Jowar choco chip cookies**

## 4. Bakery & Confectionery

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### 29. Multi Millet Cookies

Cookies are small, sweet, and familiar global snacks. The inclusion of millets through cookies can positively contribute to consumer well-being and reduce malnutrition problems across the world. The use of multi-grains is well established in other food sectors, particularly bakery and breakfast cereals. The synergy of many millets provides impressive health benefits with a delightful taste. The “Multi millet cookies” are manufactured through “Baking technology.” It is free of gluten, rich in slow-releasing carbohydrates and good at dietary fiber levels.



Multi millet cookies



Barnyard millet puffs

### 30. Barnyard Millet Puffs

“Barnyard millet Puffs” are manufactured with barnyard millet grains using “Popping technology.” The currently available technology and machinery have led to this product development and standardized with white chocolate coated barnyard millet puffs. The process requires decorticated & polished grains, and the resulting product has highly desirable functional and sensory qualities. The Gun puffing machine comprises a heavy-duty rotary barrel-shaped machine with an opening on one end with provision to firmly close it with a lid on the other end. This is generally done by the sequence of pre-cleaning (grading, destoning & aspirations), dehulling, polishing, conditioning, puffing, roasting, coatings, and packing. It has milky white color and crunchy texture. It has nearly three months of shelf life. It is highly acceptable for children and adults.



## 5. Savory

### 31. Ragi Instant Vegetable Soup mix

"Ragi Instant Vegetable Soup mix" is developed with ragi flour and dried vegetables by using milling, sieving and drying technologies. The consumers' awareness about the health benefits, finger millet, has gained importance because of its functional components, such as slowly digestible starch and resistant starch. "Ragi Instant Vegetable Soup mix" is delicious and nourishing soup. It is loaded with high dietary fiber, calcium, and ragi content. It is delightful with peppery flavor. It is suitable for diabetic people and anemic women. The shelf life of the instant ragi soup mix is six months.

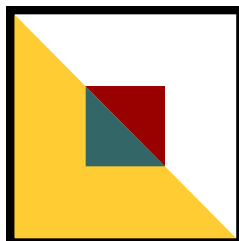


## 6. Beverages

### 32. Sorghum Lassi

The Lassi is a traditionally popular beverage and ready to drink (RTD) beverage. Lassi is a popular product close to sweet stirred curd that has been used as a refreshing beverage. Sorghum Lassi is developed using “Fermentation technology.” It contains probiotic organism and improves intestinal tract health, improves the immune system, synthesizing, and enhancing the bioavailability of nutrients. Commonly, there are two different types of Lassi, sweet and salty. It is prepared by stirring the whole curd into a delicious drink with sugar or salt, a small amount of cold water or ice to make the product flowable. The synergy of millet and dairy ingredients delivers the right amount of nutrients to the consumers and maintains their well-being.





## 7. Traditional/ Ethnic Foods

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### 33. Multi millet ladoo

Multi millet ladoo is manufactured with millets like sorghum, pearl millet, ragi, and foxtail millet using different technologies like pre-cleaning, dehulling, mixing, roasting, shaping, cooling, and packing. These steps make the millet into an acceptable product and to enhance its nutritional profile. Multigrain make a positive contribution to the taste and texture of products. Its taste is appealing and texture is soft. So, consumer readily accepts these kind of products.



Multi Millet ladoo



Sorghum Muruku

### 34. Sorghum Muruku

Muruku is a crunchy snack, although muruku is traditionally made with rice flour, and now it is replaced by sorghum flour to make it healthier. It is made with heat and oil treatment with sesame seeds and mung dhal, which enhances macro and s micronutrients as well. The texture of sorghum muruku is more similar to rice muruku, and the taste is very appreciable. The sorghum muruku color is golden brown and appealing.



## 8. Fortified foods

### 35. Zinc-rich Jowar Pasta

The manufacturing of Zinc-rich Jowar Pasta is done by adding water to the blend semolina made from whole sorghum and wheat to make homogenous mass forced through an opening in a perforated plate or die with a design specific (pasta shape) to the food and is then cut to a specified size by blades. Thus the process is called “Cold extrusion technology.” Additionally, sesame seeds are incorporated to enhance zinc levels. It is ready to cook, and have a relatively good shelf life at about six months at room temperature. Its cooked texture is moderately soft and white. Masala Jowar pasta is a suitable flavor and scrumptious too.



Iron rich jowar pasta

### 36. Iron-rich Jowar Pasta

Iron-rich Jowar Pasta is developed for anemic people keeping in view that to eradicate anemia. Here it is fortified with garden cress powder mainly to enhance the iron levels, using cold extrusion technology. Its cooking time is very less as it belongs to ready to cook category. Its texture is moderately insignificant to regular pasta. This product is acceptable and tasty with some veggies and masala.



Zinc rich jowar pasta

## 8. Fortified foods

### 37. Zinc-rich Jowar vermicelli

Fortification plays a significant role in combating nutrient deficiency diseases like malnutrition, kwashiorkor diseases. A product has been developed to increase the availability of millet-based fortified foods. Jowar vermicelli is fortified with sesame seeds, which are rich zinc content using versatile cold extrusion technology. It is ready to cook food made ease in cooking to the consumers and with the addition of healthy nutrients. It is rich in zinc and also loaded with high amounts of protein and good fats. It can consume as delicious desserts or a healthy breakfast.



Zinc rich jowar cookies

### 38. Zinc-rich Jowar cookies

To reduce malnutrition problems, the addition of millets to the people's food choices plays a crucial role. These specialties of the cookies are developed by the addition of processed sesame seeds using baking technology. Zinc-rich Jowar cookies are exceptionally good at its sensory characteristics as well as in its nutritional profile. It is richly dense with protein and zinc contents. It has a good shelf life, which is about four months.



Zinc rich jowar vermicelli



## 8. Fortified foods

**Nutrihub**

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### **39. Iron-rich Jowar vermicelli**

The anemic disease is a severe health issue for main women. Iron-rich jowar vermicelli is standardized with the addition of processed garden cress using novel cold extrusion technology. By the addition of this particular ingredient, iron levels are enriched. It is the fast-growing sector of the food industry due to its convenience, and its relatively better shelf life for six months.





## 9. Gluten free foods

### 40. JOWAR ATTA

The “Jowar Atta” (Pure Sorghum flour) is manufactured through “Milling technology.” The flour milling industry is a vibrant sector that combines traditional skills with high technology to produce a wide range of flours. It is the separation of bran and germ from the endosperm and the reduction of the hardy endosperm to the uniform particle size. Jowar atta is packed with a good amount of iron, a good amount of protein and fiber. It is a low glycemic index & fiber-rich food, so it is very friendly to diabetes. Jowar atta can be processed into roti, can be used as an ingredient in the bakery, snacks products, traditional sweets & savories, etc. Its shelf life is about three months at room temperature.



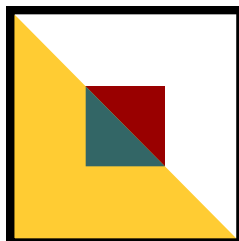
Jowar atta



Finger millet atta

### 41. FINGER MILLET ATTA

Finger millet is one of the better-known millets in India. Nowadays, its product became a part of a healthy regime in the new generation, especially finger millet atta. The “Finger millet atta” (Pure ragi atta) is manufactured through “Milling technology” using different pulverizers, hammer mills, and sieving machines. Here the whole grain is ground into fine particle size, which is homogenous. Ragi flour is similar in texture as whole wheat flour but has a pale pinkish tinge. After the addition of water and cooking, the color develops into the deep reddish-brown shade. Ragi atta is rich in minerals like calcium and iron. The high level of fibers in Ragi atta slows down the pace of digestion, thereby helping in lowering blood sugar levels. Ragi atta can be processed into roti, used as an ingredient in the bakery, snacks products, etc.



## 9. Gluten free foods

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### 42. JOWAR IDLI RAWA

Suji Rawa only is available in the market; gradually, it is replacing by Jowar Rawa due to consumer health conscious. Jowar fine semolina is made through milling technology. Milling is a process of separating the bran and germ from the starchy endosperm, and it is ground into fine size (Idli rawa) in a Jowar grinding plant or different milling units. This is generally done by the sequence of cleaning, grinding, and separation and packaging operations. Jowar Idli Rawa tends to control diabetes. It contains the right amount of dietary fiber, helps improve digestion and can be processed into RTC breakfast. It has soft texture like rice idli and tastes greatly.



Jowar idli rawa



Jowar upma rawa

### 43. Jowar Upma rawa

Jowar Upma Rawa/ coarse semolina is made through pulverizing technology. Milling separates the bran and germ from the starchy endosperm so that the endosperm can be ground into medium size (Upma rawa) in a Jowar grinding plant. This is generally done by the sequence of cleaning, grinding, and sieving processing. Jowar Idli Rawa tends to control diabetes. This product contains the good amount of dietary fiber and helpsto balance sugar levels. Jowar upma rawa can be breakfast and also used in cold & hot extrusion processing as raw material.

## 9. Gluten free foods

### 44. Jowar khichidi rawa

Jowar coarse semolina is manufactured through the milling process, it is a process where the hardy endosperm can be ground into coarse size (khichdi rawa) in a Jowar grinding plant. This is generally done by the sequence of cleaning, grinding, and sieving processing. Jowar Khichidi Rawa is packed with good quality fiber, which can help facilitate digestion, manage obesity, regulate blood sugar levels, and curb the risk of blood pressure. Jowar Khichidi Rawa is cooked into Jowar vegetable khichdi and mouthfeel was good.



Multi millet rawa



Jowar khichidi rawa

### 45. Multi Millet rawa

Multi millet fine semolina (Idli rawa) is manufactured using milling technology. The whole meal millets semolina may be prepared irrespective of their size, shape, and texture of the grains in pulverizers/chakki mill/hammer mills. This is generally done by the sequence of cleaning, grinding/milling, sieving, and packaging processing. Multi– millet Idli Rawa has the combined nutritional benefits of different millets. It can be processed into healthy & tasty idlis, snacks, and used in the extrusion process as a raw ingredient.



## 9. Gluten free foods

### 46. Jowar thinner flakes

The technologies involved in the flaking of whole Jowar grains are soaking, washing, roasting, flaking, drying, sieving, and cooling. Flaking is done by the roller machine, which is generally used for the paddy. It is suitable for different aged groups people and can consume with minimal cooking time, serve as a healthy and natural breakfast. These are gluten-free and have excellent nutritional composition, including folic acid, calcium, iron, zinc, and magnesium. It is consumed as spiced flakes (chudwa), with milk and in nutribars also. Flakes are relatively shelf-stable, lightweight, and convenient to ship and store.



Jowar thinner flakes



Jowar thick flakes

### 47. Jowar thick flakes

Here the jowar thick flakes were manufactured by the edge-runner machine, which is generally used for the paddy to make poha. This machine is only suitable for sorghum in millets. The technologies involved in the flaking of whole Jowar grains are soaking, washing, roasting, flaking, drying, sieving, and cooling. It comes under Ready-to-eat (RTE) breakfast cereals. It can consume as a sweet base (with milk) and a spicy base (like Poha). It is suitable for different aged groups people and can consume with the minimal cooking process.

## 9. Gluten free foods

### 48. Finger millet flakes

Now a day's people have adopted ragi products as their food of choice. The technologies involved in the flaking of whole Ragi grains are soaking, roasting, flaking, drying, sieving, and cooling. Flaking is done by the roller flaking machine. It comes under Ready-to-eat (RTE) breakfast cereals. Ragi flakes are chock-full of proteins, minerals, amino acids, fiber, and vitamins. It is suitable for different aged groups people and can consume with minimal cooking in the home.



Finger millet flakes



Jowar cookies

### 49. Jowar cookies

The “Pure Jowar cookies” are manufactured through “Baking technology.” The necessary process involves mixing ingredients until the flour is converted into a stiff and soft dough, followed by baking the dough into a crispy cookie. The availability of advanced technology made it feasible to produce commercial products out of Jowar grains (Sorghum). Majorly wheat-based cookies are only available in the market. Their usage and its availability are also extending day by day and slowly replacing the wheat-based cookies. These are gluten-free cookies and are recommendable for the celiac people. Jowar cookies are packed with a good amount of iron, a good amount of protein and fiber. It has a 6-months shelf life.

## 9. Gluten free foods

### 50. Pearl millet roller flakes

The technologies involved in the flaking of whole pearl millet grains are soaking, roasting, flaking, drying, sieving, and cooling. The flaker roller machine does roller or thinner flakes. Millets are super healthy and equally tasty grains. They also function as alternatives to Ready-to-eat (RTE) breakfast cereals. Pearl millet flakes are crisp and fissure in texture. They are a pack of nutrients with improved starch and protein digestibility. It is suitable for different aged groups people and can consume with minimal cooking in the home. They are relatively stored for three months at ambient conditions and easy to store. Pearl millet poha is a highly acceptable product, and the taste is good.



Pearl millet flakes



Sorghum Khakhra

### 51. Sorghum khakhra

The “Sorghum khakhra” is manufactured through the basic process involves milling, dough kneading, roasting to provide a delicious, crunchy and healthy snack enjoyed with a selection of pickles and chutneys. It is served usually during breakfast. It is more suitable for consumption in the present health scenario to combat free-radicals, which cause obesity and other chronic diseases, as it is rich in phytochemicals and micronutrients. Khakhra are thin crackers made from Sorghum, cumin, oil and other spices. Different incorporations can be added in the Sorghum khakhra like dried fenugreek Leaves, masala also. These incorporations will enhance taste and to attract consumers.



## 9. Gluten free foods



Sorghum cakes

### 52. Sorghum Cake

“Sorghum Cake” is manufactured with Sorghum and other ingredients by using “Baking technology.” The transformation from batter to cake may seem magical, where it includes many food technology processes. Manufacturing of Sorghum cake is feasible with household level to large commercial scale using different equipment types. It has great amounts of protein and gluten-free recommendable for celiac people. Sorghum Cake is the finest example, for those looking for healthy cum tasty snack. Its shelf life is about 4-5 days at chilling conditions.



Sorghum muffins

### 53. Sorghum Muffins

Muffins are sweet bakery treats with individual serving. They are developed with Nutri cereal “Sorghum” to increase the richness of its nutrients and sensory profile. By using bakery technologies, this product has been developed. Addition of different flavors like blueberry, pineapple, butter, and many kinds of nuts will mask the nutty flavor of millets, It serves as a healthy bakery snack to all age group people. It can be stored for ten days at chilling conditions.

## 9. Gluten free foods



**Jowar almond cookies**

### 54. Jowar almond cookies

Generally, cookies are small, flat, and sweet based bakery products. Millets addition to these makes healthier bakery good and helpful for the Celiac people. It also improved its sensory profile by adding premium almond flavor to attract consumers. Its texture is very soft and crispy. The taste of every bite of the Jowar almond cookies is appetizing. Its shelf life is about 4-5 months.



**Ragi muffins**

### 55. Ragi Muffins

A muffin is an individual-sized, baked product that is chemically leavened and then baked in a mold using baking technologies. It is one of the most popular bakery tasty treats consumed by kids, especially. Especially for children, to enhance their bone development and brain growth, ragi helps in a better way. So, ragi muffins are brought into existence for children for their better nutrition. The necessary process involves mixing ingredients until the flour is converted into the soft and silky batter, followed by baking where the soft batter is converted into fluffy and spongy. Different incorporations can be added in the ragi muffins like choco chips, tutti frutti, raisins, cashew nuts, almonds, and different kinds of flavors can also be added like blueberry, pineapple, butter but the amount will vary. These incorporations will enhance taste and attract children. The shelf life of ragi muffins is about ten days under ambient conditions.

# 10. Meal Replacement foods

Nutrihub

ICAR-IIMR  
2020

## 56. Millet Nutri bar

“Millet Nutri bar” is prepared mainly with sorghum flakes, ragi flakes, and ragi pops with other functional ingredients by using “Baking technology.” Millet Nutri bar is considered a convenience source as it offers a perfect delivery system for nutrients and functional ingredients, which has led to an increased emphasis on ingredients over functional claims. Due to growing consumer demand for healthy, natural, and convenient foods, attempts are being made on healthy breakfast, delicious sweets, and desserts. Millet based Nutri bar is the most excellent resource for healthy based food choice consumers. The shelf life of the millet Nutri bar is about three months at ambient conditions.





## Expression of Interest (EoI) for Technology Commercialization

Nutrihub, TBISC of ICAR- Indian Institute of Millets Research Institute of Millets Research (IIMR) invites expression of willingness/ interest from Entrepreneurs, Existing processing Firm, Start-ups etc. for licensing the millets & millets value added technologies developed by ICAR-IIMR, Rajendranagar,

### Tariff card on technology Licensing

Number of Technology	Tariff rate
1	Rs. 50,000 per technology
2-3	Rs. 33,000 per technology
4-5	Rs. 30,000 per technology

#### Technology License includes a package of

- \* 2-day Training programs for 1 or 2 representatives
- \* Technology Docket
- \* Details of Machinery, Specifications, Suppliers etc.
- \* Nutritional Profile (Proximate composition)

#### Note:

- ◇ Expression of Interest on a letter head of registered firm along with application form needs to be submitted to Dr. B. Dayakar Rao, Principal scientist & Nodal Officer IPTM & Commercialization, ICARIIMR through e-mail at [dayakar@millets.res.in](mailto:dayakar@millets.res.in).
- ◇ The Institute Technology Management Unit (ITMU)-IIMR will assess the requirement and process the application in every 15 days and qualified applications will be communicated to the nodal officer.
- ◇ Entrepreneurs will receive the communication from the nodal officer of the ITMU-IIMR along with model Memorandum of Understanding (MoU) format which is to be signed by both the parties on agreeing with the terms and conditions specified in model MoU. Signing of MOU will be done once in 2 months' duration. In exceptional cases it can be fast tracked.
- ◇ MoU will be made for three (3) years and be renewed for two years if agreed by both parties.
- ◇ Entrepreneurs / Start-ups/ Processing firms etc. for Consultations/incubation support/ Technology costing/ Draft MOU can write to [nielan-tbi@millets.res.in](mailto:nielan-tbi@millets.res.in) for appointments between 14:30-16:30 hours from Monday to Saturday (except Second Saturday/ Public Holidays). Exposure visit to Centre of Excellence (COE), Primary & Secondary Processing Facilities along with wet sampling & provision of literature will be on payment basis. However, consultation will be at no-cost.

**For queries please email to [dayakar@millets.res.in](mailto:dayakar@millets.res.in)/[nielan-tbi@millets.res.in](mailto:nielan-tbi@millets.res.in)**



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