COMMON FACILITY CENTRE

NUTRIHUB'S MODEL PRODUCTION FACILITY TO SUPPORT MILLETPRENEURS

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Common Facility Centre:
Nutrihub's Model Production Facility to Support Milletpreneurs

Nutrihub
ICAR-Indian Institute of Millets (Shree Anna) Research
Rajendranagar, Hyderabad

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Foreword

It is with great pleasure and a deep sense of national purpose that I commend this important publication detailing the role and evolution of the Common Facility Center (CFC) at Nutrihub, ICAR-Indian Institute of Millets Research (IIMR), Hyderabad. At a time when India is witnessing a transformative shift in its agricultural and nutritional landscape, the documentation of such pioneering models is not only a timely but an essential endeavour

The Government of India has consistently emphasized the need for innovation-driven agri-entrepreneurship and value addition in the food processing sector. In this regard, the Nutrihub at ICAR-IIMR stands as a sterling example of how research institutions can serve as active enablers for capability building of startups and grassroot level development. The Common Facility Center, as elaborated in this volume, provides crucial support to emerging millet entrepreneurs throughout India, empowering them with access to state-of-the-art infrastructure, technical know-how, and market linkages. What sets this Center apart is its holistic approach offering both primary and secondary facilities that cater to various stages of millet processing, packaging, and innovation. The "Eatrite" brand, first of its kind in ICAR ecosystem, demonstrates how scientific rigor and entrepreneurial zeal can converge to create various products that are both nutritionally rich and commercially viable propositions.

The future vision articulated in this book underscores the dynamic potential of millet-based entrepreneurship in addressing issues of food security, nutrition and sustainable agriculture. As millets regain their rightful place in the Indian diet and global food systems, the Common Facility Center at Nutrihub will continue to play an increasingly strategic role.

I congratulate Dr. B Dayakar Rao and his team behind this initiative for their dedicated efforts in capturing the journey, achievements and future aspirations of this exemplary institution. It is my hope that this book will inspire stakeholders across sectors researchers, entrepreneurs, policymakers, and development practitioners to support and replicate such models for a healthier, self-reliant India.

Mr Jagdeep Marahar
Managing Director - Nestlé R&D Centre India Ltd.

Preface

Millets are regaining prominence due to their health benefits, ecological adaptability, and contribution to sustainable farming systems. However, the transition of millets from farm to fork requires modern interventions in processing, product development, quality assurance, and branding. The Common Facility Center (CFC) at Nutrihub, hosted by the ICAR–Indian Institute of Millets Research (IIMR), Hyderabad, sponsored by DST, GOI is a dedicated infrastructure hub established to strengthen the millet-based agro-processing and entrepreneurship ecosystem in India. As the country advances its efforts to promote nutritional security, climate-resilient agriculture, and value-added processing, the CFC emerges as a critical enabler of innovation, enterprise development, and inclusive growth in the millet value chain.

CFC is an innovative incubate model setup for the incubators offering 360º facilitation for the incubatees. Continuous innovation done with product development, shelf-life studies, and addressing palatability issues of millets. Various primary processing machines developed for rice and wheat were retrofitted to suit millet processing. Also, the facilities have been visited by officials and experts from international delegations, central government, and various state governments.

The CFC is a unique model facility which can be successfully replicated by other incubators, globally. It operates on a shared-access model, making advanced food processing tools affordable and accessible for early-stage and small-scale enterprises. Equipped with modern machinery for cleaning, grading, dehulling, milling, flaking, puffing, roasting, baking and extrusion, the facility supports the large-scale production of a various of value-added millet products for startup incubatees and for our own model millet brand "Eatrite."

This book demonstrates that CFC is more than just an infrastructure, and it reflects a commitment to the growth of milletpreneurs and the market reach of their innovative products. The progress of CFC demonstrates the dedication, we put in developing the millet value chain.

This publication serves to highlight the vital role of the CFC as a platform for transformation where technology, tradition and innovation converge, driving the sustainable agri-food entrepreneurship to shape the future of India's food landscape.

Authors

Acknowledgment

I would like to express my genuine gratitude to everyone who supported and contributed to the establishment and growth of the Common Facility Centre and its mission to empower milletpreneurs.

First and foremost, I extend my heartfelt thanks to the **ICAR (Indian Council of Agricultural Research)**, **Nutrihub TBISC** and our host institute, **ICAR- Indian Institute of Millets (Shree Anna) Research (IIMR)**, for their invaluable support and guidance. Their unwavering commitment to fostering a research environment has significantly contributed to the success of this mission.

We are immensely grateful to **Department of Science and Technology (DST)** and **RKVY-RAFTAAR** for their vital funding support in developing the essential infrastructure and facilities necessary for the growth of millet startups.

I gratefully acknowledge the contributions of ICAR-IIMR's former directors - **Dr. Seetharama, Dr. SV Rao, Dr. J.V. Patil, Dr. Vilas A. Tonapi and Dr. C.V. Ratnavathi**, and the current director, **Dr. C Tara Satyavathi,** for their continued support and guidance. Their leadership and vision were instrumental in directing this project towards success.

I also extend my sincere thanks to the Board of Directors **Dr. J. Stanley, Dr. B Venkatesh Bhat,** and **Dr. D Yogeswara Rao** for their continuous support.

We deeply appreciate the technical guidance and encouragement provided by **Dr. N. G. Malleshi**, Scientist G (Retired) and Former Head, Department of Grain Science & Technology, CSIR-CFTRI, Mysore, and **Er. R G Math,** Senior Principal Scientist (Retired), CSIR-CFTRI in setting up these facilities.

Special thanks to **Er. P. Hemasankari,** Scientist, ICAR-IIMR, and Dr. A. Srinivas, Scientist, ICAR-IIMR for their dedicated efforts for improving the engineering aspects of millets, processing machineries and for her consistent support.

We would like to extend our heartfelt gratitude to **Mr. Venkat Suresh**, Senior Consultant, Nutrihub for his meticulous editing and thoughtful refinement of the content. Also, **Mrs. E Kiranmai** for her constant support in developing and commercialization of technologies to the incubatees.

I wholeheartedly thank **the startups** and the respective **incubatees** for effectively utilizing the facility and supporting its growth throughout the years.

Lastly, we are grateful to all the **project** and **administrative staff** at Nutrihub and external funded projects, who directly or indirectly contributed to the growth of CFC over the years.

Abbreviations and Acronyms

CFC	–	Common facility centre
CoE	–	Centre of Excellence
DST	–	Department of Science and Technology
EBO	–	Exclusive Brand Outlets
FPO	–	Farmer Producer Organization
FSSAI	–	Food Safety and Standards Authority of India
HMI	–	Human Machine Interface
HTST	–	High Temperature Short Time
HUL	–	Hindustan Unilever Limited
ICAR	–	Indian Council of Agricultural Research
IIMR	–	Indian Institute of Millets (Shree Anna) Research
IR	–	Infrared
KW	–	Kilowatt
LSU	–	Louisiana State University
MET PET	–	Metallized Polyethylene Terephthalate
MOQ	–	Minimum Order Quantities
PET	–	Polyethylene Terephthalate
RKVY- RAFTAAR	–	Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied Sector Rejuvenation
RTC	–	Ready to Cook
RTD	–	Ready to Drink
RTE	–	Ready to Eat
SHG	–	Self-Help Groups
SKU	–	Stock Keeping Units
VFD	–	Variable Frequency Drive
VFFS	–	Vertical Form Fill Seal

Chapter 1

Inception and Impact of Common Facility Centre

1.1 Introduction

a. Inception of CFC:

Nutrihub at IIMR started its journey as an Agri-Business Incubator under the Indian Council of Agricultural Research (ICAR). In 2017, it received the prestigious NIDHI-TBI recognition and funding from the Department of Science and Technology (DST) to develop infrastructure and office space, which can be utilized by startups rather than investing on own infrastructure. Nutrihub is a unique and first of its kind incubator to cater the needs of start-ups in the millets space, throughout India. Nutrihub is the focal point where innovators, entrepreneurs, agripreneurs, experts, industry giants, academia, and funding agencies shall gravitate towards the creation of new-knowledge based economy.

Nutrihub-TBI's success in building a pipeline of millet-based startups is recognised across the country, as they have established last mile connectivity to consumers which was missing otherwise. ICAR, DST and RKVY-RAFTAAR should be credited for funding the Common Facility Center (CFC), the state-of-art facility at Nutrihub, ICAR-IIMR, which provides infrastructure for day-to-day manufacturing needs ofnumerous millet entrepreneurs. Their technology backstopping, mentoring, market facilitation and financial facilitation have become a blessing to startups in the grey area of millets commercialisation. Leveraging these supports, over 180 millet-based startups are incubated and graduated from Nutrihub, and thousands of entrepreneurs are supported with technology transfers, training, exposure, and awareness.

CFC is a unique proposition under Nutrihub. It is characterized by the unique vertical among the technological incubators throughout India. The CFC facility was inaugurated by Dr. S. Chandrasekhar, Secretary, DST in the presence of Dr. C. Tara Satyavathi, Director, ICAR-IIMR, and Dr. B. Dayakar Rao, CEO, Nutrihub & Principal Scientist, ICAR-IIMR on 10th March, 2023. It is a state-of-the-art infrastructure dedicated to fostering innovation, entrepreneurship, and technological advancement in the domain of millets processing.

Inauguration of CFC by Dr. Srivari Chandrashekhar, Secretary (DST), Dr. C. Tara Satyavathi, Director, ICAR-IIMR, and Dr. B. Dayakar Rao, CEO, Nutrihub, ICAR-IIMR

Dr. B. Dayakar Rao, Director, Nutrihub briefed the chief guests on the CFC facilities

b. The CFC's Strategy and Impact on Stakeholders:

As the demand for healthier, sustainable, and climate-resilient crops rises, millets have emerged as one of the most promising food grains due to their nutritional density, drought resistance, and versatility. Recognizing this potential, the Government of India designated 2018 as the National year of millets, followed by the India led United Nations's announcement and celebration of the International Year of Millets 2023, which further accelerated the interest and investment in millet-based product development. In this context, the CFC at Nutrihub has emerged as a catalytic enabler, ensuring that budding entrepreneurs and rural enterprises have access to investment intensive food processing infrastructure and know-how. Now, entrepreneurs can incubate ideas, develop products, pilot product lines, and scale up with reduced risk and cost.

The primary stakeholders of CFC are startups, followed by research institutes, industries, and state governments. The important link of entrepreneur-investor-incubator-government-corporate network is significant for the growth of CFC and Nutrihub. The startups' markets must be well established and connected with FPO's for ensuring the reliable supply chain management and strengthen backward integration with farmers.

Advanced processing facilities are necessary for food companies to efficiently generate high-quality products. It can be quite costly to establish such facilities, particularly for small business owners. To

meet this demand, the CFC was established, which drastically lowers the initial capital costs by granting the shared access to advanced manufacturing infrastructure and equipment.

To overcome this technological and economical entry barriers, entrepreneurs enrolled into the Nutrihub's incubation programs gain access to the CFC production facilities for a period of 1 year, along with business mentoring, market linkage, and investor connect opportunities. Incubatees with own formulation or valid technology licence can utilize these production facilities to perform large scale manufacturing of millet-based products. Also, the CFC provides hands on technological training on primary and secondary processing, support for product development, shelf-life studies and packaging of developed products, and skilled manpower for operating machineries. The CFC also enables backward and forward integration for expanding their market presence.

c. Eatrite Brand – An Exemplary Milestone Initiative

Nutrihub launched its own millet foods brand - "Eatrite", translates to "Eating it Right", with a tagline of "eat millets-stay healthy," thus prompting the consumers that they are consuming healthier foods carrying rich nutrition and diverse health benefits. This is the first ever millet brand in the country and the first ever commercial brand amongst all the ICAR Institutes. This initiative provided a roadmap for milletpreneurs to launch their own millet brand. Currently, about 37 value added products such as cookies, flakes, flours, instant mixes, and so on were sold under eatrite brand. Millet based products were produced in large quantities and made available for sale through *"Millet Shoppe"* at ICAR-IIMR. The success of eatrite brand has been the inspiration for the birth of 400+ millet brands in the country today.

1.2 Features of The Common Facility Center (CFC)

The CFC has been thoughtfully designed to bridge the gap between innovation and commercialization in the millet sector. Its infrastructure and services cater to the entire millet value chain, from raw grain cleaning to final product packaging. Some of its core features include:

a. Advanced Equipment and Infrastructure:

The CFC is equipped with a variety of advanced equipment such as:

- Primary processing line consists of cleaning, grading, sorting, destoning, dehulling, separation, and color sorting.
- Milling line equipped with different mills capable of producing different products such as flour, semolina, kichadi mix, etc.
- Baking line is equipped to manufacture a diverse range of products including millet-based bread, cake, muffins, rusk, and cookies.
- Extrusion line consists of both hot extrusion

for RTE snacks, and cold extrusion for RTC products such as pasta, vermicelli, etc.

- Flaking line for producing flakes and other flavoured snacks from different millet grains.
- Packing line consists of vacuum packing, nitrogen flush packing, filling and band sealing.

With affordable pricing models, including pay-per-use, the CFC makes its services accessible and affordable for small businesses. Machines are available for small and medium-scale production, allowing entrepreneurs to test batch quantities without heavy upfront investment.

b. Regulatory Compliance and Quality Assurance:

At CFC, the manufacturing practices adheres to the food safety standards and enables startups to comply with the national food safety regulations including good manufacturing practices (GMP), good hygiene practices (GHP), Food Safety and Standards Authority of India (FSSAI) labelling regulations and other certifications.

c. Packaging and Branding Support:

The center provides access to semi-automatic packaging machines suitable for pouches, bottles, and sachets. During the incubation period, branding and design expertise and guidance from experts is also available for startups to enhance their consumer appeal.

d. Training and Skill Development

The startups associated with the Nutrihub are also offered the technology training sessions on product manufacturing, methodologies, principle of the technology, effective packing, storage guidelines and other essential information.

1.3 Value Propositions of CFC

The Common Facility Center operates under a vision to democratize access to food innovation infrastructure in India's millet sector. Here are some of its unique value propositions:

a. Affordability

The shared facility model drastically reduces capital expenditure for startups, allowing them to focus on market validation and scale-up.

b. Customization & Flexibility:

The center offers tailor-made product development to meet the needs of the target customer segments of each startup, enabling flexibility in batch sizes and product variants.

c. Batch and Continuous Operation:

CFC offers the feasible production choices including batch scale (small scale) and continuous scale (large scale), enabling both the small businesses and large businesses to manufacture as per their real-time market demands. This allows startups to evaluate consumer acceptance and stable demand before establishing large scale production.

d. Government Recognition & Linkages:

Brands incubated at Nutrihub are authorized to carry the ICAR-IIMR's logo on their packaging, offering the authenticity and recognition for their brand. Additionally, the incubated startups are given access to need-based connections/linkages, networking events, exhibitions, etc.

e. Sustainability Focus:

Emphasis is placed on minimal waste processing, promoting sustainable packaging solutions and circular economy principles.

1.4 Operational Aspects

The Common Facility Center follows a structured yet flexible operational model to accommodate various users – from individual innovators to registered startups and FPOs. The key aspects of CFC's functioning include:

a. Reduction of Operational Risk:

By accessing the facilities at CFC, the startups can reduce the risk of operational costs as well the production loss during the upscaling of the product. At CFC the startups can test and optimize the product at a commercial level in a controlled processing environment reducing the risk of errors.

b. Usage Model:

Entrepreneurs can book slots to use the facility on a nominal processing fee. Booking is done through a formal application process routed through Business Manager at Nutrihub. Both short-term (daily use) and long-term agreements are available, depending on the business requirements.

c. Product Refinements and Innovation Support:

The startup receives scientific and technological assistance for refinement and upscaling their product for commercial scale. The refined technology will be upscaled with in the CFC for ensuring the repeatability and viability of the processing.

d. Manufacturing Credibility:

Startups manufacturing products at CFC maintains manufacturing and other regulatory standards required for establishing their credibility with partners, investors, and consumers. For the smoothing functioning of the operations, manufacturing, logistics and regulatory compliances, CFC plays a crucial role in hand holding the newly established startups.

e. Monitoring & Compliance:

Regular audits at CFC ensure food safety, cleanliness, and compliance with FSSAI norms. The other data related to production batches, usage hours, and inventory are also maintained to ensure the data backed operations for startups.

CFC stands as a practical example of how public research institutions can partner with industry and startups to translate agricultural innovation into economic growth, nutritional security, and sustainable development. CFC assists new businesses with reduced expenses, scaling up their products, and overcoming the difficulties of breaking into the commercial market.

Chapter 2

Infrastructure at CFC

This book chapter is dedicated for various processing facilities available at CFC along with their specifications and applications. The CFC is installed with the primary processing, secondary processing, and packaging units, capable of handling different millet varieties.

2.1 Primary Processing Equipment

2.1.1. Continuous Primary Processing Line

The 1 TPH Continuous Primary Processing Line converts the raw harvested grains into RTC edible form, by incorporating the grading, destoning, dehulling and separation operations.

Figure 2.1 Continuous Primary Processing Line at Plant 1, CFC

Firstly, the raw material is fed to the hopper, which is connected to a bucket elevator for carrying the grains to the aspirator cum grader. The first equipment in the line, the **grader** involves the use of screens to separate the grains and impurities based on the size differences. There are set of perforated sieves which sort the grains based on the size and remove any impurities such as sticks, chaff, stones, etc. The grains are collected from the side and any mud or smaller size impurities are collected from the bottom. Next, the **aspirator** is used to remove dust from the grains. The cleaned grains are sent to the next elevator from where it enters the vibro-destoner.

Figure 2.2 Aspirator cum Grader

The cleaned grains enter the **vibro-destoner**, which works based on the difference in density of the grains. It has a vibrating inclined deck combined with air flow. The deck has a perforated mesh through which air flows upwards. The airflow can be adjusted to lift the grains which are lighter and not the heavier stones. The vibratory action of the deck helps to move the stones up, while the lighter grains float on top of the air stream above the stones and move downhill by gravity and angle of the deck. The vibration ensures the material is in constant motion, improving separation efficiency. The destoned grains will be received from outlet at the front while the stones will be rejected from the back. The grains are sent to the next elevator from where the grains enter the next stage i.e. dehulling.

Figure 2.3 Destoner

Dehulling is the process of removing outer husk without damaging the inner kernel in minor millets. A dehuller is a crucial piece of equipment in the millets processing line, which separates the outer husk from the grain kernels. The grains are fed into the rotating impeller through hopper which accelerates the grains, directs them to hit the outer casing, and makes sure the husk splits from the grains due to the impact force. The impeller speed can be adjusted using a VFD to achieve higher dehulling efficiency. The husk will be separated from the dehulled grains using a fan box which carries the husk away using a cyclone. The grains are fed to the next elevator which transfers them to the next stage i.e. separation.

Figure 2.4 Dehuller

A **gravity separator** is used to separate grains of different densities by using the gravity and compressed air. The separator has an inclined deck that vibrates, and a mesh that allows the air to pass through it. When the material is fed on the deck, the combined effect of vibration and airflow helps to layer the particles by density. The air flow can be adjusted, for the efficient separation of the grains. As a result of the process, the particles are grouped by weights along the deck's length. It has typically three refractions: one for the dehulled rice, second for both dehulled and unhulled mix, and third for the unhulled grains. The output from the gravity separator can be used either for further milling process or can be packed and sold as millet rice.

Figure 2.5 Gravity Separator

Vendor Details:

Machine Name	Continuous Primary Processing Line
Manufacturer	M/s Borne Technologies
Capacity	1 ton/hr.

2.1.2 Color Sorter Machine

The Color Sorter Machine is used to sort the grains based on the difference in their color. It has high resolution cameras and IR sensors to remove defective grains and foreign materials from the grains. As the grains pass through the vibrating chute, a high-speed ejection system precisely removes discolored and damaged grains while retaining good quality grains. The machine can be calibrated for different millets to account for natural colour variations while maintaining quality standards.

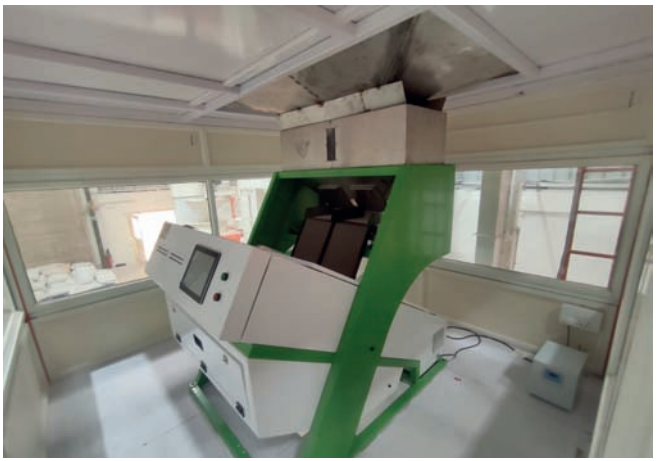


Figure 2.6 Colour sorter

A color sorter ensures consistency in quality by removing discolored grains in large volumes quickly and efficiently. This is essential in food industries

where consumers expect a visually appealing product. The settings can be adjusted to meet specific quality requirements, and ensure the desired parameters for different applications. Typically, the colour sorter is integrated the primary processing line after the dehulling and separation operations, serving as the final quality checkpoint before packing. The colour sorter improves product value, reduces labor cost and minimizes food wastage particularly, crucial for processers targeting export markets or premium segments.

Figure 2.7 Colour Sorter Assembly

Vendor Details:

Machine Name	Color Sorter Machine
Manufacturer	M/s Millgrain Machinery Industries
Capacity	500 kg/hr.

2.1.3 Continuous Milling Line

The Continuous Milling Line with 1 ton/hr processing capacity is used to convert the raw millet grains into finished products like flours, and semolina. This line consists a Chakki mill (300 kg/hr), Roller mill (400 kg/hr) and Hammer mill (300 kg/hr).

Figure 2.8 Continuous Milling Line at unit 1, CFC

i. Chakki Mill

Firstly, the raw material is fed into the hopper, which is connected to a bucket elevator for carrying the grains from the silo. A chakki mill, with its traditional yet effective stone grinding mechanism, excels in making fine flour. It has two stones, where one is stationary, and the other is rotating. The ability to adjust the gap between the stationary and rotating stones provides a key control parameter, enabling the flour production with varying degree of fineness, catering to diverse culinary applications.

Figure 2.9 Chakki Mill

Figure 2.10 Roller Mill

ii. Roller Mill

A roller mill is used for making coarse, medium, and fine semolina. It has two corrugated cylinders, which rotate in opposite direction creating a shearing action that breaks the grains without excessive pulverization. The gap between the rollers is adjustable, allowing precisely controlled particle size. The corrugated surface of the rollers helps in separating the endosperm from the bran with minimal heat generation, preserving the nutritional integrity and texture of the product.

iii. Hammer Mill

A hammer mill is used to produce fine flour and semolina. Inside the milling chamber, a set of rapidly rotating hammer like blades strike the grains repeatedly, breaking grains into smaller fractions. The screen is interchangeable, allowing for the control of particle size based on the requirement. As the particles are reduced in size, they are forced toward a perforated screen at the bottom of the chamber. Only the particles fine enough to pass thorough the screen are collected at output, while the larger particles are recirculated within the chamber for further grinding.

Figure 2.11 Hammer Mill

Figure 2.12 Different Milling Outlets

The milled output passes through the entoleter which operates by spinning the material at high speeds within the rotor chamber. This process disinfests the flour and semolina by destroying the microbial contaminants. The entoleter enhances the hygiene, especially for the flour, which are prone to infestation and spoilage. The product is conveyed to the plan sifter, which uses vibrating sieves to segregate the milled material based on the particle sizes. Each deck is equipped with mesh screens of varying fineness, allowing it to segregate flour, semolina, bran, and oversize particles. The sifter ensures that uniform particles proceed to packing, while the coarse particles are directed back for regrinding.

Vendor Details:

Machine Name	Continuous Milling Line
Manufacturer	M/s Grain & Pulses Engineering
Capacity	1 ton/hr.

2.2. Small Scale Primary Processing Equipments

a. Aspirator cum Grader

An aspirator cum grader is a versatile machine used in food processing industries for cleaning, grading, and separating grains. The process starts by feeding the raw materials, such as grains into the hopper**.** The hopper facilitates uniform feeding of the material into the system, ensuring a steady flow for efficient processing. The grains pass through the aspirator,

which removes lighter impurities like dust, chaff and husk using controlled air suction. This step is critical for cleaning the grains before sending to grading.

The partially cleaned material proceeds to the grader, which uses appropriately sized sieves to separate the grains and impurities based on size and shape. The sieves can be customized or interchanged to suit grading requirements, ensuring precise separation of unwanted particles or differently sized grains. The graded material is collected separately, while the discarded impurities and undersized particles are directed to collection outlets. This machine combines cleaning and grading operations in a single unit, making it compact, efficient and time-saving for small scale processors.

Figure 2.13 Aspirator cum Grader

Vendor Details:

Machine Name	Aspirator cum Grader
Manufacturer	M/s K.K. Life Science
Capacity	100 kg/hr

b. Aspirator cum Destoner

A vibro-destoner is a machine used in food processing industries to remove stones, heavy impurities, and other unwanted materials from grains. It ensures the quality and purity of the processed material by efficiently separating unwanted particles based on weight and size. The process starts by feeding the raw material into the hopper**.** The hopper facilitates an even and controlled feed into the machine, ensuring a smooth and continuous operation. From the hopper, the material moves to the aspirator, which uses controlled airflow to remove lighter impurities such as dust, chaff, and husk. This initial cleaning step is essential for reducing the load on subsequent components and improving the overall efficiency of the machine.

After initial cleaning, the material passes to the destoner. The destoner works on the principle of vibration and density separation. Through a vibrating deck and airflow adjustments, heavier impurities like stones and metal fragments are separated and discharged, while the lighter, clean grains move forward. The vibrating action ensures precise separation and minimal loss of good quality material. Finally, the processed material moves to the grader, which uses sieves to separate the grains

based on size and shape. This additional step ensures that the output is uniform and meets the quality specifications.

Figure 2.14 Aspirator cum Destoner

Vendor Details:

Machine Name	Aspirator cum Destoner
Manufacturer	M/s Baba Auto Mechanical Works
Capacity	100 kg/hr

c. Dehuller

A dehuller is a machine used to remove the outer husk or hull from grains, ensuring the edible portion is clean and ready for further processing. It is widely utilized in the processing of minor millets and similar grains.

The process begins with feeding the raw material into the hopper, which ensures a consistent and controlled ow of grains into the machine, maintaining steady operation and optimal efficiency. From the hopper, the grains are directed to the impeller, the core component responsible for dehulling. The impeller rotates at high speeds, generating the centrifugal force responsible for efficiently separating the husk from the grains while preserving the kernel integrity.

The speed of the impeller can be precisely controlled using a Variable Frequency Drive (VFD), allowing for adjustments based on the type of grain being processed. The separated husk and lighter materials are removed by a cyclone, ensuring minimal contamination in the dehulled grains. Meanwhile, the broken grains are collected separately through a side outlet for ensuring clean separation. The resulting dehulled grains are ready for further processing or packaging, providing high-quality output with minimal waste. This streamlined and adjustable process makes the dehuller an essential equipment for grain processing.

Figure 2.14 Dehullers

Vendor Details:

Machine Name	Dehuller
Manufacturer	M/s Dhan Foundation
Capacity	60-70 kg/hr
Capacity	100-120 kg/hr

d. Single Stage Dehuller cum Separator

A single-stage dehuller cum separator is used to perform dehulling and husk separation in a single operation, a commonly used practice for processing minor millets. This equipment also works on the same principle of centrifugal impact forces.

After dehulling, the mixture of dehulled grains and husk moves to the aspirator, which separates them by using a controlled airflow. The aspirator directs the husk to a separate outlet, while the clean, dehulled grains are collected for further processing or packaging. This integrated system simplifies the processing workflow by combining dehulling and separation in a single stage, making it ideal for small to medium-scale operations.

Figure 2.15 Dehuller cum Separator

Vendor Details:

Machine Name	Single stage dehuller cum separator
Manufacturer	M/s K.K. Life Science
Capacity	60-70 kg/hr

e. Minor Millets Polisher

A polisher is used to enhance the appearance, texture, and quality of grains by removing the outer bran or surface layers which are not easily digested. Polishing improves the grains aesthetic and cooking properties, making them more appealing for consumption and further processing.

This process starts with feeding the cleaned grains into the hopper, which ensures a steady and controlled flow of grains into the polishing chamber. Inside the chamber, the conical polishing wheel performs the primary polishing action by creating friction between the grains and the surface of the wheel, while gently removing the outer bran layers without damaging the kernels.

The mesh surrounds the polishing wheel plays a dual role, as it acts as a barrier to retain the grains within the polishing chamber while filtering out the removed bran and fine particles. This polishing

wheel also ensures that only the polished grains exit the chamber. The size and design of the mesh can be optimized to achieve the desired level of polish. Finally, the polished grains are collected at the outlet, ready for further processing, or packaging.

Figure 2.16 Minor Millet Polisher

Vendor Details:

Machine Name	Minor Millets Polisher
Manufacturer	M/s K.K. Life Science
Capacity	30 kg/hr

f. Major Millets Polisher

A major millets polisher is a machine designed to enhance the quality and appearance of larger size millets such as pearl millet, sorghum, by removing the outer bran or surface layers. The cleaned grains are put in the hopper, which serves as the feeding system for the machine.

The cleaned grains are fed into the hopper which ensures a controlled and uniform flow of grains into the polishing chamber. Inside the chamber, the horizontal disk-shaped abrasive wheels carry out the polishing. These rotating disks create friction against the surface of the grains, effectively removing the bran or rough outer layers while maintaining the

Figure 2. 17 Major Millets Polisher

integrity of the kernels. The mesh positioned on one side of the chamber allows the removed bran and fine particles to pass through it, while retaining the polished grains in the chamber until the process is complete. The polished grains are then discharged through the outlet, ready for further processing or packaging.

Vendor Details:

Machine Name	Major Millets Polisher
Manufacturer	M/s Baba Auto Mechanical Works
Capacity	75 kg/hr

g. Plate Mill

A plate mill is a versatile grinding machine used to produce various granular textures such as fine, medium, and coarse semolina from grains. Within the grinding chamber, the grains pass between two plates**,** one fixed and the other rotating which grind the grains into the desired texture. The plates are typically made from durable materials and feature abrasive surfaces to facilitate effective grinding.

An adjustment mechanism allows a precise control of the gap between two plates, allowing to produce outputs of varying textures for specific requirements. Small gaps results in finely ground semolina, while wider gaps produce coarser textures. This ability to customize the output makes the plate mill a vital machine in food processing, providing flexibility, efficiency, and consistent results for various applications.

Figure 2.18 Plate Mill

Vendor Details:

Machine Name	Plate Mill
Manufacturer	M/s Guru Nanak Engg. Corp.
Capacity	100 kg/hr

h. Chakki Mill

A pulveriser is used to crush, grind materials into finer particles. The grinding chamber is the core part of the pulveriser, consisting of rotating blades or discs that crush and grind the material. The grinding chamber is designed to handle different materials and ensure effective size reduction while controlling heat generation during the process. After grinding, the processed material exits through a chute, ready for further processing or packaging.

Figure 2.19 Chakki Mill

Vendor Details:

Machine Name	Pulveriser
Manufacturer	M/s Guru Nanak Engg. Corp.
Capacity	30 kg/hr

2.3. Secondary Processing Equipment

Secondary processing of millets transforms raw millet grains into value-added food products with enhanced shelf life, convenience and consumer appeal. Unlike primary processing (cleaning, dehulling, and milling), secondary processing creates ready-to-eat or ready-to-cook products.

Key processing techniques in secondary processing include:

1. **Extrusion**: Creating puffed snacks, and breakfast cereals using high temperature and pressure
2. **Instant foods**: Developing products like instant mixes like idli, dosa batter, khichdi mix, and Pongal mix
3. **Baking**: Producing breads, cookies, biscuits, and other baked goods with partial or complete substitution of millet flour
4. **Flaking:** Development of thin and thick flakes for production of various products such as chivda, museli and granola bars
5. **Ready-to-eat products**: Instant mixes, flakes, porridges, and convenience foods
6. **Composite flour development**: Individual millet flours were packed and sold. Also, multi millet flour with different millets to improve the nutritional profile.

Secondary processing of millets adds significant value to these nutritionally dense grains, making them more appealing to modern consumers while preserving and sometimes enhancing their health benefits.

2.3.1. Baking Technologies

A. Continuous Baking Line

The continuous baking line with a 500 kg/batch capacity, is an automated system designed for the efficient production of baked goods, streamlining

the process from dough preparation to final product stacking. The process begins with the sigma mixer, which thoroughly mixes ingredients to form a uniform and consistent dough. The prepared dough is then fed into the sheeter, where it is rolled into a continuous sheet. The sheeter features adjustable rollers, allowing precise control of the sheet's thickness to meet specific product requirements. Once the dough sheet is formed, it passes through the cutting die, which cuts it into desired shapes and sizes. The excess dough trimmed during this process is collected by the scrap return system and redirected to the sheeter for reuse, ensuring minimal waste.

The shaped dough pieces are then transported into the baking tunnel which travels through a continuous oven that bakes the products under carefully controlled temperature conditions. The baking tunnel is divided into different zones to allow fine adjustments for uniform and customized baking, catering to various product types and recipes. After baking, the products are conveyed onto the cooling conveyor, where they are gradually cooled to room temperature. This controlled cooling prevents moisture condensation and helps maintain the desired texture of the baked goods. Finally, the cooled products reach the stacker, which aligns and stacks them uniformly for easy packaging. This integrated setup ensures high efficiency, consistent quality, and minimal waste, making it an indispensable system for large-scale baking operations. The flexibility to adjust parameters in different stages of the process allows the production of a wide variety of baked goods, catering to diverse market demands.

Finally, the biscuits will be packed by using a tray packing sealing machine. This advanced sheeting and cutting technology, combined with other specialized equipment and precise processing steps, enables the production of other moulding biscuits such as Mil-Bite, Mil-Lite, Mil-Day, Digestive biscuit and other nutritious millet incorporated biscuits with consistent quality and desirable texture. This integrated setup ensures high efficiency, consistent quality, and minimal waste, making it an indispensable system for large-scale baking operations.

Figure 2.20 Dough Sheeting

Figure 2.21 Mil-Bite Biscuits

Figure 2.22 Mil-Lite Biscuits

Fig 2.23 Dough Moulding Type

Fig 2.24 Mil-Day Cookies

a. Blender (Double Arm Sigma Mixer)

The double arm sigma mixer is a robust industrial mixing equipment designed for batch processing of dough and similar viscous materials with a 100-120 kg capacity. It consists of two Z-shaped (sigma) arms that rotate in opposite directions inside a heated or cooled mixing chamber, creating an intense kneading and shearing action. These sigma arms continuously fold, stretch and compress the ingredients against the chamber walls, ensuring thorough mixing and uniform consistency. The mixer's design allows for mixing with minimal product adherence, and efficient discharge through a bottom outlet. Operation typically involves loading ingredients, setting mixing parameters like speed and temperature, and mixing until the desired homogeneity is achieved for making suitable dough for bakery, confectionery, and food processing applications.

Figure 2.25 Sigma Mixer

Specifications of Sigma Mixer

Main Frame: Fabricated out of MS angles, channels, and plates

Mixer Bowl: 4mm SS 304 Grade sheets with water jacket

Mixer Arm: Z-type arm of steel casting fitted with suitable drive shafts

Bowl Lid: SS 304 grade sheet door with balanced counter weight

Arm Fittings: Cast iron mounted fittings with heavy duty bearings, seals and glands, lubrication system etc.

Bowl Tilting: Heavy duty worm gear mounted to bowl fitted with worm shaft coupled to 1 HP geared motor

Sigma Arm Drives: 7.5 to 10 HP geared motor with VFD coupled to Sigma arm both the arms will be driven by heavy duty helical gears

Machine Guards: All the covers will be fabricated of SS 202 sheets

Electrical Panel: Provided with all safety components, and accessories like front operated panel with reverse forward push buttons, selector, timer, hooter and phase indicator lamps with emergency switch.

Capacity: 100-120 kgs

Dough in hopper | **Sheeting** | **Moulding**

Baking through tunnel oven | **Baking to cooling conveyor** | **Cooling and packing**

Figure 2.26. Components of Continuous Baking Line

b. Continuous Baking Line Machine

The continuous biscuit production line operates as an integrated system where raw dough enters the process and transforms into finished biscuits through sequential stages. Initially, the premixed dough is fed into a multi-stage laminating machine with gauge rolls that progressively reduce thickness and create multiple layers required for developing the characteristic flaky texture. The laminated dough

then passes through a docker unit that perforates the sheet to prevent air bubble formation during baking. A rotary cutter precisely cuts the dough into standard biscuit shapes, which are then transported by a continuous iron mesh travelling inside the tunnel oven with precisely controlled temperature zones ranging from 180°C to 240°C. The biscuits traverse the tunnel in approximately 8.27 seconds (varies based on product), with the final product in a golden color and desired texture.

For cookies, sheeting mechanism is not necessary. The soft dough transferred to the moulding setup, where the die takes up required dough and drops it to the conveyor belt. The remaining procedure is same as biscuits. After baking, they move onto a cooling conveyor belt where their temperature is gradually reduced, stabilizing their structure before being collected in designated tubs for packaging and distribution. Throughout this automated process, each stage is carefully monitored and controlled to ensure consistent product quality, texture, and dimensional uniformity.

Figure 2.27 Continuous Baking Line

Potential Products

- Mil-Bite Biscuits
- Mil-Lite Biscuits
- Mil-Day Cookies
- Digestive Biscuits
- Different variations of all the above biscuits and cookies

Specifications of continuous baking line

Rotary molding, cutting unit and 3 sets of Gauge roller with cut & lay laminator size 450mm wide

i. Two roller pre sheeter – size 200mm, pre sheeter with two stage gauge roller unit – one set of grooved rollers, one set gauge roller with SS 304 Hopper, this unit will be driven by 1 HP geared motor and VFD

ii. 1st carry web – ½ HP geared motor

iii. First gauge roller (200mm dia. with chill roller)- this unit is driven by 1HP geared motor and VFD, there is a PU conveyor is driven by ¼ HP geared motor and VFD

iv. Second gauge roller (200 mm dia. chill roller) – this unit is driven by ½ Hp geared motor and VFD, there is a PU conveyor driven by ¼ HP geared motor and VFD

v. Final gauge roller (200mm dia. with chill roller) - this unit is driven by ½ Hp geared motor and VFD, there is a PU conveyor driven by ½ HP geared motor and VFD

vi. Rotary molding cum cutting unit with panner web
Facing roller drive: 2 HP geared motor with VFD
Molding die size: 205x460mm
Cutting die size: 140x460mm
Cutting die drive: 1.5 HP geared motor with VFD endless conveyor (nylon)
Scrap return: ½ HP geared motor with VFD cotton conveyor
Panner web: ½ HP geared motor with VFD endless conveyor

vii. Electric Biscuit Baking Travelling ovens
Size: 460 to 500mm width X 9000 to 10000mm length
Charging: 1000 to 1100mm
Discharging: 2000mm
eating control: 72KW heaters with thyristor temperature control (including pre heating control)
Maximum heat: 350^{0}C
Drive: 1 HP geared motor with AC drive
Exhaust blower: 1 HP motor with return heat distribution
Brush: 1HP motor
Conveyor: Z 47
Construction: Made out of thickness angles and covered with SS 202 sheets
Insulation: Mineral wool and Ceramic wool are provided on all four sides
Electric panel: should provide with PLC

viii. Stripper unit
Frame: Mild steel fabricated (angles, channels and plates)
Frame width: 1000 to 1100mm
Conveyor: Cotton – 850mm width X 4mm thick
Web drive rollers: Dia 200mm MS rollers rubberized
Web looping: U – type looping
Web drive: ½ HP geared motor with VFD (LG make)
Web tracking: Manual
Web Tightening: web tensioner and web tracking will be provided
Idler rollers: provided at necessary places
90^o "L" turn conveyor:
Drive: ½ HP geared motor with VFD
Cooling Conveyor with Stacker & Packing table
Frame: Mild steel fabricated (Angles, channels & plates duly power coated)
Frame width: 1000 to 1100mm
Conveyor web width: cotton 20" width X 4mm thick
Web drive rollers: Dia 200mm MS rollers rubberized
Web looping: S – type gear driven
Length of the Conveyor: 90mt x 2 tiers (1st tier – 12mt, 2nd tier – 8 mt, bottom 3.5 mt & packing table 5 Mt)
Web drive: 2 HP geared motor with VFD (LG make)
Web tracking: Manual
Web Tightening: Manual Tightener per tier Idler rollers: Top every 3 ft, bottom every 4 Ft for easy web travel

Stacker Unit (Triple Board)

Frame: Mild steel fabricated ((Angles, channels & plates)

Frame width): 1000 to 1100mm

Web Drive Rollers: Dia 160mm mild steel rollers rubberized

Web looping: U – type gear driven

Stacker Fingerer: Aluminium star wheel

Stacker drive: ½ HP geared motor with VFD

Web Tightening: Manual Tightener

Idler rollers: Provided where necessary

Slope plates: Magnetic plates

Stacker guides: Mild steel plates with nickel chrome plated

Conveyor: poly Urethane (P U) 20" wide brush

Brush: Nylon

Packing table:

Frame: Mild steel fabricated (Angles, channels & plates)

Frame width: 1000 to 1100mm

Web Drive Rollers: Dia 200mm mild steel rollers rubberized

Web looping: S – type gear driven

Web tracking: Manual

Web Tightening: Manual Tightener

Idler rollers: Provided where necessary

Table web drive: ½ HP geared motor with VFD

Guide lines: MS flat – 5 Mt long

Capacity – 110 kg/hr.

Cost – Rs. 1.12 Cr.

Manufacturer's Details

M/s. Bismak engineers

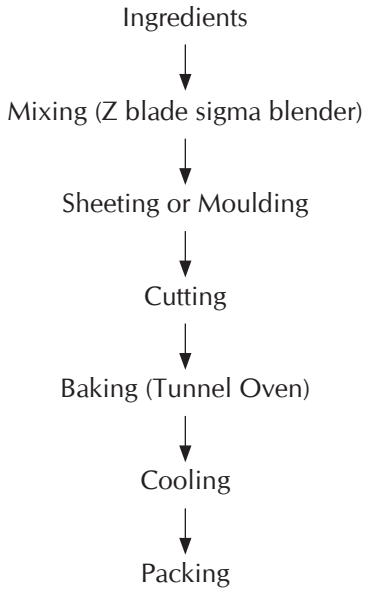
Peenya 1st stage, Vivekananda Nagar, Peenya, Bengaluru, Karnataka 560058.

Supplier Details:

M/S. Sree Sai Datta Engineering Works**,** H. No. 8-224/4, Old Airport Road, Goutham Nagar, Ferozguda, Secunderabad – 500011, India.

Contact: 8000003722; email: ssdeworks@gmail.com

Process Flow Chart of Continuous Baking Line



c. Packing and Sealing Using Tray Packing Machine

A tray pack machine is an efficient packaging system designed to seal products placed in trays,

ensuring freshness, hygiene, and secured handling. The machine is commonly used in food industries for packing ready-to-eat products. The packing roll contains a continuous sheet of sealing material, typically made of laminated film, which is unrolled and used to cover the trays. The conveyor system moves the trays through the machine, positioning them precisely under the sealing mechanism.

The machine allows for adjustments in conveyor speed, enabling it to match different production rates and accommodate trays of various sizes. The temperature of the sealing system is also adjustable, ensuring an airtight seal without damaging the trays or the sealing material. This flexibility makes the machine suitable for packaging both heat-sensitive and durable products. The tray pack machine ensures a tight and secure seal that extends shelf life, prevents contamination, and enhances product presentation.

Figure 2.28 Tray Packing Machine

Vendor Details:

Machine Name	Tray Pack Machine
Manufacturer	M/s Sri Swamy Packaging
Cost	Rs. 5,55,250

B. Cookie Dropping and Wire Cut Machine

Cookie preparation includes a sequence of steps including cleaning, milling, creaming, mixing, cutting, or dropping, baking, cooling, and packing. The process begins with the preparation of cookie dough in a planetary mixer, a versatile piece of equipment that thoroughly combines ingredients such as flour, sugar, and flavourings to achieve a consistent texture. The mixer is equipped with interchangeable attachments, such as whisks, beaters and dough hooks to cater to different mixing requirements.

a. Planetary Mixer

Planetary mixture consists of 2 blades (centre blade and edge blade) with kettle shifter, speed adjuster and height adjuster of blades. The capacity of the kneader is 30 kg per batch.

Figure 2.29 Planetary Mixer

b. Cookie Cutting Machine (Wire Cut or Dropping Method)

The wire cut technique also promotes better rise and a lighter texture in the finished cookies, as it minimizes handling of the dough which deflates air gaps. Additionally, this approach is often quicker and requires less specialized equipment than traditional cookie-making methods, making it accessible for home bakers. Cookie cutting machine consists of hopper, in which sheeting rollers are placed along with cutting dies at the bottom. The function of the sheeting rollers is to spread the dough into cookie shape. The capacity of machine is 20-25 kg per batch.

The wire cut technology for making cookies refers to a method of portioning and shaping the dough using moulds. First, the dough is loaded into the "Cookie cutting machine" and the extra dough from the tray platform is removed by clicking "Wire cut" button. After pressing the required "Recipe" button, the machine starts cutting the dough into fine shape cookies and drops into trays. Then, the oven trays with cookies are arranged in the oven trolley and transferred to the "Rotary oven".

Figure 2.30 Cookie Cutting Machine

c. Rotary Oven

The rotating rack oven is a conventional oven with forced air circulation. Rotor oven is a rear oven with back burner and heat exchanger, to reduce the overall dimensions. Its versatility makes it

suitable for several types of breads, cookies, cakes, and muffins. The air is channeled into the baking chamber through special ducts and a series of inlets with adjustable shutters. The oven has a trolley in which multiple trays are stacked vertically. These trays hold the cookie shaped dough to be baked and are designed to optimize the use of space inside the oven. After the trolley is placed inside the baking chamber, it rotates continuously to ensure even exposure of all trays to heat, resulting in uniform baking across all levels.

The oven is equipped with precise controls for adjusting time and temperature, making it adaptable for a wide range of baking requirements. Bakers can program the oven to achieve the specific conditions needed for different products with consistent quality. The rotary mechanism combined with controlled convection heating ensures that hot air circulates evenly, eliminating hotspots and reducing the risk of uneven baking. This combination of a rotating trolley, adjustable settings and efficient heat circulation makes the rotary oven a versatile and reliable choice for high-capacity baking operations. The oven has a perfect thermic isolation with no toxic materials, and works with diesel burners.

Figure 2.31 Rotary Oven

d. Horizontal Flow Wrap Sealing Machine

Horizontal flow wrap machines are automated packaging systems that continuously wrap products in flexible film material as they move horizontally through the machine. These versatile machines form a tube of packaging film around products to create a longitudinal seal along the bottom or back, followed by transverse sealing and cutting to separate individual packages. The packing roll holds a continuous sheet of packaging material such as polypropylene, polyethylene, or biodegradable films, and feeds it to the machine. This technology helps in wrapping the products like bars, cookies, biscuits and muffins. The conveyor transports the products from the loading area to the wrapping section, maintaining a steady flow and ensuring precision in positioning for consistent packaging. Key components include an infeed conveyor, film handling system, forming box, sealing mechanisms, and control systems, while the advanced models offering features like modified atmosphere packaging and integrated quality control.

The machine allows for adjustments in conveyor speed to accommodate different product sizes or production rates, and temperature of the sealing mechanism to ensure strong, airtight seals without damaging the packaging material. This flexibility ensures that the machine can handle a wide variety of products while maintaining efficiency and product integrity.

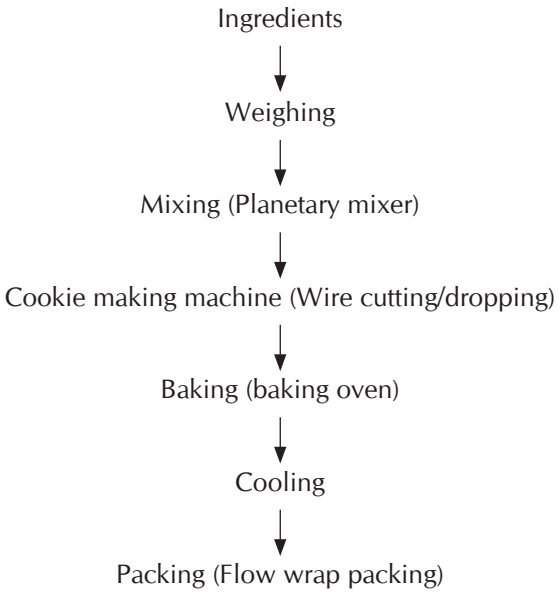
Figure 2.32 Horizontal Flow Wrap Machine

Potential Products

- Jowar Cookies
- Ragi Cookies
- Ragi Jaggery Cookies
- Jowar Premium Almond Cookies
- Jowar Premium Cashew Cookies
- Jowar Premium Choco Chip Cookies
- Ragi Premium Cashew Cookies

Specifications	Manufacturer's Details
Planetary Mixer • Capacity – 100 Liter • Batter capacity – 40kgs • Motor HP – 5 • Motor phase – 3 ϕ • Model: C-100 • Cost of the equipment: 4,13,575/- **Cookie Cutting/Dropping Machine** • Fully automatic with PLC control • Touch screen type with 35 memories, with 6 nozzles • Power 1.2 Kw, Phase, and 400Volts • Machine size 900×900×1200mm • Machine weight 170kgs • Cost of the equipment is Rs.8, 50,000/- **Rotary Oven** • Model number: 04AR/7090R • Dimensions: 1780 x 2400 x 2630 • Capacity: 18-70x90 • Motor horse power: 3.75 HP • Energy: 72,000 kcal/h • Baking area: 11.34 m^2	Arun Rega Bakery Machineries Pvt. Ltd. S. F no. 213, site no. 4, Sitra Kalapatti road, Kalapatti post, Coimbatore – 641048 Tamil Nadu, India
Continuous Band Sealer • Power: 220v – 50Hz • Sealing width: 10-15mm • Heater: 65W • To seal all kinds of plastic films, compound films and aluminum-plastic film. • Cost – 12500/- **Horizontal Single Wrap Sealing Machine** Heaters: 3 nos. Power: 1.73 Cost: Rs. 6,87,619	Ace fine pack Pvt. Ltd Pullepady, Ernakulam, Kerala Tel: +91 484 2353855. M/S Sri Sai Datta Engineering works, New Gowtham Nagar, Ferozguda, Hyderabad

Cookie Line - Process Flow Chart



C. Muffin Line

The muffin making process involves creaming, beating, dropping, baking, cooling and packing. The process begins with the preparation of the muffin batter in a planetary mixer**,** equipped with versatile attachments such as whisks, beaters, and paddles to thoroughly mix ingredients like flour, sugar, eggs, and flavourings. This ensures a smooth, homogeneous batter with the desired consistency, and free from lumps.

a. Planetary Mixer

The planetary mixer details mentioned in section 2.3.2

b. Muffin Dropping Machine

A muffin dropping machine with a capacity of 25 kg/batch is used for efficient production of muffins, ensuring precision, uniformity, and high productivity. In this technique, the prepared muffin batter is dropped into the mould trays, which are lined with paper cups. The quantity of batter drop can be adjusted as per our requirement. These trays are designed to hold individual muffin cups, ensuring easy release after baking.

This method is particularly useful for batters which tend to be stickier and less structured. Then, the mould trays with batter are arranged in the oven trolley and transferred into the Rotary oven for baking. The dropping technique also promotes better rise and a lighter texture in the finished muffins, as it minimizes handling of the batter which can deflate

Figure 2.33 Muffin Dropping Machine

air bubbles. After baking and cooling, the muffins are transferred to the flow wrap machine to seal each muffin with wrappers, protecting them from contamination and extending shelf life.

c. Rotary Oven

The rotary oven is same as mentioned in section 2.3.1B

d. Packing and Sealing

The flow wrap machine to wrap individual machines is mentioned in section 2.3.1B

Potential Products

- Jowar Muffins (with egg)
- Ragi Muffins (with egg)
- Other millet-incorporated muffins (with egg)
- Millet Based Eggless Muffins

Muffin Line - Process Flow Chart

Specifications	Manufacturer's Details
• Working width – 18'' (450mm) • No of nozzles – 7 • Power – 1 hp (3 ϕ) • Cost in INR – 6,00,000/-	Kar Bakery Equipments (India) Private Ltd. Plot no – 162, Brahmanapally Road, Ragannaguda, Turkayamjal, Abdullapurmet, Hyderabad, Telangana – 501510

D. Continuous Bread Making Line

Bread is a staple food consumed globally and is traditionally made from refined wheat flour. It plays a significant role in daily diets, providing carbohydrates and energy. However, the refined wheat flour bread has several nutritional drawbacks, including a high glycaemic index, which can cause rapid spikes in blood sugar levels. Additionally, the refining process strips wheat of essential fiber, vitamins, and minerals, making it less nutritious compared to whole grains.

The processing of bread follows a straight dough method with slight modifications, where all ingredients added at once to prepare dough. Millet bread, developed from nutrient-rich and gluten-free millets, offers a superior alternative due to its higher fiber, protein, essential minerals and antioxidants. Unlike refined wheat, millets have a low glycaemic index, making them a preferable choice for diabetic patients and those aiming for better blood sugar management.

Figure 2.38 Ragi Bread

a. Spiral Dough Mixer

This is used to mix and knead the flour to prepare the homogeneous dough with required consistency. It can handle 100-120 kgs of dough/batch and suitable for large bakery operations. It is equipped with a bowl, spiral arm, dividing plate, driving motors and safety transparent guard.

Figure 2.39 Spiral Dough Mixer

b. Dough Divider Machine

This volumetric divider is suitable for soft to medium soft dough consistency with up to 55% water content and helps to divide the dough in a specific manner. In this machine, the dough is processed with the natural process and not stressed or warmed up. The prepared dough was transferred to the hopper, where it was divided into portions of the desired weight. The dough weight can be adjusted using two dedicated adjustment buttons.

Figure 2.40 Conical Dough Divider Machine

c. Dough Moulding Machine

Bread moulder is designed for moulding long loaves of bread and rusk toast. Its sturdy construction makes the machine suitable for use in automatic and semi-automatic bread and rusk production plants. Sheeting is done with the help of 3 sets of rollers to reduce the thickness and increase surface area to the required extent, while also degassing the dough piece.

The gap between the roller can vary with the help of a side rotating lever along with a gauge. With the aid of a mesh belt along the moulding belt, the sheeted dough is rolled back into a cylindrical form. The length of the rolled dough can be adjusted using the provided lever to fit different mould sizes, whether for small or large loaves. Additionally, the thickness of the rolled dough can also be modified using the same adjustment lever. The final rolled dough could be transferred to pan directly for proofing.

Figure 2.41 Dough Moulder

d. Proofing Chamber

Proofing is a step in preparing bread and other baked goods in which the dough is allowed to rest and rise a final time before baking. During this rest period, yeast ferments the dough and produces gases, thereby leavening the dough.

Figure 2.42 Proofing Chamber

e. Rotary Oven

A rotary rack oven is a type of bakery oven that uses a rotating rack to bake multiple trays of food at once. The rotating rack helps ensure that all the food is heated evenly, resulting in more consistent baking.

Figure 2.43 Rotary Oven

f. Slicer

A bread slicer used to slice the bread based on desired thickness. There are two types of slicing- fixed and adjustable thickness. After bread reached room temperature, the breads can be sliced and packed.

Figure 2.44 Bread Slicer

g. Packaging

Hand operated sealing machine is used for sealing the bread packets.

Figure 2.45 Hand Sealer

Potential Products

- Jowar Bread
- Ragi Bread
- Multi Millet Bread
- Millet Buns
- Millet Rusks
- Pizza Bases

Continuous Bread Line - Process Flow Chart

Ingredients
↓
Weighing
↓
Mixing (Spiral Mixer)
↓
Dough Divider
↓
Moulding
↓
Proofing
↓
Baking (Rotary Oven)
↓
Cooling
↓
Slicing
↓
Packing

Manufacturer's Details	Reva Project Engineers # C-103, 3rd Cross, 3rd Stage, Peenya Industrial Area, Bengaluru-560 058 Email - revaproject@yahoo.com. Contact: +91 9448185219

2.3.2. Flaking and Puffing Technologies

A. Continuous Flaking Line

Continuous flaking line consists of steam cooker, dryer, roller flaker and grading unit. The gap adjustment mechanism for the rollers allows operators to control the thickness of the flakes to meet specific product requirements. The key process steps involved in the flaking of whole Jowar grains are washing, cooking, drying, roller flaking, grading, drying, sieving, and cooling.

a. Grain and Dal Washer

A grain and dal washer is used for thorough cleaning of grains, lentils and pulses by removing dirt, dust, pesticides, and other impurities. It is typically made of stainless steel, ensuring durability, hygiene, and resistance to corrosion. This chamber is equipped with a fine mesh which allows water to drain efficiently while keeping the grains intact. The machine features a water inlet system to supply the clean water in a controlled manner, and an outlet system to effectively drain the used, dirty water to maintain cleanliness throughout the process.

An agitator creates a consistent motion by using paddles, to dislodge the dirt and impurities without damaging the grains. A drainage system often incorporates filters to ensure no grains escape with the outflow.

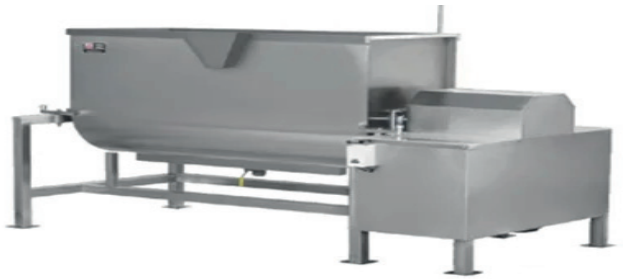


Figure 2.46 Grain and Dal Washer

Vendor Details:

Machine Name	Grain and Dal Washer
Manufacturer	M/s. Shamukha Industries
Capacity	60 kg/hr

b. Steam Cooker

The commercial steam grain cookers in flaking lines use the pressurized steam to efficiently and uniformly cook the grains before sending to flaking process. In a typical setup, raw grains (up to 50 Kg capacity) are fed into the steam cooker to expose to high-pressure steam. This process gelatinizes the starch in the grains, softening them and making them more pliable for subsequent flaking. The steam cooking also helps to sterilize the grains, increasing their shelf life and improving food safety. The cooker's design usually includes features for precise control of cooking time, temperature, and steam pressure. The entire process is carefully controlled to ensure

the grains reach the optimal moisture content and texture required for flaking, resulting in high-quality flaked products like breakfast cereals or snack foods (Chivda).

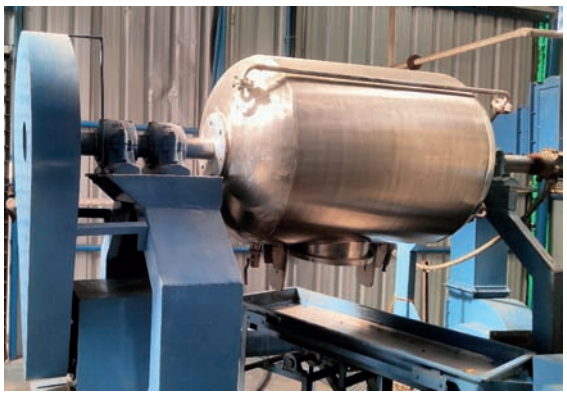


Figure 2.47 Steam Cooker

c. Dryer

The LSU (Louisiana State University) dryer is a widely used grain drying system known for its efficiency and versatility in handling various types of grains with 200 kgs capacity. The LSU dryer operates on a vertical column design, where wet grain enters from the top and moves downward through alternating drying and cooling sections. Hot air is forced through the grain column, removing moisture as it passes. The unique aspect of the LSU dryer is its use of reversing air flow, which helps to achieve more uniform drying and reduces the risk of over-drying or under-drying of the batch. One of the key advantages of the LSU dryer is its ability to handle high-moisture grains efficiently. It can process a wide range of grains including millets, rice, corn, wheat and soybeans. The dryer's design allows for easy adjustment of drying parameters such as grain flow rate and drying time, making it adaptable to different grain types and moisture conditions. Energy efficiency is another notable feature of the LSU dryer.

Figure 2.48 LSU Dryer

d. Roller Flaking Machine

Roller flaking machines are used to process grains and cereals into flakes. They consist of two or more large, smooth rollers which rotate in opposite directions. As grains pass between these rollers, they are flattened and compressed into thin flakes. This process is commonly used to produce breakfast cereals, oatmeal, and animal feed. Roller flaking improves the digestibility and cooking properties of grains while preserving their nutritional value. The thickness of the flakes can be adjusted by changing the gap between the rollers.

Figure 2.49 Roller Flaking Machine

e. Grader

Flake graders are essential components in grain processing operations, designed to sort and classify the flakes by size and quality. These machines typically employ a series of vibrating or rotating screens with varying mesh sizes to separate flakes into different categories. As flakes pass through the grader, larger pieces are retained on coarser screens while smaller or broken flakes fall through to finer screens below. This process ensures product consistency, removes undersized or damaged flakes, and allows for efficient sorting of flakes for various applications. Flake graders play a crucial role in industries such as cereal production, animal feed manufacturing and brewing, where uniform flake size is vital for maintaining product quality and optimizing processing efficiency.

Figure 2.50 Grader

f. Tray Dryer

Tray drier is used for the best drying results in conventional process. It is a double walled cabinet with single or double doors. The gap between two walls is filled with high density fiber glass wool insulation material to avoid heat transfer. Stainless

Figure 2.51 Tray Dryer

steel trays with material are placed inside the cabinet to allow drying process. Tray drier is provided with control panel board, process timer, digital temperature controller cum indicator etc. Tray drier is available in capacities ranging from 6,12,24,48,96 and 192 trays.

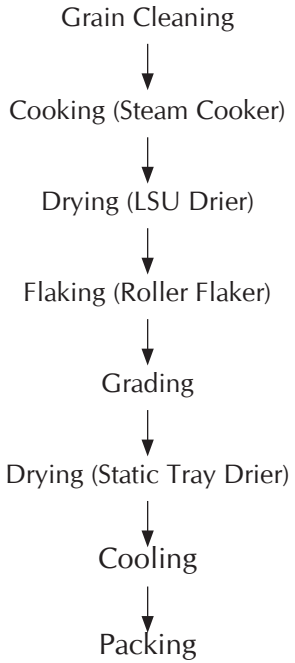
Potential Products

- Namkeen (Chivda)
- Poha
- Upma
- Thin and Thick akes

Specifications	Manufacturer's Details
Steam Cooker Specifications • SS-304 (MOC – Stainless steel) with 8mm thickness • Motors are Crompton make & gear head greaves make. • Motor – 2.24 KW • Grader – 0.37 KW • Blower Motor – 0.75 KW	1 **Sri Datta Engineering Works** Shop no.5-5-35/91/B, Prashanthi Nagar, Kukatpally, Hyderabad – 500072.
LSU Dryer Specifications • MOC – Stainless Steel • Bucket elevator motor – 0.75 KW • Elevator height - 25 ft • Thickness - 2.5 mm • Belt width – 100 mm • Bucket size – 4″ • Pulley width – 100 mm • Dryer motor (1400 rpm) – 0.3 KW • Motors are Crompton make & gear head greaves make.	2. **Perfura Technologies Pvt Ltd** #7, Maruthamalai Gounder Layout Ramaksrishanapuram, Ganapathy Coimbatore - 641006 Phone: 9894850009/00009 Email: sales@perfuratech.com
Roller Flaker Specifications • Flaker inside body – Stainless steel sheet • Flaker outer frame – Mild steel • Ac drive for feed roll • Operates with gears • Flaker roll diameter (500*1000) mm • Roller flaker motor (965 rpm) – 9.3 KW • Cooling conveyor motor (1420 rpm) – 0.75 KW • Belt diameter – 300mm	3. **Sandeep Industries** 3229, Ranjeet Nagar, New Delhi, Delhi – 110008.

Specifications	Manufacturer's Details
• Conveyor belt material - Teflon food grade (heat resistant)	
Grader Specifications • Grader motor – 0.37 KW • Sieve Area 56 × 23 ft^2 • 1st sieve diameter – 4.84 mm	
Tray drier Specifications • Double door with display settings • Number of trays – 96, • Motor - 3 Phase • Cost of the equipment is R. 4, 00,000/-	

Continuous Flaking Line – Process Flow Chart



B. Other Types of Flaking Machines

a. Rice Flaking Machine (Edge Runner)

A rice flaking machine, commonly known as a poha machine, is used to transform parboiled rice into attened rice, a popular ingredient in many cuisines. The machine is fed cleaned and parboiled grains at a controlled rate. The grains then pass through heavy-duty rollers that flatten the grains into thick flakes, with the surface of the rollers ensuring uniformity without breaking the grains.

The processed flakes are collected through a discharge chute, ready for drying, packaging, or immediate use. Powered by a robust drive mechanism, including motors and belts, the machine operates efficiently. The machines are valued for their ability to produce high-quality, uniform flakes while maintaining efficiency and catering to different culinary needs.

Figure 2.52 Edge Runner

Vendor Details:

Machine Name	Rice Flaker (Edge Runner)
Manufacturer	M/s ABC Agro Food Machines
Capacity	50 kg/hr

b. Extrusion Flaker

Millet or Cereal flakes can be made by an extrusion process for overcoming the difficulties in traditional flaking method. Extrusion cooking process combines mixing, cooking, kneading, shearing, and forming. It also provides better controlling and possibility of combining wide number of raw materials. Typically, raw material is fed into an extruder barrel and the screw conveys the raw material through the barrel. The raw material undergoes heating, compression and mixing to form a thermoplastic mass. The raw material is extruded out of the extruder barrel into strands or ropes, which are cut into pellets. These pregelatinized extruded pellets are conditioned and fed to the rollers for flaking. The partially gelatinized flakes are roasted to make them fully gelatinized to produce good cooked texture, stable, and shelf-life. Roasting at higher temperature produces a crispier and puffier flakes with increased shelf life and reduced water activity.

Figure 2.53 Extrusion Flaker

Vendor Details

Machine Name	Extrusion flaker
Manufacturer	M/s. K.K. Life Sciences
Capacity	50 kg/hr.

b. Grain Puffing Line

The grain puffing machine is used to produce the puffed grains, which are popular snacks. Puffing is a simultaneous process of starch gelatinization and

grain expansion, during which grains are exposed to high temperatures for a short time. During this process, the controlled expansion of kernel is carried out, while the vapor pressure escapes through the micropores of the grain structure due to high pressure or thermal gradient. The process requires decorticated grains, and the resulting product has highly desirable functional and sensory qualities.

The Gun Puff machine comprises a heavy-duty rotary barrel-shaped structure with an opening on one end and a provision to firmly close the barrel with a lid on the other end. All the decorticated & polished grains are dropped in to the barrel and heated by using LPG, furnace oil, firewood or electricity. The typical process involves the sequence of pre-cleaning (grading, destoning & aspirations), polishing, conditioning, puffing, grading, roasting, coatings, and packing. The shelf life of puffs ranges from 2 to 3 months. Flavors like cream onion, tomato, turmeric & salt, mint, chat masala, etc. can be used for enriching the taste of sorghum puffs as per choice.

The barrel is the main chamber where the grains are subjected to high pressure and temperature. Inside the barrel, grains are exposed to heat and pressure, causing the moisture within the grains to vaporize rapidly, and expand (puffing) to release the grains inside pressure. The burner provides the heat necessary for the puffing process. The burner's intensity can be adjusted to control the temperature, making it adaptable for different types of grains and puffing requirements. This machine is essential in food processing industries for producing puffed snacks efficiently and consistently.

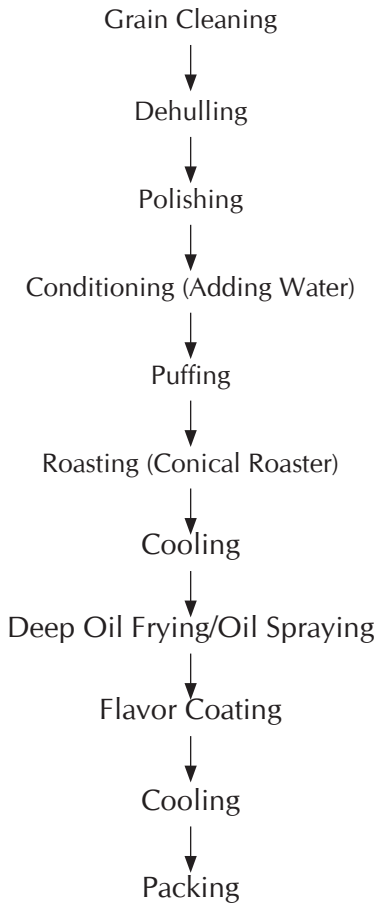
Figure 2.54 Gun Puff Machine

Potential Products

- All major and minor millet puffs

Specifications	Manufacturer's Details
• Batch type 1-3 kg per batch • 0.4-1.3 MPa Bulking pressure (be different for materials) • Power Consumption 0.75kw • Capacity- 30-40kg/hour • Weight of loading for a time 1-3 kg • Cost of the equipment: Rs. 15,22,850/-	Jinan Americhi machinery & equipment co., ltd., Tianqiao Industrial Park, Tianqiao District, Jinan city, Shandong province, 250023, China. Tel: 0086 18663764200 Email: americhi@live.com

Puffing Line - Process Flow Chart



2.3.3. Extrusion Technologies

A. Hot Extrusion Line

a. Hot Extruder

Hot extrusion technique is a process which combines several unit operations including mixing, cooking, kneading, shearing, shaping, and forming with application of high temperatures and pressure. All wet and mixed ingredients are forced to pass through an opening in a perforated plate or die with a specific design. The extruder consists of a large, rotating screw tightly fitted within a stationary barrel with a die. Hot extrusion cooking is a high-temperature short-time (HTST) process which reduces the microbial contamination and inactivates enzymes. The main reason for enhanced shelf life of hot extruded foods is the reduced water activity (0.1–0.4) because of this process.

A hot extruder is used to produce snacks, cereals, and extruded products by shaping and cooking raw ingredients under high temperature. The process begins with the mixer, which blends raw materials including flour, to form a uniform mixture with precise moisture content. The mixture is fed into the screw conveyor, which convey the material to the extruder while ensuring consistent feeding. At the heart of the system is the twin-screw hot extruder, which consists of two intermeshing screws within a heated barrel. The screws generate intense shear forces, mixing the material thoroughly while cooking it under high temperature. The design of the screws allows for controlled processing, accommodating diverse raw materials and ensuring homogeneous cooking.

As the material exits the extruder, a die shapes it into the desired forms, such as rings, ball, analogue rice. Dies can be customized to produce various shapes, catering to different product requirements. The extruded product is then transferred via an

air conveyor, which uses airflow to move the hot extrudate gently, reducing breakage or deformation. For certain applications, the extrudate is further processed using a roller flaker, which presses it into thin flakes, commonly used in cereals.

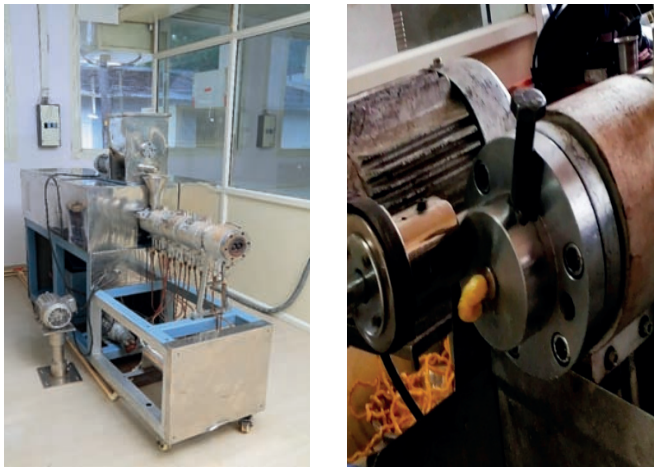


Figure 2.56 Hot Extruder

b. Flavour Coating Machine

A flavour coating machine with an oil sprayer is designed to evenly coat products like extruded snacks and puffs, with seasonings, flavours, or other coatings. The hopper ensures a steady and controlled release of the coating material into the machine. The rotating barrel tumbles the food products continuously to create a uniform mixing, and ensure that each piece is evenly coated with the flavouring agents. The barrel is typically tilted or designed at an angle to facilitate the forward movement of the products as they are coated.

The oil sprayer connected with a heater, maintains the oil at an optimal temperature to prevent solidification and ensures smooth spraying and uniform consistency. The oil delivered through a nozzle atomizes into a fine mist for even application onto the food products. The nozzle is strategically positioned within or near the barrel to ensure that the oil is evenly dispersed as the barrel rotates. Together, these components create a system that ensures precise and consistent application of oil-based coatings, enhancing the flavor and appearance of the final product while maintaining efficiency and minimizing waste.

Figure 2.57 Flavour Coating Machine

Vendor Details:

Machine Name	Flavor Coating Machine
Manufacturer	M/s K.K. Life Sciences

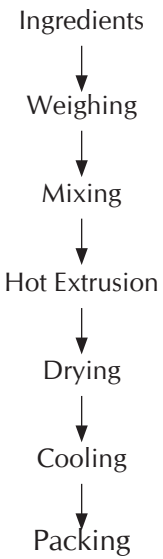
Potential Products

- All millet based extruded snacks
- Analogue Rice
- Extruded Puffs

- Extruded Balls
- Extruded Flakes

Specifications	Suppliers
• Screw diameter - 30 MM • Screw central distance: 26mm • Speed range – 0-500rpm • First series l/d: 11.6/12.7/23 • Heating way: heating ring • Cooling way: water • Temperature scope: 20°c -300°c • Number of measuring temperature point – 4 • Capacity – 50 kg/hr. • Cost of the equipment: ₹ 16,71,700	M/s K.K Life Sciences, No. 21/41, Flat No. 3, Sunkuvar Street, Triplicane, Chennai, Tamil Nadu 600005. Contact: 99412 22214

Hot Extrusion Line - Process Flow Chart



B. Cold Extrusion Line

Cold extrusion technology is a food processing operation in which a set of mixed ingredients are forced through an opening in a perforated plate or die with a specific design. The cold extrusion is used to produce the RTC products such as vermicelli, pasta, noodles, etc. The addition of water to the flour blend creates a wet homogenous mass. This wet mass is then placed in the extruder and forced through a disc perforated with desired openings coated with Teflon. The output sent to the dry heat treatment to produce the final product ready for packing.

a. Cold Extruder

A cold extruder is used to shape the raw material into specific forms without applying heat during the extrusion process. It is commonly used for products such as pasta, noodles, vermicelli, etc. The process starts with mixing, where the raw material is thoroughly blended to achieve a uniform consistency. The mixing chamber consists paddles or rotating blades to facilitate effective mixing.

The mixed material is then transferred to the extrusion chamber, where the screw plays a vital role in conveying and compacting the material. The screw's design determines the pressure and flow of the material, ensuring it is properly pushed through the system. At the end of the extrusion chamber is a die head**,** which holds the die of required shapes. The die shapes the material into the desired form, such as rods, strands, elbows, tubes or other unique profiles. After extrusion, a cutter positioned near

the die head slices the extruded material into the required lengths or shapes, ensuring precision and uniformity. The entire process is monitored and controlled through a control panel**,** which allows the operator to adjust parameters such as screw speed, pressure, and cutting length to achieve the desired product characteristics.

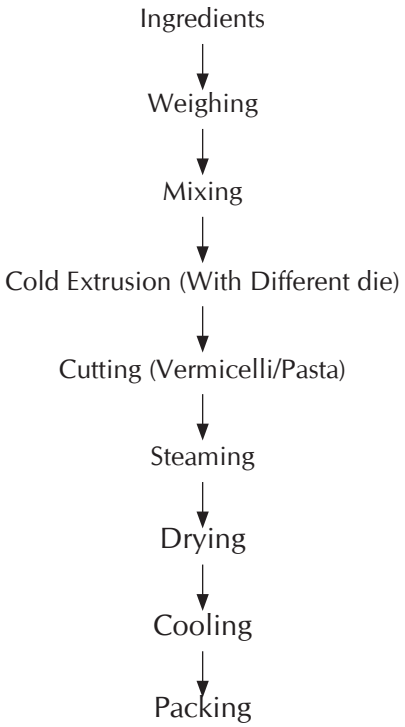
Figure 2.58 Cold Extruder

Potential Products

- All millets vermicelli
- All millets pasta and different pasta types
- All millets noodles
- Ready to cook pasta and vermicelli

Specifications	Manufacturer's Details
• Hourly extrusion production –200 kg/h • Dough kneading vat capacity-75 kg • Power– 6 KW and 3 phase connection • Motor power (1-5500;2-1870 & 3-1870 watts) • Kneading chamber capacity: 12 kg • Dimensions: 1550 mm * 1650 mm * 1650 mm • Electrical connection-400 V 50Hz 3f • Electrical connection (upon request)-230 V 60Hz 3f • Weight –590 kgs • Cost of the equipment is 37.76 Lakhs/unit (Cold extruder, Steamer & Tray drier) • Capacity - 100 kg/hr	1. Sandore Food Machines, Via Monte Sunmano,58 Zane 36010, VI Italy, Tel.0445-314388, Fax.0445-314858, Mail-sandore@sandore.com, Website: www. sadore.com **Supplier Details** Agaram Industries, 73 (Old no.:126), Nelson Road, Aminjikarai, Chennai-600 029, Tamil Nadu.

Cold Extrusion Line – Process Flow Chart



C. Noodles Making Line

Noodles are among the favourite dishes in many parts of the world, which can be produced either by using the cold extrusion or sheeting-cutting processes. The cold extrusion process for noodles being same as vermicelli, we will discuss the sheeting-cutting technology in this section. This process involves several key technological steps, with the sheeting and cutting process being particularly crucial. The process begins with pre-cleaning of sorghum grains using a destoner cum grader cum aspirator, followed by milling into fine flour using a Pulverizer. Then, the bran is separated from flour by using a vibro sifter to achieve the desired quality and particle size.

A planetary mixer blends the sorghum flour with other ingredients like refined wheat flour, amaranth, xanthan gum, and glycerol monostearate to form a pliable dough. This specialized machine employs a series of rollers to reduce thickness and a cutting die to cut noodle strands, followed by steaming. This advanced sheeting and cutting technology, combined with other specialized equipment and precise processing steps enables the production of gluten-free, nutritious millet noodles with consistent quality and desired texture.

a. Noodle Sheeting and Cutting Machine

The well mixed dough is fed into a set of rollers that gradually reduce the thickness of the dough, creating a thin, continuous sheet. As the dough sheet travels through the machine, it passes through additional rollers to further refine the thickness and texture. Finally, the thin dough sheet travels through a cutting mechanism, which uses sharp blades to slice the sheet into long, uniform noodle strands of the desired width.

Typically, the dough attains a thickness of 4.08 mm at 1st set of rollers, 2.18 mm at 2nd set of rollers and 1.42 mm at the 3rd set of rollers, Noodles with 400 mm length are cut into required shapes like round bundles or lengthy strands using sharp cutting die as per the packaging preference. Later these noodles strands are placed in trays and steamed in a pre-heated steamer.

Figure 2.34 Noodles Making Machine

b. Steamer

The steamer is pre-heated for 1 hour and the trays with noodles strands are steamed for 25 minutes.

Figure 2.35 Steamer

c. Static Tray Dryer

Tray drier is used for the best and efficient mechanism of drying. Tray drier is provided with control panel board, automatic temperature preservation and humidity control and process timer. Pre-heat the tray drier at 60°C for 30 minutes and all the trays with extruded wet noodles were kept inside the drier and dried for 4 hrs.

Figure 2.36 Static Tray Drier

d. Continuous Band Sealer

A band sealer is a versatile packaging machine used to seal bags and pouches efficiently. It provides reliable sealing for materials like plastic, laminates, or foil pouches, ensuring the integrity and protection of the packaged contents. The pouches are fed into the machine, where a guide wheel and guide belt ensure proper alignment and stability during operation. The

heating block applies controlled heat to the sealing area of the pouch, softening the material to create a seal. If nitrogen flushing is required, the nitrogen flushing attachment fills the pouch with nitrogen gas before sealing.

The embossing wheel applies pressure to the heated seal to reinforce the bond between the sealing layers, ensuring a durable and airtight seal. The wheel's settings can be adjusted using the embossing wheel adjustment knob, allowing for changes in pressure and depth. A conveyor belt moves the pouches steadily through the sealing mechanism, synchronization with the other components to ensure a smooth and continuous operation. The control panel provides centralized control for settings like sealing temperature and speed for ensuring flexibility and ease of use for different packaging requirements. The air vent ensures effective heat dissipation, maintaining optimal performance and preventing overheating during extended operations.

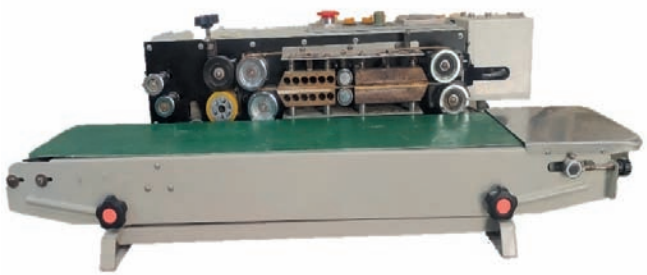


Figure 2.37 Continuous Band Sealer

Potential Products:

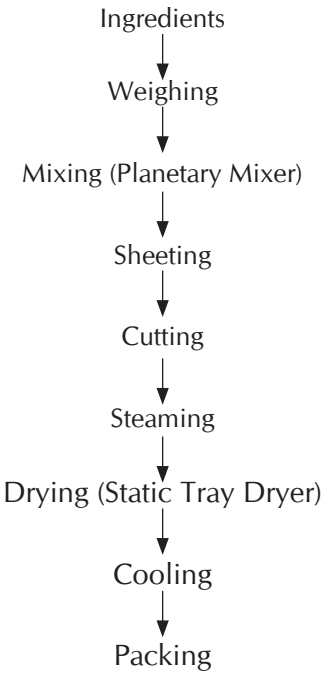
- Sorghum Noodles
- Pearl millet Noodles
- Finger millet Noodles

Specifications	Manufacturer's Details
Dimensions of the unit – L*W*H : 8700-9700*1600-1700*1500-1600cm Rollers: 8-10 groups roller Capacity- 50 kg/hr Double head nood machine or equivalent technology • Automatic transfer, forming of nodle in one time, • Dimensions of the roller (L*B*H): 3500-4000*780-900*1400*1500mm or equivalent • Roller thickness: 300-400mm • Power: 3-4 kW for each roller head • Voltage:380-400v, 50-60Hz with standard make starter and MCB (Miniature Circuit Breaker) Automatic cutting • Cost - Rs. 4,79,115/-	Dinesh Scientific dineshvrm@gmail.com +91-9896744968

Steamer Specifications details	Supplier's details
• Capacity- 400 - 500 Kg/h • Power– 0.5 kW • Cost – 8,00,000 Rs/-	Agaram Industries 73 (Old no.:126), Nelson Road, Aminjikarai, Chennai-600 029, Tamil Nadu.

Static tray drier specifications	Manufacturer's details
• Double door with display settings • Power consumption– 8-20 KW • Dimensions- 7Ft.(L) *4Ft.(W) • Capacity – 400-500kg/cycle • Cost – 10,00,000 Rs/-	Sandore Food Machines Via Monte Sunmano,58 Zane 36010, VI Italy, Tel.0445-314388

Noodles Making Line - Process Flow Chart



2.3.4. Other RTE Product Lines

A. Murukku Making Line

a. Murukku Machine

A muruku machine is used for producing muruku, a traditional snack item. The extrusion unit with die plate is the heart of the machine. It is responsible for shaping the dough into the specific muruku shape. The dough is pushed through a die plate that contains multiple small holes in various sizes and shapes, allowing the dough to be extruded into long strips, spirals, or other desired forms. The die plate can be changed to achieve different sizes and shapes based on product requirements.

A motor and drive system provides the necessary power to operate the machine. The motor drives the extrusion unit and other moving parts, ensuring that the dough is extruded at a consistent rate. The drive system is designed for efficiency and precision, allowing the machine to operate smoothly and continuously, which is crucial for high-volume production.

The cutting mechanism is responsible for cutting the extruded dough into uniform pieces of muruku. It typically consists of a cutter that cuts the dough at regular intervals as it is extruded. This ensures that each piece of muruku is of same size, which is essential for consistency in the final product. A conveyor transports the extruded and cut muruku pieces from one stage to another. It moves the dough to the frying section of the production line. The conveyor ensures that the process flows smoothly,

preventing bottlenecks and ensuring that the muruku pieces are delivered at the right pace.

Vendor Details:

Machine Name	Muruku Machine
Manufacturer	M/s Sree Sai Datta Engineering Works
Capacity	25 kg/batch

b. Deep Fryer

A deep fryer is an essential piece of equipment used for frying various snacks. It ensures the product is evenly fried, with a crispy exterior and a tender interior. The frying tank is the container where the oil is stored and heated for frying. It is typically made from durable and heat-resistant materials, designed to hold large volumes of oil. The tank is equipped to accommodate food products that are submerged in hot oil, ensuring even cooking. The heating element is responsible for providing the heat required to bring the oil to the desired temperature. In gas-powered fryers, the heating element uses gas burners to heat the oil.

The oil filtration system helps maintain the quality of the oil by removing food particles and debris. It filters out these impurities from the oil during and after the frying process, extending the lifespan of the oil and improving the quality of food. The drain valve for oil disposal allows for the easy and safe disposal of used oil. After the frying process is completed, the drain valve is used to release the oil from the tank into a container for disposal or reuse. The valve ensures smooth and controlled drainage, minimizing spills and making it easier to clean the fryer.

Vendor Details

Machine Name	Deep Fryer
Manufacturer	M/s Sree Sai Datta Engineering Works
Capacity	50 kg/batch

Figure 2.67 Murukku Machine and Deep Fryer

c. Food De-oiling Machine

A de-oiling machine for food processing is designed to remove excess oil from fried or oil-coated food products, ensuring that the final product has the desired texture and lower oil content. This process is crucial for enhancing product quality and making foods healthier. A rotating drum is the core component of the de-oiling machine, and it is typically perforated or mesh-based drum allowing the food products to be evenly distributed within the drum. As the drum rotates, the centrifugal force causes the excess oil to be separated from the food. The rotation ensures that the oil is evenly drained while maintaining the integrity of the product. The size of the perforations in the drum determines the efficiency of oil removal and helps prevent damage to delicate foods.

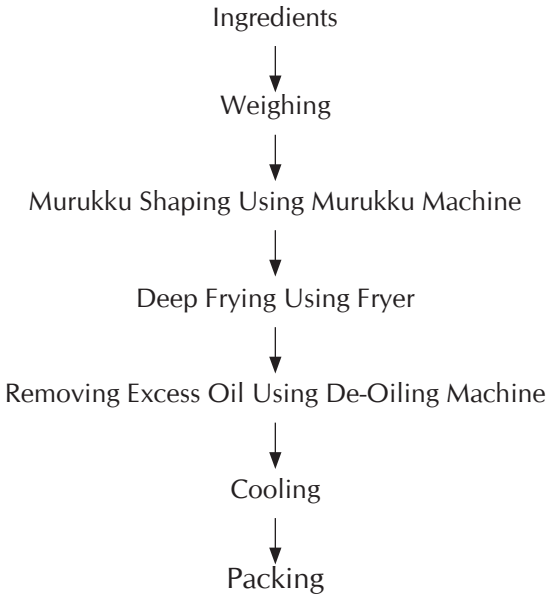
An outlet valve is responsible for discharging the collected oil from the machine. Once the oil has been separated from the food, it flows through the perforations of the drum and is collected at the bottom or side of the machine. The outlet valve allows the oil to be drained into a collection container, ready for reuse or disposal. The control panel provides the operator with the ability to monitor and control operational parameters, ensuring that the de-oiling process is optimized for different types of food products such as crispy snacks, fried foods, or oil-coated items.

Figure 2.68 Food De-oiling Machine

Vendor Details:

Machine Name	Food Deoiling Machine
Manufacturer	M/s Sree Sai Datta Engineering Works
Capacity	15 kg/batch

Murukku line flow chart



B. Nutribar Making Line

A Nutribar machine is used for production of energy bars, granola bars, or other similar nutrition bars. This machine integrates various components to efficiently mix, shape, compress, and cut ingredients into uniform bars. The blender is used to homogeneously mix all the ingredients, such as oats, crisps, sweeteners, and other ingredients ensuring consistent texture and flavour throughout the final product.

The feeding unit is responsible for transferring the blended mixture into the compression unit to ensure the consistent flow of the mixture, prevent blockages and smooth operation. The compression unit is a

critical component where the blended mixture is compacted into a solid, dense form. It uses rollers to compress the ingredients into a uniform thickness, ensuring that the texture of the bars is consistent and suitable for cutting. The compression process also ensures that the ingredients hold together firmly without crumbling.

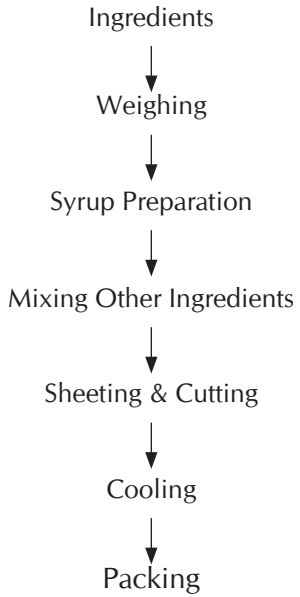
The cutting section consists of blades that divide the compressed mixture into uniform-sized bars, essential for packaging and presentation.

Figure 2.55 Nutribar Making Machine

Vendor Details:

Machine Name	Nutribar Making Machine
Manufacturer	M/s Sree Sai Datta Engineering Works
Capacity	25 kg/batch

Nutribar Making Line- Process Flow Chart



2.3.5. Other Value Addition Technologies

A. Semolina Making Line

a. Jowar Grinding Plant

The grinding plant is used to grind grains into coarse granules, commonly known as semolina. The grains are fed into the hopper, and are transported to the grinding unit by a conveyor moving at consistent feed rate. The grinding process takes place in the hammer mill, where high-speed rotating hammers crush the grains into smaller particles. Next, the material is passed through sieves to separate the desired semolina from finer flour and oversized particles. The sieves ensure uniform granule size, crucial for consistent quality in the final product.

An aspirator is used to remove lighter impurities and fine particles from the semolina, improving its quality. The residual husk and other lightweight materials are directed to a cyclone, which efficiently collects and separates them from the final product. The resultant flour is further roasted by using a conical roaster at optimized conditions to reduce the moisture content and extend the shelf-life.

Figure 2.63 Jowar Grinding Plant

Vendor Details:

Machine Name	Jowar Grinding Plant
Manufacturer	M/s Kaps Engineering
Capacity	100 kg/hr

b. Conical Roaster

The conical roaster is a designed for roasting grains, flour, semolina etc., evenly and efficiently. The roasting chamber is in conical shape to ensure even heat distribution and facilitate efficient mixing of the material during roasting process. Its construction is durable and heat-resistant, making it suitable for handling high temperatures and prolonged use. The heaters are strategically positioned to provide uniform heating to the roasting chamber. They are typically electric powered for delivering the controlled heat necessary for achieving the desired roast level. The heating system ensures consistent temperature throughout the roasting cycle, crucial for preventing uneven roasting or scorching.

The control panel allows operators to set and monitor critical parameters such as temperature, and roasting time. This precision ensures that the roasting process can be tailored to the specific requirements of different materials, enhancing flavour, texture, and quality. A discharge valve is located at the base of the roaster, enabling easy unloading of the roasted material once the process is complete.

Figure 2.64 Conical Roaster

Vendor Details:

Machine Name	Conical Roaster
Manufacturer	M/s Fans Bro Erectors
Capacity	70 kg/batch

c. Vibro-Sifter

The vibro sifter is a machine used to separate different grades of materials based on their size, ensuring uniformity and purity in the final product. These meshes are designed with varying hole diameters, allowing the separation of finer particles from coarser ones. The material is fed into the sifter, where it is sifted through the mesh, and the particles that are smaller than the mesh size pass through, while the larger particles remain on top for further processing or separation.

The vibratory motor is the component that drives the sifting action. It generates vibrations that cause the material to move across the mesh. The motor can be adjusted to control the intensity and frequency of vibrations, allowing for more efficient and precise sieving. The vibrations help to ensure that the material flows smoothly through the mesh, aiding in the separation of fine and coarse particles.

Figure 2.65 Vibro Sifter

Vendor Details:

Machine Name	Vibro-sifter
Manufacturer	M/s Tech Aramas (I) (P) Ltd.
Capacity	100 kg/hr

B. Blender

A blender is a versatile mixing machine used for combining dry powders, granules, or liquids to achieve a uniform mixture in industries like food processing, pharmaceuticals, and chemicals. Inside the mixing chamber, the agitator, often in the form of blades, paddles or ribbons, rotates to mix the materials thoroughly, break down clumps and ensure even distribution.

The discharge valve is positioned at the base of the chamber, allowing the blended material to be released efficiently. It is designed for smooth operation, minimizing material loss and enabling easy transfer to the next processing stage or packaging. The drive system powers the agitator, providing the necessary torque for effective mixing. The inclusion of a Variable Frequency Drive (VFD) allows precise control of the agitator's speed, enabling the blender to handle materials of different viscosities and mixing requirements. This adjustability ensures optimal blending consistency and prevents over-mixing or material degradation.

Figure 2.62 Blender

Vendor Details:

Machine Name	Ribbon Blender
Manufacturer	M/s Sri Srinivasa Engg. Works
Capacity	30 kg/batch

C. Urali Roaster

Urali roaster is a traditional yet efficient roasting machine commonly used for roasting grains, seeds, nuts, and spices. It is designed to provide uniform roasting while allowing easy handling and discharge of materials. The blender in the urali roaster ensures that the materials being roasted are evenly distributed and mixed during the roasting process. This continuous mixing helps to prevent the formation of hotspots, ensuring uniform roasting of the product. A stirrer constantly agitates the ingredients inside the roaster, helps to keep the materials in motion, prevents them from sticking to the bottom or sides of the roaster and promotes even exposure to heat.

The gas burner is the heat source for urali roaster, providing the necessary temperature to roast the ingredients. The burner is typically adjustable, allowing operators to control the heat intensity to match the specific requirements of different materials. The discharge valve allows for easy and efficient unloading of the roasted product. Once the roasting process is complete, the valve ensures smooth and quick release of the material without losing product quality or quantity.

Figure 2.66 Urali Roaster

Vendor Details:

Machine Name	Urali Roaster
Manufacturer	M/s Shanmuka Industries
Capacity	25 kg/batch

D. Fluidized-Bed Dryer

Fluidized bed dryer is a drying system used for drying granular, powdered, or particulate materials by suspending them in a stream of hot air. It has a mesh bottom that allows hot air to pass through, fluidizing the material and ensuring uniform drying. The blower draws and pushes the ambient air through the heating system to create a consistent airflow that keeps the material suspended. The heater raises the temperature of the air, enhancing moisture evaporation and ensuring the efficient drying of material without overheating. The control panel enables operators to monitor and adjust critical parameters such as temperature, airflow, and drying time to ensure optimal conditions for the drying process.

Figure 2.69 Fluidized Bed Dryer

Vendor Details:

Machine Name	Fluidized-Bed Dryer
Manufacturer	M/s Riddhi Pharma Machinery Ltd.
Capacity	25 kg/batch

E. Metal Detector

A metal detector is used to detect and remove metallic contaminants from products, ensuring quality and safety standards. The conveyor moves products through the metal detector. The conveyor is often adjustable to accommodate different product sizes and speeds, making the system versatile for various applications.

It generates an electromagnetic field and detects disturbances caused by metal contaminants. These disturbances trigger the detection system, ensuring

Figure 2.70 Metal Detector

even small traces of metal are identified. The buzzer acts as an alert mechanism, enabling them to take corrective action, such as removing the contaminated product from the production line. The control panel ensures ease of operation and helps maintain consistent product quality by automating the detection process.

Vendor Details:

Machine Name	Metal Detector
Manufacturer	M/s Sri Swamy Packing

2.3.6 Packaging Line

A. Pick Fill Packing Machine

A pick-fill machine is an advanced packaging system designed to efficiently measure, fill, and pack various granular or particulate products such as grains, snacks, or powders. The system integrates precision and automation for high-speed and accurate packaging. The hopper ensures a consistent supply of material to the Z conveyor and moves it efficiently to the next stage without spillage or loss.

The product is then directed to the multi-head weigher, a high-precision weighing system equipped with multiple weighing heads. Each head calculates the exact weight of the product to ensure accurate filling. The multi-head weigher can quickly combine and discharge the precise quantity required for each pack.

The system is controlled and monitored using an HMI (Human Machine Interface), which provides an intuitive interface for operators to set parameters such as weight, speed, and other packaging settings, and allows for real-time adjustments and monitoring.

Finally, the product reaches the pick-fill machine, where it is accurately dispensed into pre-formed bags, or pouches. The pick-fill machine is equipped with mechanisms to handle and seal the packaging, ensuring that the final product is securely packed and ready for distribution. This integrated system combines efficiency, precision, and automation, making it ideal for industries that require consistent, high-speed packaging of granular products.

Figure 2.59 Pick Fill Packing Machine

Vendor Details:

Machine Name	Pick-Fill Packing Machine
Manufacturer	M/s Sri Swamy Packing

Automatic Packaging Line - Process Flow Chart

B. Vertical Form Fill Packing Machine

A vertical form fill seal (VFFS) machine is an automated packaging system used to pack powdered or granular products such as flour, spices, sugar, or snacks into pouches. The packing film/roll is fed into the machine and shaped into a tube by a forming collar. The edges of the film are sealed vertically to form the pouch.

The auger is used for filling, especially for powdered products. It consists of a rotating screw inside a tube, which dispenses the product into the formed pouch with high accuracy. The auger ensures controlled and precise filling, preventing product wastage. A load cell is integrated into the system to monitor and measure the weight of the product being filled. This ensures that each pouch contains the correct quantity of product, maintaining consistency and meeting packaging standards.

The machine's operation is managed through an HMI (Human Machine Interface), a user-friendly control panel that allows operators to set parameters such as filling volume, sealing temperature and packaging speed. The HMI provides real-time monitoring and adjustments, ensuring smooth operation. Once the pouch is filled, the machine seals the top of the pouch using heat, completing the packaging process. The sealed pouches are then discharged for further processing, such as labelling or boxing.

Figure 2.60 Vertical Form Fill Packing Machine

Vendor Details:

Machine Name	Vertical Form Fill Packing Machine
Manufacturer	M/s Sandeep Instruments & Chemicals

C. Vacuum Packing Machine

Vacuum packing machine is a versatile device used to extend the shelf life of perishable goods by removing air from the packaging, and creating an airtight seal that preserves freshness and prevents spoilage. It is widely utilized in industries such as food processing, pharmaceuticals, and electronics.

The packaging bag or pouch filled with product is placed inside the vacuum chamber, where the air is extracted by the vacuum pump to create a vacuum environment. The sealing strip holds the bag in place, while the heating element generates heat to securely seal the bag, ensuring it remains airtight. The shell and cover provide structural support and safety, with the cover often being transparent for easy monitoring of the process. This machine ensures high-quality packaging that protects products from moisture, contamination, and oxygen, significantly enhancing their longevity and maintaining their quality.

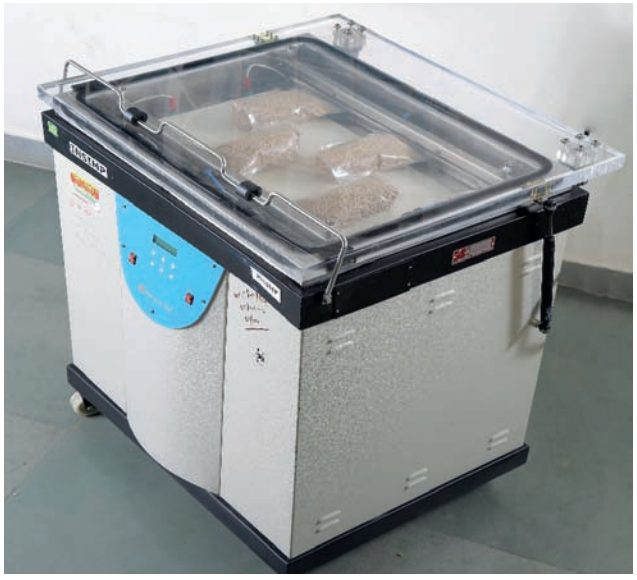


Figure 2.61 Vacuum Packing Machine

Vendor Details:

Machine Name	Band Sealer
Manufacturer	M/s Laxmi Enterprises

2.4 Layout of CFC

The CFC houses six food processing facility units in a total area of 11400 Sq. ft. Each facility is allotted for specific purposes as follows:

- Unit 1 – Large scale primary processing of grains
- Unit 2 – Secondary processing including continuous baking line, bread line, muffin line, cookie line, and packaging machines
- Unit 3 – Puffing line setup
- Unit 4 – Small scale primary processing machineries and grain storage
- Unit 5 – Secondary processing including chikki making line, frying machines, and multi head packaging machine.
- Unit 6–Secondary processing including cold extrusion line, hot extrusion line and flaking line.

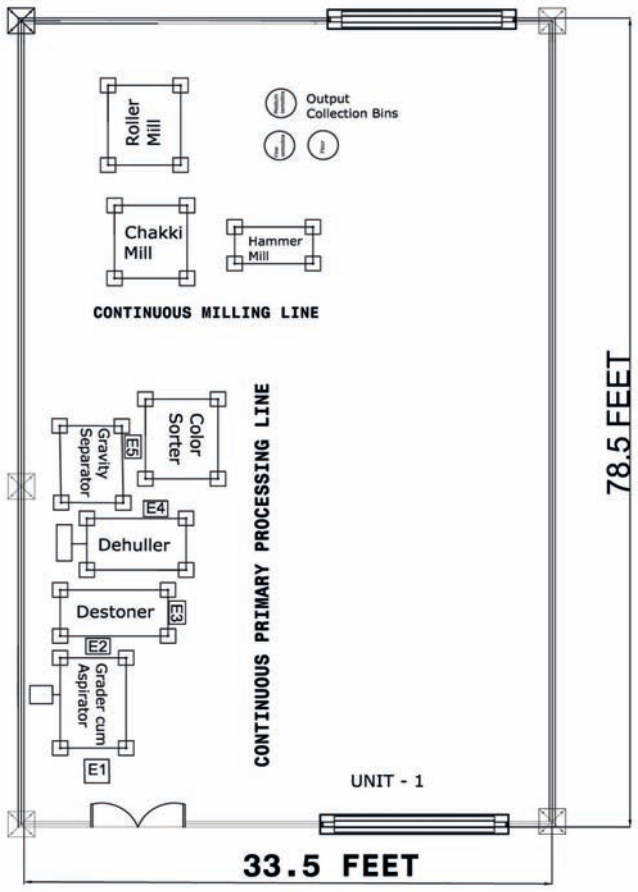


Figure 2.71 Food Processing Facility Unit-1 Layout

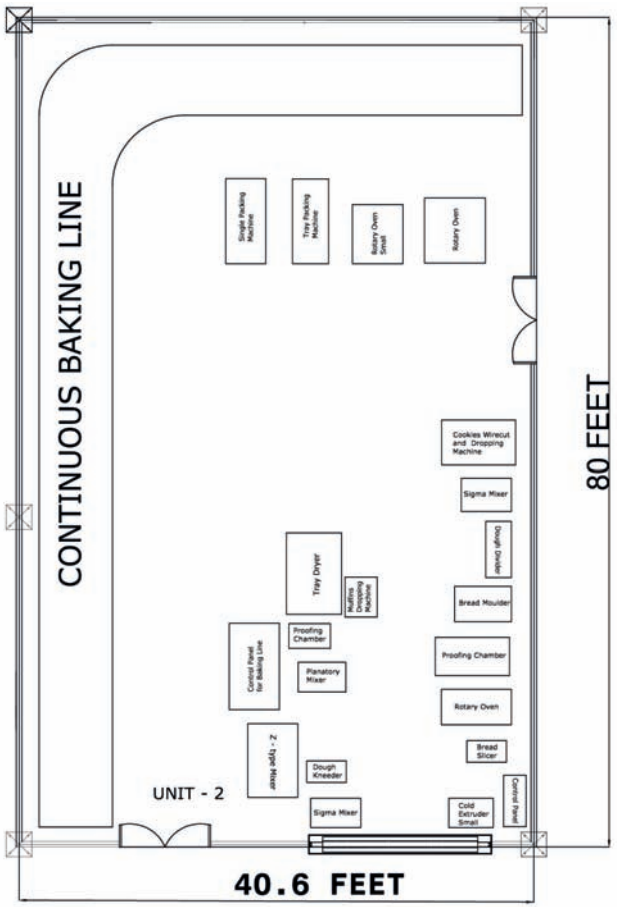


Figure 2.72 Food Processing Facility Unit-2 Layout

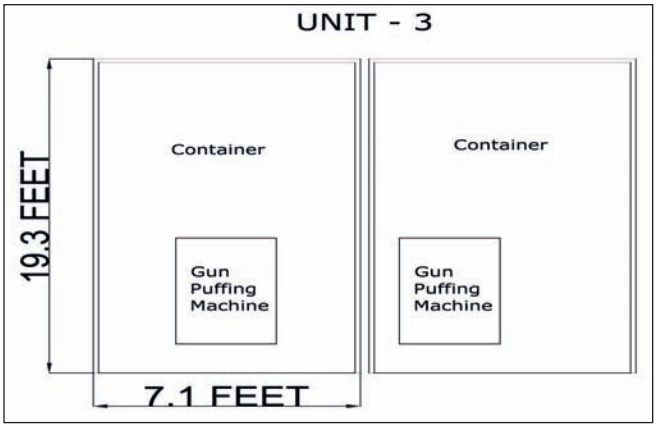


Figure 2.73 Food Processing Facility Unit-3 Layout

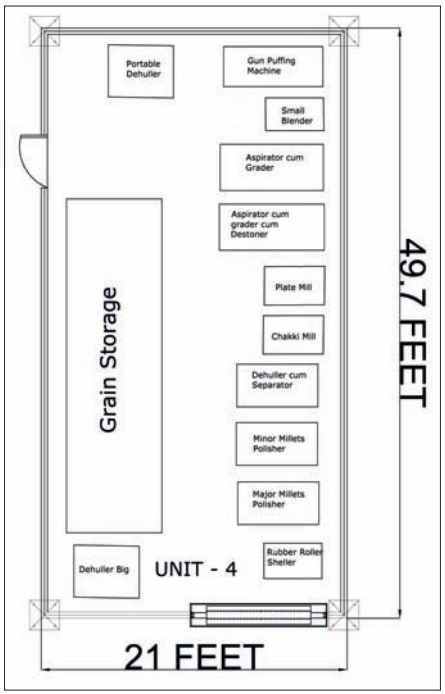


Figure 2.74 Food Processing Facility Unit-4 Layout

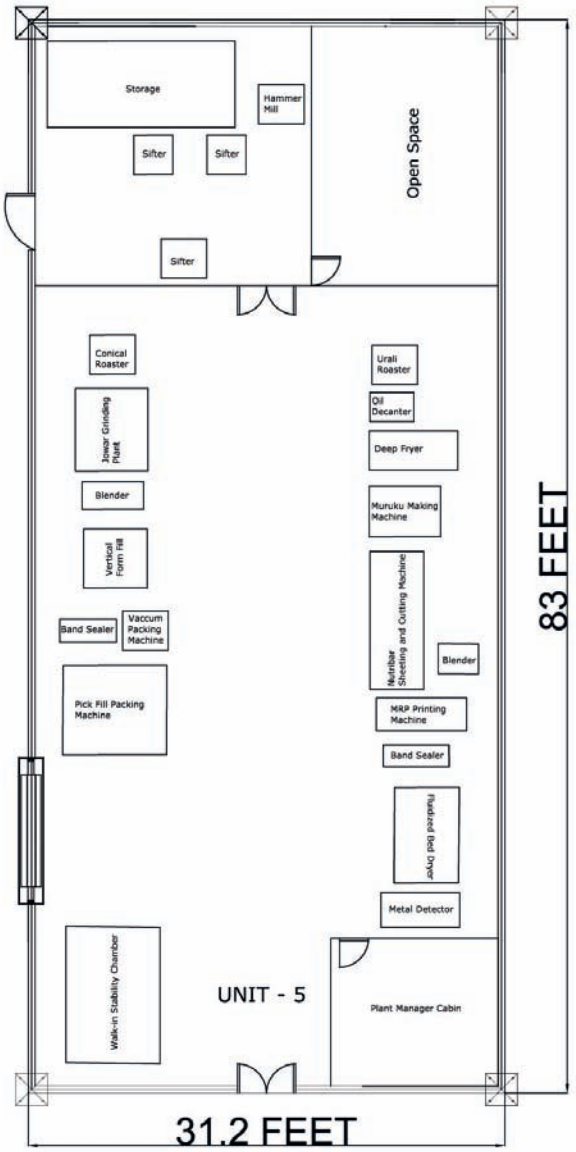


Figure 2.75 Food Processing Facility Unit-5 Layout

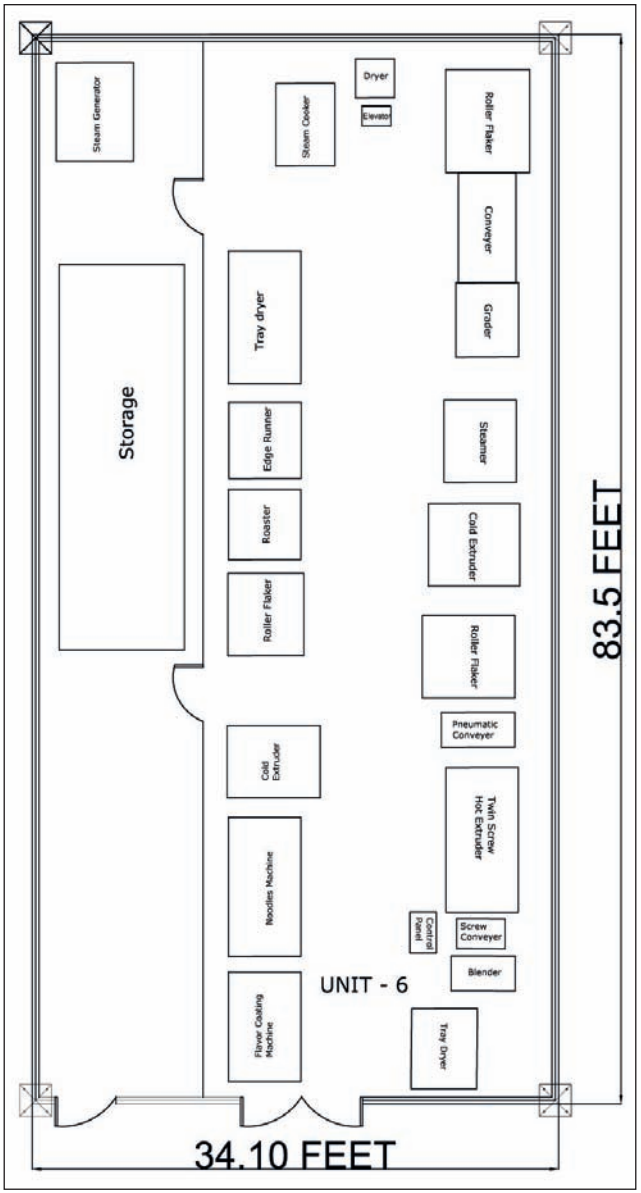


Figure 2.76 Food Processing Facility Unit-6 Layout

Chapter 3

The Journey of Eatrite Brand

3.1. Introduction

Eatrite, a brand initiative by ICAR-Indian Institute of Millets Research (IIMR), Hyderabad, with a goal: to promote health benefits of millets, and popularize nutritious millets through innovative food products that are healthy, delicious and accessible to the consumers. Eatrite serves as a model initiative for how research-led innovation can directly influence public dietary habits, improve public health, and strengthen value chains for traditional crops like millets. Eatrite emerges as a crucial bridge between agricultural research and consumer markets, combining scientific innovation with traditional wisdom.

The products in Eatrite are designed to be nutritious and convenient to a wide range of audience. They are manufactured using the advanced facilities of the CFC, ensuring high quality, safety, and nutritional values. The products manufactured for Eatrite also pass through an inhouse quality control lab at the Centre of excellence (CoE), IIMR. before dispatching to the outlet for sale. Also, every single SKU is screened through a metal detector to ensure no steel or iron foreign particles are present. The brand's novel use of conventional grains including major and minor millets is a key driver of its success. Eatrite has created products that appeal to present-day urban customers while maintaining the rich nutritional history of ancient grains, leveraging the CFC's research innovations and processing facilities.

3.2. Objectives of Eatrite

- Popularizing millets as a healthy and sustainable food choice through promoting a shift in public perception and consumption patterns.
- Encourage consumption of millet-based products
- Increasing awareness about the health benefits of millets
- Developing and promoting ready-to-eat and ready-to-cook millet-based products

3.3. Eatrite's Product

Eatrite offers a diverse range of millet-based food products, including:

- Staple Foods (Millet rice)
- Flours (Jowar Atta, Ragi Atta)
- Semolina (Idli rawa, Upma rawa, Khichdi rawa)

- Ready to Cook (Vermicelli, Pasta, Ragi soup)
- Instant Mixes (Idly mix, Upma mix, Pongal mix)
- Ready to Eat (Cookies, Muffins, flakes, Murukku, Puffs, Chivda)
- Culinary Publications (Available in English and other regional languages)

3.4. Production of Eatrite products

The products of Eatrite are manufactured at a controlled and hygienic facilities of CFC ensuring the regulatory guidelines. The products manufactured for Eatrite was passed through an inhouse plant quality check and inhouse quality control lab at CoE, Nutrihub then dispatched to the outlet for the sale. The products quality check includes the passing/ screening every single SKU through a metal detector to detect the foreign particles and dispatched to the outlet ensuring the consumers safety and regulations.

3.5. Market Strategy & Outreach

a. Distribution Channel

- The direct sale of Eatrite products through a own millet shop established at the ICAR-Indian Institute of Millets Research (IIMR), Hyderabad.
- Sale to government institutions for corporate gifting.

Table 3.1 Eatrite Products -SKUs, Shelf-Life and Packaging Used

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
1	Banyard Millet Rice	Barnyard millet rice is an unpolished rice product obtained from whole grains of barnyard millet produced by cleaning, grading, destoning, dehulling, separation and packaging	500	6	12PET + 100 Natural Poly	Vacuum Packaging	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
2	Foxtail Millet Rice	Foxtail millet rice is an unpolished rice product obtained from grains of Setaria italic (Foxtail millet) after primary processing (dehulling), which shall free the grains from abnormal flavours, odours, and living insects and impurities.	500	6	12PET + 100 Natural Poly	Vacuum Packaging	
3	Kodo Millet Rice	Kodo millet rice is an unpolished rice product obtained from whole grains of Kodo millet produced by cleaning, grading, destoning, dehulling, separation and packaging	500	6	12PET + 100 Natural Poly	Vacuum Packaging	
4	Little Millet Rice	Little millet rice is an unpolished rice product obtained from whole grains of little millet produced by cleaning, grading, destoning, dehulling, separation and packaging	500	6	12PET + 100 Natural Poly	Vacuum Packaging	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
5	Proso Millet Rice	Proso millet rice is an unpolished rice product obtained from grains of Panicum Miliaceum (Proso millet) after primary processing (primarily dehulling), which shall free the grains from abnormal flavours, odours, insects and impurities.	500	6	12PET + 100 Natural Poly	Vacuum packaging	
6	Jowar Atta	Jowar atta is a gluten free product made up of 100 percent cleaned whole jowar grains that are milled in chakki mill, sieved and packaged.	1000	3	12PET + 70 Opaque Poly	Band Sealing	
7	Multi Grain Atta	Multigrain atta is a product obtained from 3-4 grains such as whole jowar grains, wheat flour, ragi grain, urad dhal, Methi and Karaya gum	1000	3	12PET + 70 Opaque Poly	Band Sealing	
8	Ragi Atta	Ragi atta is a gluten free product made up of 100 percent cleaned whole ragi grains that are milled in chakki mill, sieved and packaged.	500	3	12PET + 70 Opaque Poly	Band Sealing	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
9	Jowar Idly Rawa	Jowar idly rawa is a gluten free product made up of 100 percent jowar. Used in the preparation of jowar idly with the replacement of rice rawa.	500	6	12PET+100 Natural Poly	Band Sealing	
10	Jowar Upma Rawa	Jowar Upma rawa is a gluten free product made up of 100 percent jowar. Used in the preparation of jowar upma, other products with the replacement of wheat rawa	500	6	12PET+100 Natural Poly	Band Sealing	
11	Jowar Kichadi Rawa	Jowar Khichadi rawa is a gluten free product made up of 100 percent jowar. Used in the preparation of jowar khichadi, other products with the replacement of rice and wheat rawa	500	6	12PET+100 Natural Poly	Band Sealing	
12	Multi Millets Rawa	Multi millet idly rawa prepared by the combination of jowar rawa, ragi, foxtail, and pearl millet rawa.	500	6	12PET+100 Natural Poly	Band Sealing	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
13	Jowar Vermicelli	Jowar vermicelli made in the combination of wheat and jowar, by using cold extrusion technology and drying	180	6	12PET + 100 Natural Poly	Band Sealing	
14	Ragi Vermicelli	Ragi vermicelli made in the combination of wheat and ragi, by using cold extrusion technology and drying. Served as breakfast or can be made into ragi kheer mix	125	6	12PET + 100 Natural Poly	Band Sealing	
15	Jowar Pasta	Jowar pasta is a shell shaped pasta made by extruding the wheat and jowar.	83	6	12PET + 100 Natural Poly	Band Sealing	
16	Instant Jowar Idly Mix	Instant jowar idly mix is a ready to cook and gluten free premix made up of jowar Idli rawa and urad dal. It removes the need of overnight fermentation of batter.	200	6	12PET + 12MET-PET + 100 Natural Poly	Band Sealing	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
17	Instant Jowar Upma Mix	Instant jowar upma mix is a ready to cook premix composed of jowar upma rawa, chana dhal, and dehydrated curry leaves	200	6	12PET + 12MET-PET + 100 Natural Poly	Band Sealing	
18	Instant Jowar Pongal Mix	Instant jowar pongal mix is a ready to cook premix composed of jowar thick flakes, pepper, hing and salt.	200	12	12PET + 12MET-PET + 100 Natural Poly	Band Sealing	
19	Instant Millet Idly Mix	It's a multi millet premix composed of jowar rawa, foxtail rawa, bajra rawa, and ragi rawa and urad dhal. It removes the need of overnight fermentation of batter.	200	6	12PET + 12MET-PET + 100 Natural Poly	Band Sealing	
20	Ragi Soup Mix	Ragi soup mix is an instant premix composed of dehydrated vegetables and other essential spices.	50	6	12PET + 12MET-PET + 80 Natural Poly	Band Sealing	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
21	Jowar Cookies	Jowar biscuit is a gluten free biscuit made with 100% jowar by using baking technology.	75	6	12PET + 18 HS BOPP	Band Sealing	
22	Ragi Cookies	Ragi cookies are a calcium rich alternative made with ragi by using baking technology.	75	6	12PET + 18 HS BOPP	Band Sealing	
23	Jowar Almond Cookies	Jowar almond cookie is a gluten free alternative made with 100% jowar and almonds by using baking technology.	75	4	Aluminium Foil (80 microns)	Flow Wraps and Cookies Box of 300 gsm	
24	Jowar Cashew Cookies	Jowar cashew cookie is a gluten free alternative made with jowar and cashews by using baking technology.	75	4	Aluminium Foil (80 microns)	Flow Wraps and Cookies Box of 300 gsm	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
25	Jowar Choco Chips Cookies	Jowar almond cookie is a gluten free alternative made with 100% jowar, and chocolate by using baking technology.	75	4	Aluminium Foil (80 microns)	Flow Wraps and Cookies Box of 300 gsm	
26	Jowar Muffin	Jowar muffin is a cupcake made from jowar flour, eggs and refined wheat flour by using baking technology.	25	1	12PET + 12MET-PET + 50 Natural Poly	Flow Wraps Packaging	
27	Ragi Muffin	Ragi muffin is a cupcake made from ragi flour, eggs, and refined wheat flour by using baking technology.	25	1	12PET + 12MET-PET + 50 natural poly	Flow Wraps Packaging	
28	Jowar Flakes	Jowar flakes are gluten free flakes made with whole jowar grains by soaking, roasting, flaking, and drying. Good for controlling the diabetes and weight management.	200	3	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	
29	Ragi Flakes	Ragi flakes are gluten free flakes made with whole ragi grains by soaking, roasting, flaking, and drying. Good for controlling the diabetes and weight management.	200	3	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
30	Jowar Murukku (50g)	Jowar murukku is a gluten free snack made in combination of jowar flour, Bengal gram flour, rice flour, and other ingredients, by extruding and frying in edible vegetable oil.	50 & 250	3	12PET + 12MET-PET + 100 Natural Poly	Nitrogen Flush Packaging	
32	Jowar Puffs	Jowar puffs are expanded snacks made from the jowar grains by polishing, gun puffing, roasting, deep frying, and coating. It is a gluten free snack coated with turmeric, edible vegetable oil, and black salt	30	1	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	
33	Bajra Puffs	Bajra puffs are expanded snacks made from the bajra grains by polishing, gun puffing, roasting, deep frying, coating. It is a gluten free snack coated with turmeric, edible vegetable oil, and black salt	30	1	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	

S. No	Product Name	Product Description	Net Weight (g)	Shelf Life (in Months)	Packaging Material	Type of Packaging	Image
34	Barnyard Sweet Puffs	Barnyard sweet puffs are expanded snacks made from the dehulled barnyard grain by polishing, gun puffing, roasting, deep frying, and coating. It is a gluten free snack coated with white chocolate.	30	1	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	
35	Millets Laddu	Millet laddu is a traditional sweet made in combination of millet flour, sugar and other ingredients.	100	0.5	12PET + 12MET-PET + 100 Natural Poly	Nitrogen Flush Packaging	
36	Jowar namkeen	Jowar Chivda is a ready to eat snack made by deep frying the jowar flakes, and mixing with nuts and spices.	50 & 100	3	12PET + 12MET-PET + 80 Natural Poly	Nitrogen Flush Packaging	

3.5 Future of Eatrite Brand

i. Diversifying the Healthy Product Portfolio

Eatrite aims to meet the evolving consumer preferences by introducing a wider range of ready-to-eat, ready-to-cook, and functional millet-based products. These health-oriented products will strengthen Eatrite's identity as a functional food brand, aligning with national goals. Product innovation will focus on both taste and nutrition, combining millet flours, flakes, and grains with natural ingredients like jaggery, pulses, seeds, herbs, and spices.

The future product lineup will include:

- High-protein millet snacks for fitness and wellness enthusiasts.
- Prebiotic and probiotic millet blends for gut health.
- Low-carb and diabetic-friendly options using foxtail, kodo, and barnyard millets.
- Traditional sweets and festive foods with modern shelf-life improvements.
- Convenient meal kits and instant recipes for urban working families and students.

ii. Expanding Eatrite Stores

To bring millets closer to the public, Eatrite plans to establish multiple exclusive brand outlets (EBOs) and franchise-based millet stores across the city. Key locations under consideration include IT corridors, shopping malls, organic markets, residential hubs and government complexes, ensuring access to both health-conscious consumers and mainstream shoppers. These stores will also serve as experience centres for exploring millets and helping to shift the perception of millets from "coarse grains" to "smart grains."

These outlets will:

- Offer the full range of Eatrite products under one roof.
- Conduct regular millet cooking demos and tasting sessions.
- Act as information centres for millet benefits and recipes.
- Host millet-based workshops, community nutrition events, and school awareness programs.

iii. Expanding to E-Commerce and Door Delivery Channels

To ensure accessibility beyond physical stores, Eatrite will launch and scale up its e-commerce presence, including:

- Establishing dedicated warehouses of finished goods for product availability and service
- A dedicated Eatrite website and mobile app with doorstep delivery and subscription plans.
- Listings on popular platforms like Amazon, Flipkart, Big Basket, JioMart, and millet-specific health stores.

- Integration with quick commerce platforms like Swiggy Instamart, Zepto, and Dunzo for instant availability.

iv. Integrating Other Millet Brands at Eatrite Channels

To build a millet centric system, Eatrite will collaborate with millet-based startups, SHGs, FPOs, and food entrepreneurs to showcase and retail their products through Eatrite offline and one channels. The display and sale of partner products will be backed by quality checks, proper branding, and marketing support, towards creating a healthy millet ecosystem and ensuring collective growth.

This initiative will:

- Offer consumers a wide range of millet brands under one roof.
- Support small-scale millet processors and women-led units.
- Promote local and regional product diversity across Telangana and India.
- Position Eatrite as a millet marketplace and knowledge hub, not just a single-brand store.

v. Conclusion

The future of Eatrite is aimed in the mission to mainstream millets through innovation, collaboration, and accessibility. By expanding its product range, retail sale, and distribution channels and background of its scientific foundation, Eatrite is poised to become a leading national model for millet marketing and health-driven food systems.

By establishing a robust e-commerce and quick-commerce ecosystem, Eatrite aims to ensure that millet products are available at the fingertips of every consumer anytime, anywhere. This digital reach is key to scaling operations and reaching urban households that increasingly rely on online platforms for their grocery needs.

Chapter 4 Coordination between CFC and Startups

4.1. Upscaling Activities Offered at CFC

The CFC at Nutrihub, IIMR offers upscaling of millet-based products from pilot to commercial scale. A few facts related to upscaling activities are as follows:

1. Primary processing facility of millets was established at CFC with a larger capacity through fabrication of new equipment specifically designed for millets in collaboration with industries, and retrofitting of existing machineries designed for other major cereals to suit the purpose.
2. Upscaling of millet-based products formulated and optimized at centre of excellence (CoE) and CFC at ICAR-IIMR. These products are analysed for nutritional, sensory and quality aspects by the food technologists at CoE. The products developed or licenced by startups are also produced in bulk quantities as per the requirement.
3. Modifications required in the product technologies of startups can be accommodated and produced in bulk quantities.
4. Own formulations developed by the startups with the help of food technologists in Nutri hub, will be produced in bulk quantities after proper clearance.
5. Industrial tie ups and project collaborations can be explored to produce the technologies at CFC and CoE.
6. Millet value added products are developed, upscaled and launched in collaboration with various government organisations such as TSRTC and various state governments.

Various industrial collaborations done to upscale the products are as follows:

1. Joint projects on the development of hot extruded products in collaboration with Givaudan, PepsiCo, and TCPL.

2. Joint projects for exploring cultivars and development of nutribar, in collaboration with ITC and Nestle.

3. Joint projects on evaluation of high protein sorghum cultivars and development of bakery products in collaboration with Britannia and Hindustan Unilever Limited (HUL).

4. Joint upscaling projects for increasing the efficiency of primary processing machines

in collaboration with Buhler and Borne Technologies.

5. Joint projects on optimizing the degree of polishing standards and its utilization in flour and semolina, in collaboration with PepsiCo, Marico and HUL.

4.2. Accessing Common Facility Centre (CFC) Services at Nutrihub, ICAR-IIMR

- Nutrihub, ICAR-IIMR, offers its state-of-the-art Common Facility Centre (CFC) to incubatees for millet-based production requirements. Startups can access these facilities by following the below structured protocol designed to ensure better coordination and quality in production.

Step 1: Submission of Production Request Form

Startups begin by submitting a detailed Production Request Form outlining their technology requirements, minimum order quantities (MOQs), and specific packaging needs.

Step 2: Review and Proforma Invoice Generation

The business team evaluates the request, checks the feasibility of the requested technologies, and aligns it with Nutrihub, ICAR-IIMR's production schedule. Following this, the request is forwarded to the production team for generating the proforma invoice detailing the cost breakdown and production specifics.

Step 3: Communication of Proforma Invoice and Production Schedule

The business team shares the proforma invoice with the startup, along with tentative production dates. Startups are required to arrange the necessary raw materials as specified in the invoice.

Step 4: Advance Payment and Quality Control Assessment

Startups make a 50% advance payment to Nutrihub, ICAR-IIMR. Upon receipt of the payment and raw materials, a Quality Control assessment is conducted to ensure compliance with production standards.

Step 5: Finalizing Production Dates and Execution

Once Quality Control is complete, confirmed production dates are communicated to the startup, and proceed to production of items.

Step 6: Pickup and Final Payment

- After completion of production and payment of balance amount, startups arrange the pickup of finished products from Nutrihub, ICAR-IIMR.
- This streamlined process ensures transparency, quality assurance, and optimal utilization of the CFC facilities. By adhering to this protocol, Nutrihub, ICAR-IIMR, provides startups with the necessary support to bring their millet-based innovations to market seamlessly.
- For further details or assistance, please contact:
  Business Team, Nutrihub, ICAR-IIMR
  Phone: 040-29884838 / +91 6305009160
  Email: business@nutrihubiimr.com

4.3. Prices and Cost of Technologies Offered to Incubatees

i. Comprehensive Solutions for Millet-Based Businesses

Nutrihub, ICAR-IIMR, offers a robust portfolio of over 90 millet value-added technologies available for technology licensing. This initiative aims to empower startups and entrepreneurs to build innovative and sustainable businesses in the burgeoning millet sector.

ii. Affordable Pricing Structure

Our flexible pricing ensures affordability for startups of various scales:

- 1 Technology: ₹50,000 per technology
- 2–3 Technologies: ₹33,000 per technology
- 4–5 Technologies: ₹30,000 per technology
- 6 or More Technologies: ₹25,000 per technology

iii. Empowering Startups for Success:

These technologies are designed to foster innovation in the millet value chain, ensuring startups can deliver high-quality, scalable, and globally competitive products.

- For More Details **Dr. J. Stanley, Principal Scientist**

Contact: 040-29884838

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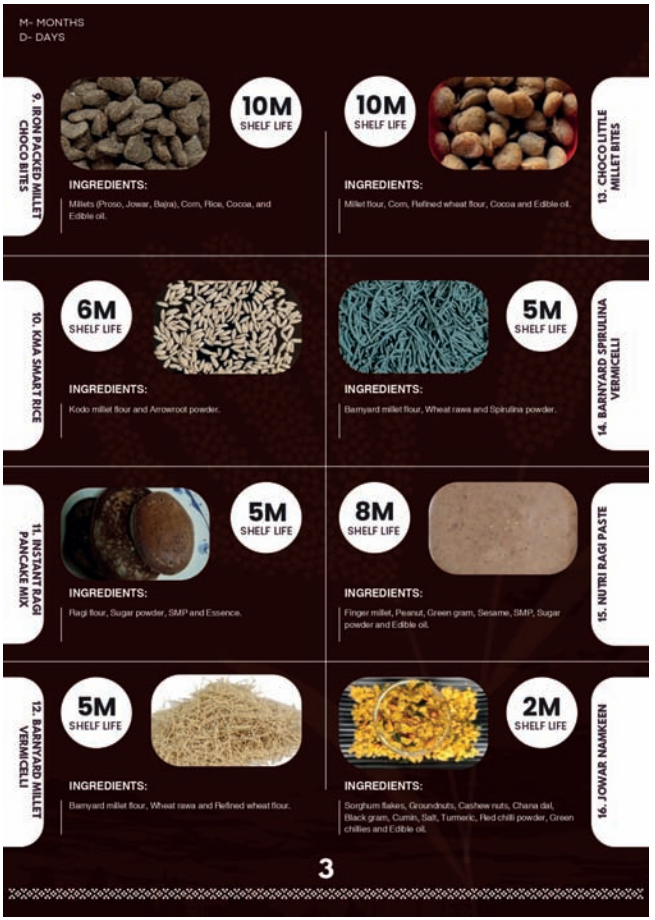
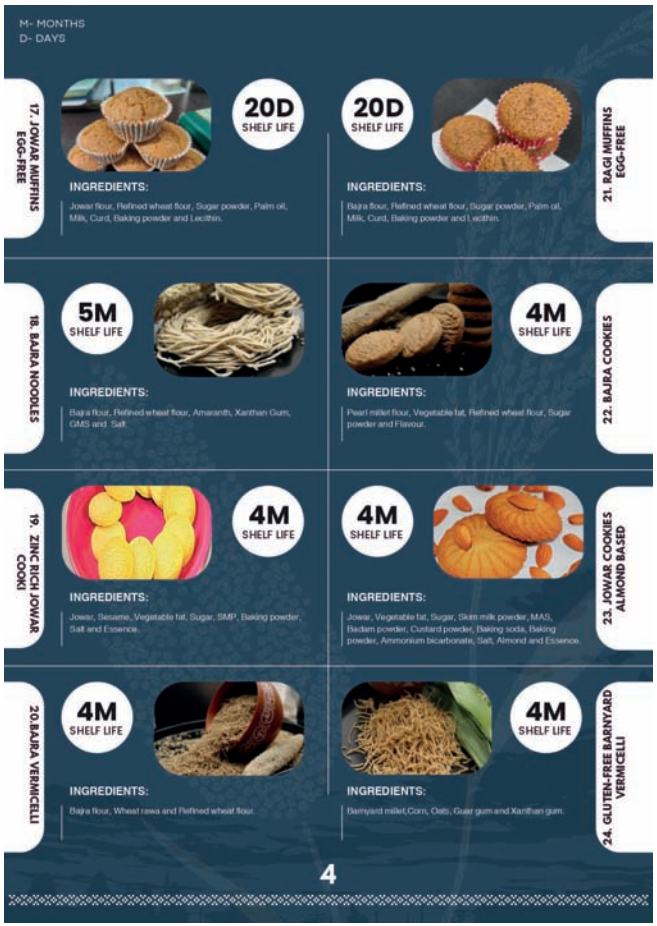
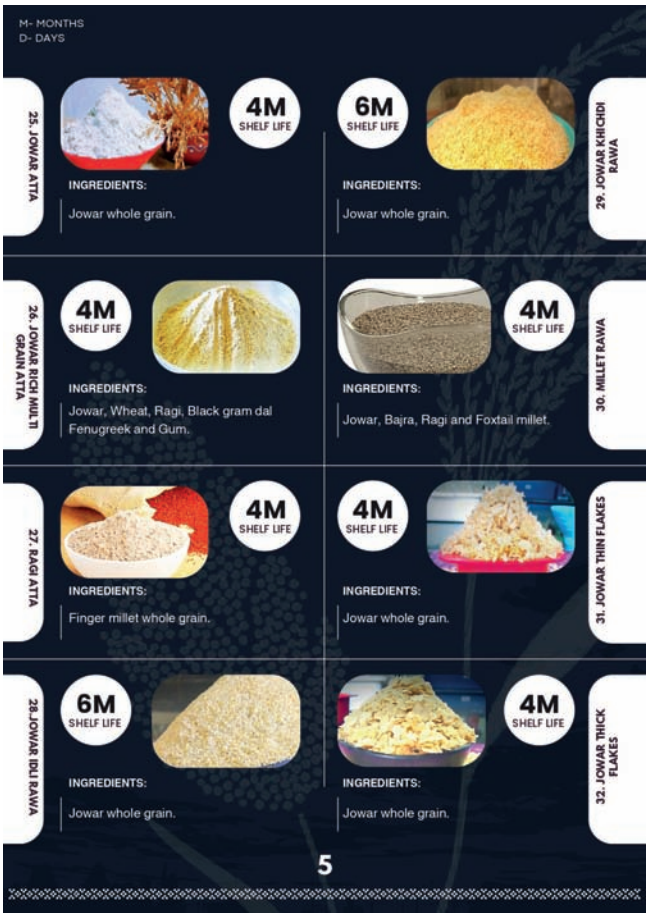
Website: www.nutrihubiimr.com

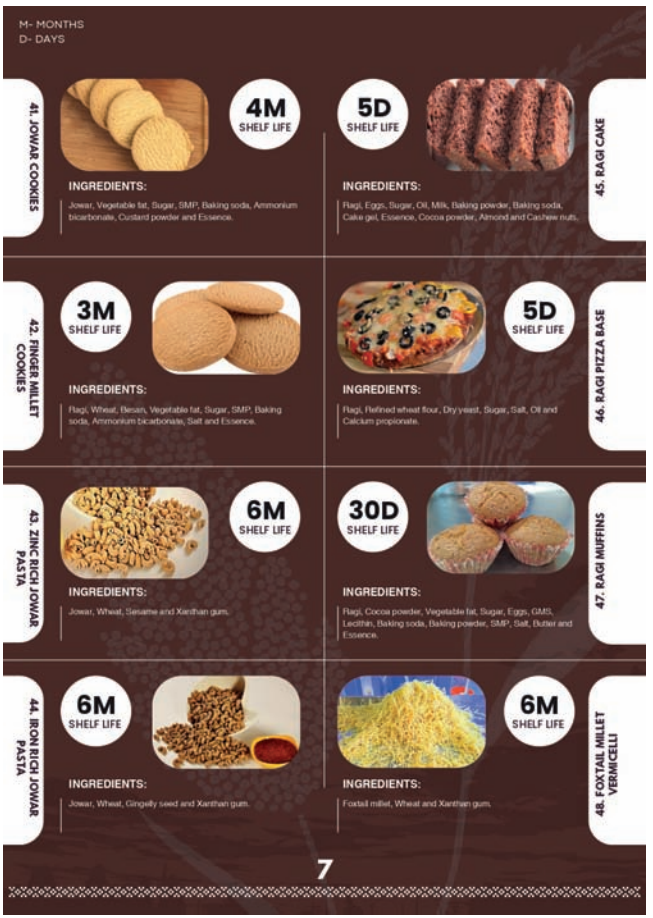

M- MONTHS
D- DAYS
1. MILLET MUSHROOM SOUP MIX
6M SHELF LIFE
INGREDIENTS:
Millets (Jowar, Foxtail, Proso), Mushroom, Dehydrated vegetables, Corn starch, Tomato powder, Seasonings, Chilli powder, Salt and Citric acid.
5M SHELF LIFE
INGREDIENTS:
Sorghum flakes, Oats, Almonds, Honey, Pumpkin seeds, Black raisins, Dried cranberries, Whey protein isolate, Dark chocolate, Butter scotch and Essence.
5. PROTEIN RICH JOWAR MUESLI
2. JOWAR DHOKLA MIX
6M SHELF LIFE
INGREDIENTS:
Sprouted jowar flour, Chickpea flour, Rice suji, Icing sugar, Chilli powder, Turmeric, Salt, Baking soda and Asafoetida.
8M SHELF LIFE
INGREDIENTS:
Millets (Proso, Foxtail, Finger), Moong Dal, Spinach, Beetroot, Turmeric, Cranberry, Cloves and Cinnamon.
6. ANTIOXIDANT-RICH MILLET FLOUR MIX
3. JOWAR NOODLES
8M SHELF LIFE
INGREDIENTS:
Jowar flour, Refined wheat flour, Amaranth, Xanthan gum, GMS and Salt.
9M SHELF LIFE
INGREDIENTS:
7. LITTLE MILLET WEANING MIX
4. CALCIUM-RICH RAGI WEANING MIX
9M SHELF LIFE
INGREDIENTS:
Ragi, Moong bean, Dates, SMP and Icing sugar.
8M SHELF LIFE
INGREDIENTS:
Millets (Barnyard, Kodo, Proso), Moong dal, Almond, Chocolate powder, Sugar and SMP.
8. NUTRI BOOST MILLET SHAKE
2

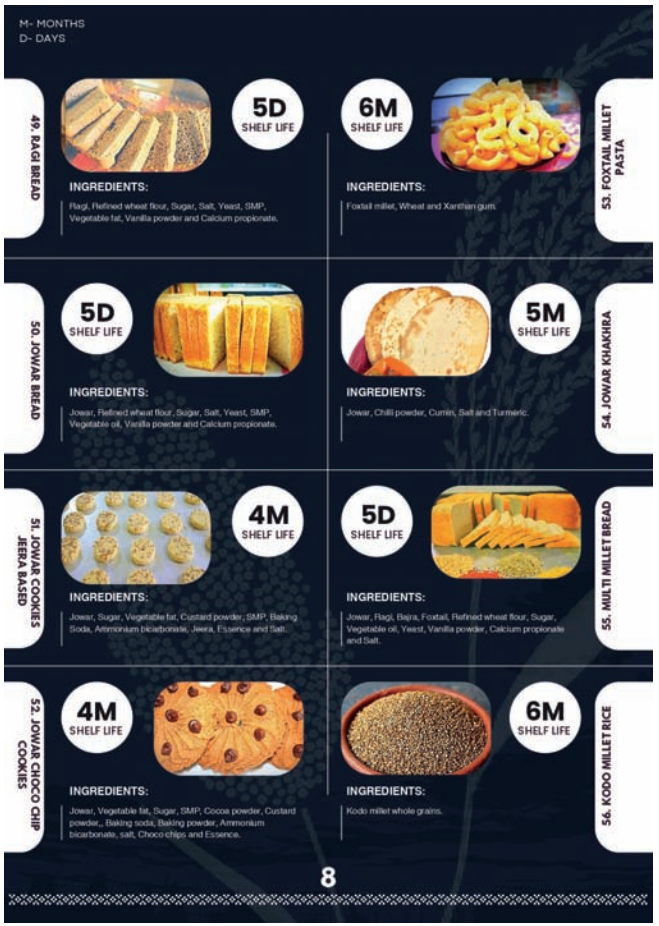

M- MONTHS
D- DAYS
9. IRON PACKED MILLET CHOCO BITES
10M SHELF LIFE
INGREDIENTS:
Millets (Proso, Jowar, Bajra), Corn, Rice, Cocoa, and Edible oil.
10M SHELF LIFE
INGREDIENTS:
Millet flour, Corn, Refined wheat flour, Cocoa and Edible oil.
13. CHOCO LITTLE MILLET BITES
10. KMA SMART RICE
6M SHELF LIFE
INGREDIENTS:
Kodo millet flour and Arrowroot powder.
5M SHELF LIFE
INGREDIENTS:
Barnyard millet flour, Wheat rawa and Spirulina powder.
14. BARNYARD SPIRULINA VERMICELLI
11. INSTANT RAGI PANCAKE MIX
5M SHELF LIFE
INGREDIENTS:
Ragi flour, Sugar powder, SMP and Essence.
8M SHELF LIFE
INGREDIENTS:
Finger millet, Peanut, Green gram, Sesame, SMP, Sugar powder and Edible oil.
15. NUTRI RAGI PASTE
12. BARNYARD MILLET VERMICELLI
5M SHELF LIFE
INGREDIENTS:
Barnyard millet flour, Wheat rawa and Refined wheat flour.
2M SHELF LIFE
INGREDIENTS:
Sorghum flakes, Groundnuts, Cashew nuts, Chana dal, Black gram, Cumin, Salt, Turmeric, Red chilli powder, Green chillies and Edible oil.
16. JOWAR NAMKEEN
3


M- MONTHS
D- DAYS
17. JOWAR MUFFINS EGG-FREE
20D SHELF LIFE
INGREDIENTS:
Jowar flour, Refined wheat flour, Sugar powder, Palm oil, Milk, Curd, Baking powder and Lecithin.
20D SHELF LIFE
21. RAGI MUFFINS EGG-FREE
INGREDIENTS:
Bajra flour, Refined wheat flour, Sugar powder, Palm oil, Milk, Curd, Baking powder and Lecithin.
18. BAJRA NOODLES
5M SHELF LIFE
INGREDIENTS:
Bajra flour, Refined wheat flour, Amaranth, Xanthan Gum, GMS and Salt.
4M SHELF LIFE
22. BAJRA COOKIES
INGREDIENTS:
Pearl millet flour, Vegetable fat, Refined wheat flour, Sugar powder and Flavour.
19. ZINC RICH JOWAR COOKI
4M SHELF LIFE
INGREDIENTS:
Jowar, Sesame, Vegetable fat, Sugar, SMP, Baking powder, Salt and Essence.
4M SHELF LIFE
23. JOWAR COOKIES ALMOND BASED
INGREDIENTS:
Jowar, Vegetable fat, Sugar, Skim milk powder, MAS, Badam powder, Custard powder, Baking soda, Baking powder, Ammonium bicarbonate, Salt, Almond and Essence.
20.BAJRA VERMICELLI
4M SHELF LIFE
INGREDIENTS:
Bajra flour, Wheat rawa and Refined wheat flour.
4M SHELF LIFE
24. GLUTEN-FREE BARNYARD VERMICELLI
INGREDIENTS:
Barnyard millet,Corn, Oats, Guar gum and Xanthan gum.
4


M- MONTHS
D- DAYS
25. JOWAR ATTA
4M SHELF LIFE
INGREDIENTS:
Jowar whole grain.
6M SHELF LIFE
29. JOWAR KHICHDI RAWA
INGREDIENTS:
Jowar whole grain.
26. JOWAR RICH MULTI GRAIN ATTA
4M SHELF LIFE
INGREDIENTS:
Jowar, Wheat, Ragi, Black gram dal Fenugreek and Gum.
4M SHELF LIFE
30. MILLET RAWA
INGREDIENTS:
Jowar, Bajra, Ragi and Foxtail millet.
27. RAGI ATTA
4M SHELF LIFE
INGREDIENTS:
Finger millet whole grain.
4M SHELF LIFE
31. JOWAR THIN FLAKES
INGREDIENTS:
Jowar whole grain.
28.JOWAR IDLI RAWA
6M SHELF LIFE
INGREDIENTS:
Jowar whole grain.
4M SHELF LIFE
32. JOWAR THICK FLAKES
INGREDIENTS:
Jowar whole grain.
5

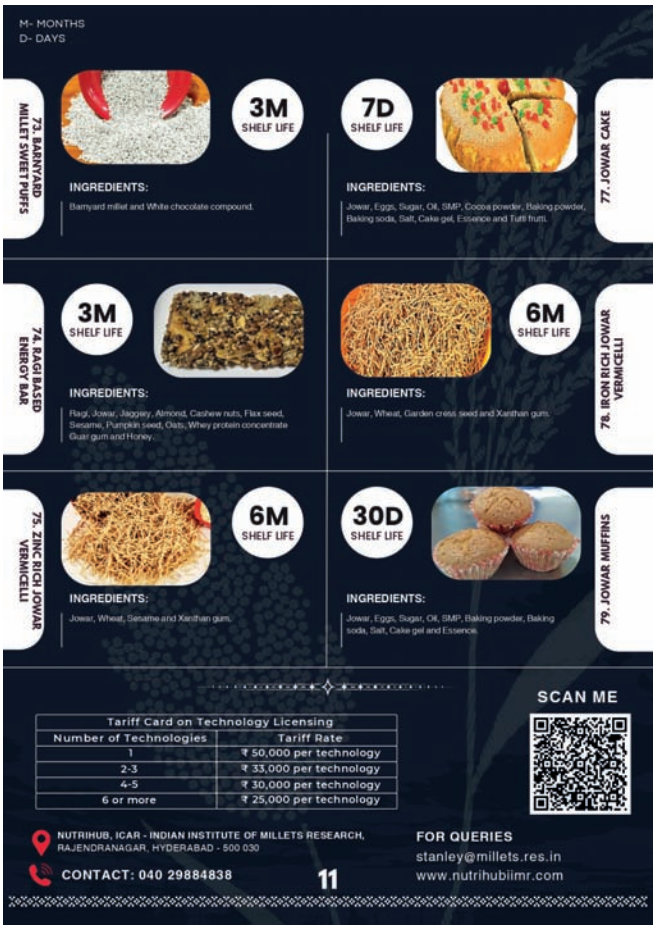

M- MONTHS
D- DAYS
33. JOWAR UPMA RAWA
6M SHELF LIFE
INGREDIENTS:
Jowar whole grain.
4M SHELF LIFE
INGREDIENTS:
Finger millet whole grain.
37. FINGER MILLET FLAKES
34. FINGER MILLET VERMICELLI
6M SHELF LIFE
INGREDIENTS:
Ragi, Wheat and Xanthan gum.
6M SHELF LIFE
INGREDIENTS:
Jowar, Dates, Cashew nuts, Raisins and Honey.
38. JOWAR MUESLI
35. JOWAR VERMICELLI
6M SHELF LIFE
INGREDIENTS:
Jowar, Wheat and Xanthan gum.
4M SHELF LIFE
INGREDIENTS:
Pearl millet whole grain.
39. PEARL MILLET FLAKES
36. JOWAR PASTA
6M SHELF LIFE
INGREDIENTS:
Jowar, Wheat and Xanthan gum.
7D SHELF LIFE
INGREDIENTS:
Jowar and Milk.
40. JOWAR LASSI
6


M- MONTHS
D- DAYS
41. JOWAR COOKIES
4M SHELF LIFE
INGREDIENTS:
Jowar, Vegetable fat, Sugar, SMP, Baking soda, Ammonium bicarbonate, Custard powder and Essence.
5D SHELF LIFE
INGREDIENTS:
Ragi, Eggs, Sugar, Oil, Milk, Baking powder, Baking soda, Cake gel, Essence, Cocoa powder, Almond and Cashew nuts.
45. RAGI CAKE
42. FINGER MILLET COOKIES
3M SHELF LIFE
INGREDIENTS:
Ragi, Wheat, Besan, Vegetable fat, Sugar, SMP, Baking soda, Ammonium bicarbonate, Salt and Essence.
5D SHELF LIFE
INGREDIENTS:
Ragi, Refined wheat flour, Dry yeast, Sugar, Salt, Oil and Calcium propionate.
46. RAGI PIZZA BASE
43. ZINC RICH JOWAR PASTA
6M SHELF LIFE
INGREDIENTS:
Jowar, Wheat, Sesame and Xanthan gum.
30D SHELF LIFE
INGREDIENTS:
Ragi, Cocoa powder, Vegetable fat, Sugar, Eggs, GMS, Lecithin, Baking soda, Baking powder, SMP, Salt, Butter and Essence.
47. RAGI MUFFINS
44. IRON RICH JOWAR PASTA
6M SHELF LIFE
INGREDIENTS:
Jowar, Wheat, Gingelly seed and Xanthan gum.
6M SHELF LIFE
INGREDIENTS:
Foxtail millet, Wheat and Xanthan gum.
48. FOXTAIL MILLET VERMICELLI
7


M- MONTHS
D- DAYS
49. RAGI BREAD
5D SHELF LIFE
INGREDIENTS:
Ragi, Refined wheat flour, Sugar, Salt, Yeast, SMP, Vegetable fat, Vanilla powder and Calcium propionate.
6M SHELF LIFE
INGREDIENTS:
Foxtail millet, Wheat and Xanthan gum.
53. FOXTAIL MILLET PASTA
50. JOWAR BREAD
5D SHELF LIFE
INGREDIENTS:
Jowar, Refined wheat flour, Sugar, Salt, Yeast, SMP, Vegetable oil, Vanilla powder and Calcium propionate.
5M SHELF LIFE
INGREDIENTS:
Jowar, Chilli powder, Cumin, Salt and Turmeric.
54. JOWAR KHAKHRA
51. JOWAR COOKIES JEERA BASED
4M SHELF LIFE
INGREDIENTS:
Jowar, Sugar, Vegetable fat, Custard powder, SMP, Baking Soda, Ammonium bicarbonate, Jeera, Essence and Salt.
5D SHELF LIFE
INGREDIENTS:
Jowar, Ragi, Bajra, Foxtail, Refined wheat flour, Sugar, Vegetable oil, Yeast, Vanilla powder, Calcium propionate and Salt.
55. MULTI MILLET BREAD
52. JOWAR CHOCO CHIP COOKIES
4M SHELF LIFE
INGREDIENTS:
Jowar, Vegetable fat, Sugar, SMP, Cocoa powder, Custard powder,, Baking soda, Baking powder, Ammonium bicarbonate, salt, Choco chips and Essence.
6M SHELF LIFE
INGREDIENTS:
Kodo millet whole grains.
56. KODO MILLET RICE
8


M- MONTHS
D- DAYS
57. JOWAR INSTANT KHICHDI MIX
6M SHELF LIFE
INGREDIENTS:
Jowar, Moong dal, Carrot, Onion, Potato, Tomato, Chilli, Curry leaves, Ginger, Garlic, Salt and Turmeric.
6M SHELF LIFE
INGREDIENTS:
Foxtail millet whole grain.
61. FOXTAIL MILLET RICE
58. PROSO MILLET RICE
6M SHELF LIFE
INGREDIENTS:
Proso millet whole grain.
6M SHELF LIFE
INGREDIENTS:
Jowar idli rawa, Black gram dal, Baking soda, Citric acid, Instant dry yeast and Salt.
62. JOWAR INSTANT IDLI MIX
59. BARNYARD MILLET RICE
6M SHELF LIFE
INGREDIENTS:
Barnyard millet whole grain.
6M SHELF LIFE
INGREDIENTS:
Jowar, Bajra, Ragi, Foxtail, Urad dal, Baking Soda, Citric acid, Dry yeast and Salt.
63. MILLET INSTANT IDLI MIX
60. LITTLE MILLET RICE
6M SHELF LIFE
INGREDIENTS:
Little millet whole grain.
12M SHELF LIFE
INGREDIENTS:
Jowar, Moong dal, Cumin, Pepper, Salt, Curry leaves and Asafoetida.
64. JOWAR INSTANT PONGAL MIX
9


M- MONTHS
D- DAYS
65. JOWAR INSTANT UPMA MIX
6M SHELF LIFE
INGREDIENTS:
Jowar, Bengal gram dal, Black gram, Curry leaves, Cumin, Asafoetida and Salt.
10D SHELF LIFE
69. MULTI MILLET LADDOO
INGREDIENTS:
Sorghum, Pearl millet, Finger millet, Foxtail millet, Jaggery, Ghee and Dry fruits.
66. RAGI VEG. SOUP MIX
12M SHELF LIFE
INGREDIENTS:
Ragi, Carrot, Beans, Onion, Corn, Coriander, Peas, Red chilli powder, Pepper, Herbs, Milk powder and Salt.
2M SHELF LIFE
70. JOWAR MURUKKU
INGREDIENTS:
Jowar, Moong dal, Sesame, Chilli powder, Papadkar, Salt, Turmeric, Ajwain and Oil.
67. JOWAR PUFFS
4M SHELF LIFE
INGREDIENTS:
Jowar whole grains.
4M SHELF LIFE
71. MULTI MILLET COOKIES
INGREDIENTS:
Jowar, Bajra, Ragi, Wheat, Foxtail millet, Besan, Vegetable ghee, Sugar, SMP, Cocoa powder, Custard powder, Baking powder, Ammonium bicarbonate, Emulsifier, Salt and Essence.
68. PEARL MILLET PUFFS
3M SHELF LIFE
INGREDIENTS:
Pearl millet whole grain.
5M SHELF LIFE
72. JOWAR EXTRUDED SNACK
INGREDIENTS:
Jowar, Maize, Rice, Bengal gram, Salt and Oil.
10


M- MONTHS
D- DAYS
73. BARNYARD MILLET SWEET PUFFS
3M SHELF LIFE
INGREDIENTS:
Barnyard millet and White chocolate compound.
7D SHELF LIFE
77. JOWAR CAKE
INGREDIENTS:
Jowar, Eggs, Sugar, Oil, SMP, Cocoa powder, Baking powder, Baking soda, Salt, Cake gel, Essence and Tutti frutti.
74. RAGI BASED ENERGY BAR
3M SHELF LIFE
INGREDIENTS:
Ragi, Jowar, Jaggery, Almond, Cashew nuts, Flax seed, Sesame, Pumpkin seed, Oats, Whey protein concentrate Guar gum and Honey.
6M SHELF LIFE
78. IRON RICH JOWAR VERMICELLI
INGREDIENTS:
Jowar, Wheat, Garden cress seed and Xanthan gum.
75. ZINC RICH JOWAR VERMICELLI
6M SHELF LIFE
INGREDIENTS:
Jowar, Wheat, Sesame and Xanthan gum.
30D SHELF LIFE
79. JOWAR MUFFINS
INGREDIENTS:
Jowar, Eggs, Sugar, Oil, SMP, Baking powder, Baking soda, Salt, Cake gel and Essence.
Tariff Card on Technology Licensing
Number of Technologies | Tariff Rate
1 | ₹ 50,000 per technology
2-3 | ₹ 33,000 per technology
4-5 | ₹ 30,000 per technology
6 or more | ₹ 25,000 per technology
SCAN ME
NUTRIHUB, ICAR - INDIAN INSTITUTE OF MILLETS RESEARCH, RAJENDRANAGAR, HYDERABAD - 500 030
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11

4.4. List of Incubated Startups Utilizing CFC for Production Needs

This compendium brings to life the stories of over 130 innovative startups supported by Nutrihub, ICAR-Indian Institute of Millets Research (IIMR). These startups represent a diverse tapestry of entrepreneurial spirit from across India, with contributions from Telangana, Tamil Nadu, Karnataka, Maharashtra, and many other states. Through their dedication, these startups are not only developing groundbreaking millet-based products but also promoting sustainable practices and enriching rural livelihoods.

S. No	Name of the Startup	Brand Name	Founder Name	State
1	Inner Being Wellness Private Limited	Inner Being	Mr. Jadhav Chandra Sheker	Telangana
2	Ahobilam Foods Private Limited	Ahobilam Foods - Millet Cave	Mr. Srivatsava Varma Pothuri (Mrs P. Hemamalini)	Telangana
3	Fountainhead Foods Private Limited	Health Sutra	Mr. Sai Krishna Bharadwaj Popuri	Telangana
4	GoBhaarati Agro Industries & Services Private Limited	GoBhaarati	Mr. Sridhar Iriventi	Telangana
5	Hope Blessing Enterprises Private Limited	Hope Foods	Mr. Philip Ratnam	Delhi
6	MforMillet Foods Private Limited	Troo Good	Mr. Bhupatiraju Bhima Ra-makrishna Raju	Telangana
7	Ridgeland Industries Private Limited	Rigdam	Mrs. Dabbugunta Madhavi & Mr. Dibyajyoti Borgohain	Telangana
8	Rowan Agro Nature Private Limited	Rowan Agro Nature	Mr. Umesh Devurkar	Karnataka
9	Nutrisnax	Mego	Mr. Rohit Didige	Telangana
10	Sri Foods	Sri Foods	Mr. P. Kapilan	Tamil Nadu
11	Lakshmi Shaurya Private Limited	Ancient Foods	Mrs. B Lakshmi Haritha Bhavani	Telangana
12	Swad Nandini Foods	Swad Nandini	Mr. Balbhim basole	Karnataka
13	Sivamshu Associates	Pidatha Kindha Pappu	Mrs. Spoorthi Bavandla	Telangana
14	Boutique Foods LLP	Boutique Foods	Mrs. Shilpi Bhandari	Maharashtra
15	Millenova Foods Private Limited	Millenova Foods	Mrs. Sowmya Mandarapu	Telangana

S. No	Name of the Startup	Brand Name	Founder Name	State
16	Doctor Millets Agro Industries Private Limited	Doctor Millets	Mr. Puram Manikyam Gupta	Telangana
17	Coastal Foods	Eat Millet	Mr. Tummala Siva Kumar	Andhra Pradesh
18	Vina Venkatesa Foods	Desi Viva	Mr. M Ganesh Gupta	Andhra Pradesh
19	Millet Break Private Limited	Millet Break	Mr. Rahul Kumar Singh	Uttar Pradesh
20	Lippia Private Limited	Lippia Foods	Mr. Chakravarthy	Telangana
21	Sattva Life Foods Private Limited	Hapup	Mrs. Shruti Ajmera Reddy	Telangana
22	Immpeccable Innovations Private Limited	Sportify & Begins	Mr. Arnab Guha & Mrs. Neha Tyagi	Karnataka
23	DMR Food Products LLP	DMR Food Products LLP	Mr. Mahipal Reddy	Karnataka
24	Sri Vanamali Foods Private Limited	Sri Vanamali Foods Private Limited	Mr. Rahul Vadlakonda	Telangana
25	Nutrimagic	Nutrimagic	Mr. D. Sreehari	Telangana
26	Sri Sai Raghavendra Consortium	Millet Marvels	Mrs. O.G. Ushasri	Telangana
27	NFP Tech Services Private Limited	NFP Tech Services	Mr. Suryaprakash Reddy	Telangana
28	Bharata Gou Sampadha	Bharata Gou Sampadha	Mrs. Ranjeetha	Telangana
29	AmanHealth Agro and Medical Research Center Private Limited	AmanHealth	Dr. Ponakala Koteswara rao/ Malathi	Telangana
30	Magasool Agro Private Limited	Magasool Agro	Mr. Ajay Tannirkulam	Karnataka
31	Sai Sustainable Agro & Rural Products Private Limited	Sai Sustainable Agro	Mr. Jitendra Sinha	Odisha
32	Taproot Farms Private Limited	Superlet/ famnutra	Mr. Gopi Krishna Anumasa	Telangana
33	Pardha Millets India Private Limited	Pardha Millets	Mr. Ravichandra Pothuraju, Mr. RAJA SEKHER NARNI	Andhra Pradesh
34	Rasvirrya Foods Private Limited	Rasvirrya Foods	Mr. Preetam Dutt Koka	Karnataka

S. No	Name of the Startup	Brand Name	Founder Name	State
35	Tasty Tribe Private Limited	Tasty Tribe	Mrs. Nupur Jha	Haryana/ Maharashtra
36	Millet Mantra Private Limited	Millets Mantra	Mr. Vamsi Krishna & Mrs. Poojitha	Telangana
37	Earthylife	Earthylife	Mr. Pramod Kumar	Telangana
38	Millets and more	Millets and More	Mrs. Arigay Ramya	Telangana
39	Greentatwa Agri Tech LLP	Greentatwa	Dr. Peddi Reddy Ramarao	Tamil Nadu
40	M/s. Sreelatha Foods Private Limited	Good Life	Mr. Raghunatha Reddy Chinta	Andhra Pradesh
41	M/s. Sattva Life Foods Pvt. Ltd.	Hapup Foods	Mrs. Shruti Ajmera Reddy	Telangana
42	Harika Foods	Harika Foods	Mr. E Kiran Kumar	Telangana
43	Nutricroft Foods Private limited	Nutricroft Foods	Mr. Thirumala Reddy	Telangana
44	Arch Foods	Arch Foods	Mr. Aprpit Agarwal	Uttarakhand
45	Nutricircle Limited	Nutricircle	Mr. Hitesh M Patel	Telangana
46	Shathabdhi Organics	Shathabdhi Organics	Mrs. Kasu Sribhanu	Telangana
47	Urban Monk Private Limited	Millet Amma	Mr. Ajay Bhuwalka & Mrs. Ruchika Bhuwalka	Karnataka
48	Sri Mayee Foods LLP	Sri Mayee Foods	Mr. Satya Prakash	Telangana
49	Sabka Wellness On Private Limited	WellnessOn	Mr. Santhosh Kumar	Telangana
50	Ushodaya Enterprises Private Limited	Priya Foods - Ramoji Rao	Ms. Geniya Banerjee	Telangana
51	Aaharasamitha Foods Private Limited	Aaharasamitha Foods	Mr. Venkatesh Rajamani	Tamil Nadu
52	Sri Kalyani Foods	Ammae	Mr. P K Anand	Telangana
53	Sarva Seva Samithy Sanstha	Sarva Seva Samithy Sanstha	Mr. Mihir Sahana	West Bengal
54	MY MILLETS	MY MILLETS	Ms Sharon Pradeep	Telangana
55	3N Health Foods Private Limited	Saaral Foods	Mr. Uvais UL Karan P J	Tamil Nadu
56	Avani Ayurveda Private Limited	Avanis - Herbal	Mr. Priyank Agarwal	Chhattisgarh

S. No	Name of the Startup	Brand Name	Founder Name	State
57	Nabhitha Engineering Private Limited	Nabhitha Engineering Private Limited	Ms. Buddarangaiah Gari Radha	Telangana
58	Vishra Agrosales	Vishra Agrosales	Dr. G. Ayyappadasan	Tamil Nadu
59	Chennai Chettinad Products Private Limited	Chennai Chettinad Products Private Limited	Mr. I Syed Sajan	Tamil Nadu
60	AKN Foods Private Limited	Sukritin	Mr. Anees Begam	Tamil Nadu
61	Picante Foods	Picante Foods	Mr. Akshay Prakash Baldota	Maharashtra
62	Nutrisukan Biotech Private Limited	Nutrisukan Biotech	Mrs. Sukanya P	Karnataka
63	Liv O Lyf	Liv O Lyf	Mrs. G. Vasudha Lakshmi	Telangana
64	SRNS Enterprises	Millet Roat	Mrs. Shabana Babu	Telangana
65	Healthy soil, Food & People Private Limited	Healthy soil, Food & People Private Limited	Mr. Gurmeet Singh	Punjab
66	Sanhir Foods India Private Limited	Prollets	Mr. Mihir Mukund Desai	Maharashtra
67	Heldyfarm Foods LLP	Heldyfarm Foods	Mr. Praveena Balusu	Telangana
68	Green and Good Products Private Limited	Wise Mama	Mrs. Aparna Bhatnagar	Karnataka
69	Y B Foods	Y B Foods	Mr. Yash Agrawal	Maharashtra
70	Jnani Nutritional (OPC) Private Limited	Jeeni Foods	Mr. Gowripriya Vinodh Mr. Loganathan Karam Govinda	Tamil Nadu
71	Hima Agro & Textiles	Nutri N Rich	Madabushi Madhavan	Telangana
72	Yummy Tales of Millets Private Limited	Yummy Tales/ Yummy Bee	Mr. Riyazlal SK	Telangana
73	Magnum Foods & Snacks Private Limited	Munch Fit	Mrs.Sbhangi Sawant Mr. Afzal	Delhi
74	Kadapala Agrotech Private Limited	Instabites	Mrs. Mrudula Kadapala	Telangana
75	SSSB Natural Food Products	SSSB Natural Food Products	Mr. M Baswaraj	Telangana

S. No	Name of the Startup	Brand Name	Founder Name	State
76	Millet Express Foods Private Limited	Millet Express	Mr. Godavarthi Venkanna Babu	Telangana
77	Ecoliving	Nutri Amaze	Mrs. Navya Manne	Telangana
78	Nutrivative Food Private Limited	Nourish You	Mr. Krishna Reddy	Telangana
79	Kondapalli Foods	Kondapalli Foods	Mr. Charan kondapalli, Mrs. Rama kondpalli	Telangana
80	Levain Bakers Private Limited	Keybes	Mrs. Nalini, Mr. Krishna Shyam Sunder-kumar	Telangana
81	Jeevitha Enterprises	Jeeni	Mrs.Dhana Lakshmi	Karnataka
82	Hungry Koala Private Limited	Hungry Koala	Mrs. Shazia Anjum	Karnataka
83	Aseervad Agro And Food Processing Private Limited	Aseervad Agro	Mr. John William Carey Medithe, Mr. Venkatratnam Akumarthy	Andhra Pradesh
84	Deccan Agro Foods & Spices	Deccan Agro/ Millets Mantra	Mrs. Alla Ratna Kumari	Telangana
85	Millets of Mewar LLP	Millets of Mewar LLP	Mr. Manoj Prajapat & Mr. Surendra Gandharva	Rajasthan
86	Trishakthi Foods LLP	Trishakthi Foods LLP	Mrs. Preethi Reddy Kundar, Mrs. Reena Mandula & Mrs. Lavanya Pamula Party	Telangana
87	ACUltiy Millets LLP	ACUltiy Millets LLP	Mr. Sandeep Kumar Dhawan	Delhi
88	Millet Yard Private Limited	Millet Yard	Ms. Aruna Chourasya, Ms. Anushree Agarwal, Mr. Nishant Desai	Madhya Pradesh
89	SBMM Unskippable Foods Private Limited	SBMM Unskippable Foods Private Limited	Mrs. Kumkum Sukrita Balaji	Telangana
90	Semis Foods Private Limited	Semis Foods / Nutrivise Xtreme	Mr. Kambhampalli Veeranjaneyulu	Karnataka

S. No	Name of the Startup	Brand Name	Founder Name	State
91	Agrinee Naturals Producer Company Limited	Agrinee Naturals	Mr. Maulik Arora	Gujarat
92	Creative Nutrition Private Limited	Creative Nutrition Private Limited	Mr. Kartik Gupta	Haryana
93	Pago Foods and Bvereages LLP	The Jaava Pot	Mr. Ramesh Garikamokkala	Telangana
94	Environment Conservation Society	Switch On Foundation	Mr. Vinay Jaju	Kolkata
95	Sai Sadan Food Processing Private Limited	Sai Sadan's, Millet Leaf, Satvik Shreeanna	Mr. D Krishna Mohan	Chhattisgarh
96	The Millets	The Millets	Mrs. Hadassah Gold Manthri	Telangana
97	Nutri Honey Flakes LLP	Nutri Honey Flakes LLP	Mrs. Kasarapu Usha Naga Prasuna	Andhra Pradesh
98	Shyamaka Millet Foods Private limited	Poshan Tree	Mr. Peddababu & Mr. Peddanna	Andhra Pradesh
99	Myshta Organics (OPC) Private Limited	Myshta Organics	Mrs. M Shruthi	Telangana
100	Skandhanshi Agro Foods Private Limited	DesiNutri	Mr. K. Suresh Kumar Reddy	Telangana
101	Sankar Enterprises	Sankar Enterprises	Mr. Jayasanakar Mettu	Andhra Pradesh
102	Masters of Millets Private Limited	Masters of Millets	Mr. Krishna Teja Yadav & Mr. Namdev Panchal	Telangana
103	Deep Root Food Tech Private Limited	Yuneeday	Mr. Rahul Singh Chouhan	Karnataka
104	Manga Srinivas Food International Private Limited	EatFull & Millet Factory	Mr. Kavali Manideep	Telangana
105	Brahhm Arpan Organic Private Limited	Brahhm Arpan Organic	Mr. Raman Prabhakar Singh & Mrs. Surekha	Delhi
106	G-Life International Private Limited	G-Life	Mr. Chandrashekar Khajuria	Karnataka
107	Borne Technologies Private Limited	Borne Technologies	Mr. Vikram Sankaranarayanan	Tamil Nadu

S. No	Name of the Startup	Brand Name	Founder Name	State
108	Sri Surya Organics	Sri Surya Organics	Mr. Lokeshwar Raju Konduri	Telangana
109	Kapardi Enterprises	Siridhanya Millets	Mr. Nageshwar Rao Midathala	Telangana
110	Gold Dust Kitchen	Gold Dust Kitchen	Mr. Nilay Jain	Madhya Pradesh
111	Isayu Foods Private Limited	Isayu Foods	Mrs. Margaret HJ / Mr. Sujay	Karnataka
112	Satvam Nutrifoods Limited	Satvam	Mr. Ganpatlal Dahyalal Patel	Gujrat
113	Rajhans Consultants and Technocrats Private Limited	Sattvik Sutra	Mr. Vishal Rajhans	Chhattisgarh
114	Krisan Trading	My Millets	Mrs. Shobhana, Mr. Sireesh Katta	Karnataka
115	Tashvika India Private Limited	Amrut Bhojanam	Mrs. Sadhvi Pandey, Mr. Suraj Pandey	Delhi
116	Munico Foods Private Limited	Gutzy	Mr. Satyabrath Muni	Odisha
117	Mashroom Dots Enterprises	Mashroom Dots	Mrs. Poojitha Ambati Mr. Vinay Ambati	Andhra Pradesh
118	Vaishnavi Agro Food Industries	Vaishnavi Agro	Mr. Akula Siva Kumar	Andhra Pradesh
119	Kathirava Naturals Private Limited	Bwise 365	Mrs. Aishwarya Samala	Telangana
120	Sanjay Rice Mill	Veeram	Mr. Sanjay B Chordiya / Mr. Sandesh Chordiya	Maharashtra
121	Medsun Life Sciences	Medsun	Mr. A Jeevan Venkat Sai	Telangana
122	Mileats	Mileats	Mr. Pidishetty Pranav Kumar Mrs. Pallavi Reddy	Telangana
123	Gsamruta Foods (OPC) Private Limited	9Tattvas	Mrs. Swarnima Singh D	Uttar Pradesh
124	Anilu Foods (OPC) Private Limited	Health Magic	Mrs. Archana Gupta	Karnataka
125	Mavy Nutrition Private Limited	Mavy Nutrition	Mrs. Hadassah Manthri	Andhra Pradesh

S. No	Name of the Startup	Brand Name	Founder Name	State
126	Indlands Foods Private Limited	Indlands Foods Private Limited	Mrs. Pallava Sujatha	Andhra Pradesh
127	Urban Firman Nutrient India (OPC) Private Limited	Urban Firman Nutrient India (OPC) Private Limited	Mr.Maheshwar Bonthu, Mr. Umamaheshwar Reddy	Andhra Pradesh
128	Maagaani Foods Private Limited	Maagaani	Mr. Runith Reddy	Telangana
129	Purferme Project Private Limited	Purferme Project	Mrs. Purnima Kar Sharma / Mr. Abhinav Sharma	Karnataka
130	AMC Nutrinest Private Limited	millatenutrinest	Mr. Gangireddy Arunkumar Reddy	Andhra Pradesh
131	Millet Growers LLP	Millet Growers LLP	Mrs. Gayathri Vemuri	Telangana
132	Kshetragna Agronym Private Limited	Kshetragna	Mr. Ravindra Babu Aluru	Andhra Pradesh
133	Maestro Millets LLP	Maestro Millets	Mr. Jaydeep Jaiswal	Gujarat
134	Srianna Divine Foods India Private Limited	Moms Millets	Mr. Venkatramani	Karnataka
135	Nuturemite	Nuturemite	Mrs. Usha Sri Cherala, Mr. Mahesh	Telangana
136	Unistem Sales and Marketing LLP	Giri	Mr. Sampath Kumar	Telangana

4.5. Uniqueness of the Common Facility Centre (CFC) at Nutrihub, ICAR-IIMR

The Common Facility Centre (CFC) at Nutrihub, ICAR-Indian Institute of Millets Research (ICAR-IIMR) stands as a pioneering model of incubation and capacity building in India's millet innovation ecosystem. It is uniquely designed to cater to the needs of early-stage start-ups and stakeholders involved in millet-based value addition and entrepreneurship.

a. Incubation with Production Infrastructure – Beyond Handholding

Unlike many incubators whose support is limited to mentoring and networking, the CFC at Nutrihub provides start-ups with direct access to a well-equipped production infrastructure. This enables entrepreneurs to scale their prototypes to pilot production level, test market their products, and achieve early revenue traction without investing heavily in manufacturing infrastructure. The facility includes specialized lines for hot and cold extrusion,

flaking, bakery production, and chikki bars, among others. These units support rapid prototyping and help start-ups achieve product-market fit and validate consumer acceptability before commercial launch.

CFC has supported the development of millet-based products tailored for both domestic and export markets. Products like multi-millet soup mixes, instant weaning powders, pasta, flakes, extrudates, and fortified flours are designed at the CFC using food safety-compliant processes and packaging systems. This enables start-ups to meet international standards in HACCP, shelf-life extension, and nutritional labelling – thus making them globally competitive.

b. Facilitator of Technology Commercialization and Entrepreneurship

The Common Facility Centre (CFC) at Nutrihub enables the commercialization of technologies and fostering entrepreneurship, particularly in the millet-based agri-food sector. It goes beyond being a processing unit it acts as a strategic platform where innovation is translated into viable business ventures. Nutrihub has embedded the principles of a Public-Private-Partnership (PPP) model within the CFC, allowing start-ups, research institutions, and private enterprises to co-create value.

The facility supports licensing of more than 120 developed technologies from ICAR-IIMR and facilitates their real-world application by incubatees. It also serves as a hub for field validation, consumer trials, and market-linked adaptation of technologies, thus bridging the gap between research labs and retail shelves. The CFC, therefore, exemplifies how inclusive, innovation-driven ecosystems can be built through institutional support, shared resources, and collaborative models, making it a national benchmark in technology-driven agribusiness incubation.

c. Hands-on Training and Capacity Building

The Common Facility Centre (CFC) at Nutrihub, ICAR-IIMR, caters to the hands-on training and experiential learning in millet processing, value addition, and entrepreneurship. It offers structured and demand-driven training modules designed to cater to a diverse audience—including early-stage entrepreneurs, farmers, Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), researchers, and students—who seek practical exposure to the millet value chain.

A wide range of flagship programs are conducted at the CFC to meet varying levels of expertise and learning needs. These include the Startup Ignition Program, Cooking with Millets, Technology Development Program (TDP), and the Entrepreneurship Foundation Program on millets. Each of these modules focuses on real-world skill-building and enterprise-readiness, providing participants with immersive experiences in food innovation and millet-based product development.

The training formats are flexible and range from short, intensive one-day workshops to comprehensive 24-day immersion programs. Participants gain hands-on exposure to millet processing techniques, machinery

operation, packaging solutions, hygiene protocols, labelling norms, and quality control procedures. The facility also hosts specialized training sessions in collaboration with government and development partners such as the Department of Science and Technology (DST), Ministry of MSME, and INSIMP, thereby ensuring a blend of scientific rigor, policy relevance, and industry applicability.

By bringing together incubation, production infrastructure, technology commercialization, and hands-on capacity building under a single platform, the CFC effectively bridges the gap between innovation and market realization. It addresses the entire millet value chain from product ideation and prototyping to pilot production and go-to-market strategies making it a unique and comprehensive ecosystem enabler.

A key strength of the CFC lies in its shared infrastructure model, which dramatically reduces the cost of entry for emerging entrepreneurs. This approach is particularly empowering for grassroots innovators, women-led enterprises, and rural agripreneurs who often face capital and resource constraints. By offering access to advanced processing machinery, expert mentorship, and real-time product testing and validation, the CFC enables these entrepreneurs to commercialize their innovations with confidence and competitiveness.

As a national benchmark in agribusiness incubation, the CFC continues to catalyze inclusive entrepreneurship, foster local innovation, and drive the mainstreaming of millets as sustainable and health-focused superfoods—both within India and globally.

Chapter 5

Future of CFC

The Common Facility Centre (CFC) at Nutrihub, ICAR–Indian Institute of Millets Research (IIMR), Hyderabad, is poised for significant expansion and evolution as it continues to serve as a global model for millet-based food processing and enterprise development. Building on its strong foundation, the future of the CFC will be characterized by technological advancement, expanded outreach, and deeper integration with the millet innovation ecosystem.

One of the key priorities in the coming years is the upgradation and diversification of processing infrastructure. As consumer preferences evolve and millet-based products gain wider market acceptance, the CFC aims to introduce advanced automation, precision processing equipment, new product lines for large scale production and smart packaging solutions. This will enable the development of innovative products such as large-scale bakery production units, Millet based beverages, specialized units for gluten-free and fortified products and smart packaging and automation technologies that cater to health-conscious urban and global markets.

5.1 Scaling up the Common Facility Centre (CFC)

The Common Facility Centre (CFC) at Nutrihub, ICAR–Indian Institute of Millets Research (IIMR), Hyderabad, is on the threshold of a transformative expansion. Building on its reputation as a national model for millet-based enterprise development, the CFC is poised to evolve into a globally recognized centre for food innovation, technology incubation, and inclusive entrepreneurship. The next phase of its journey will be characterized by advanced infrastructure, wider outreach, global benchmarking, and deeper integration with the millet value chain.

1. Expansion of Contract Manufacturing Services

A significant area of growth lies in the expansion of contract manufacturing capabilities. The CFC plans to establish dedicated lines for millet-based product manufacturing on behalf of start-ups, MSMEs, and food entrepreneurs. This facility will cater to businesses that need pilot or commercial scale production without heavy upfront investment in infrastructure. By providing quality-controlled

manufacturing services, the CFC will support product validation, brand scaling, and timely market entry especially for early-stage enterprises.

2. New Production Lines for Scaled-Up Processing

To meet the growing market demand and support scale-up of innovative millet products, the CFC will invest in high-capacity and diversified processing lines. Planned additions include

- Functional Millet-Based Foods: Development of health-oriented food products leveraging the nutritional profile of millets.
- Millet-Based Beverages and Bottling Unit: Infrastructure for producing and packaging a variety of millet-derived drinks.
- Millet Milk Production Facility: Dedicated line to produce plant-based millet milk as a dairy alternative.
- Millet-Based Meat Analogues Unit: Facility to produce plant-based meat substitutes using millet as a core ingredient.
- Large-Scale Millet Bakery Products Unit: Automated systems for mass production of millet-based baked goods including breads, biscuits, cookies, and snacks.
- High-Protein Millet Snacks: Production of protein-rich snack options targeting fitness and health-conscious consumers.
- Gut-Friendly Foods: Manufacturing of prebiotic and probiotic millet products that support digestive health.
- Sugar-Free Millet Products: Development of naturally sweetened or sugar-free alternatives for diabetic-friendly and health-conscious markets.
- Instant Millet Recipe Line: Ready-to-cook and ready-to-eat millet-based meal solutions for urban and on-the-go consumers.
- Fortified Millet Analogue Rice Production Unit: Specialized facility to produce nutrient-enriched millet rice alternatives aimed at combating malnutrition.
- Gluten-Free Millet Processing Facility: Dedicated unit to ensure the production of certified gluten-free millet products, catering to individuals with gluten intolerance or celiac disease.

These infrastructure enhancements will significantly boost the volume, quality, and product diversity needed to cater to both domestic and international markets and align with the current trends in market.

3. Global Outlook and Standards

The CFC's future roadmap includes aligning with international food safety and quality benchmarks such as FSSAI, HACCP, and Codex Alimentarius. This

global alignment will not only enhance credibility but also enable Indian millet products to meet the compliance needs of export markets. Specialized innovation clusters are also planned, such as Ready-to-Eat (RTE) and Ready-to-Cook (RTC) product development unit, gluten-free product facility, pilot-scale beverage bottling unit. These clusters will position the CFC as a globally competitive innovation hub for value-added millet products.

4. Strengthening the Eatrite Brand and Market Reach

Another strategic dimension involves scaling the "Eatrite" brand through multiple channels. The CFC will support the launch of exclusive Eatrite outlets, franchising models, collaborations with online delivery platforms, and regional distribution networks. This expansion will enhance millet visibility, improve accessibility, and make Eatrite a household brand that symbolizes health, tradition, and innovation.

5. Becoming a National Resource Centre for Capacity Building

The CFC envisions becoming a national centre of excellence for training and capacity building. Future includes enhanced training programs on millet processing technologies, food safety, labelling, packaging, and business development. These programs will specifically empower rural youth, women entrepreneurs, FPOs, and SHGs promoting inclusive economic development and widespread job creation across regions.

6. Collaborative Innovation and Sustainability Focus

Deeper collaboration with research institutions, industry partners, and government agencies will be a cornerstone of the CFC's future. Joint R&D projects, technology transfers, and co-development of products will ensure seamless flow of innovations from lab to market. Additionally, the CFC will actively promote sustainable practices including green packaging solutions, waste reduction technologies, and energy efficient operations making it a model of responsible food processing infrastructure.

With institutional strength, strategic partnerships, and expanding infrastructure, the CFC at Nutrihub, ICAR-IIMR is well-positioned to emerge as a pan-India and globally recognized hub for millet innovation. It will not only incubate the next generation of millet startups but also play a central role in mainstreaming millets into national diets and global food systems contributing significantly to India's goals of nutrition security, sustainability, and rural prosperity.

Annexure 1

List of Staff Employed at CFC

S. No	Name of the Employee	Designation	Period Employed	
			Joining	Relieving
1	Mr. KVD Karthik	Plant Manager	16-01-2025	Current Working
2	Dr. Tamilselvan. T	Research Manager	29-10-2024	Current Working
3	Mr. Md Abdul Mannan	Operations Manager	23-09-2024	Current Working
4	Ms. Sailaja P	Senior Research Fellow (SRF)	08-05-2024	Current Working
5	Mr. Rajendar B	Technical Assistant/ Production Supervisor	07-08-2017	Currently Working
6	Mr. P Vamsi Krishna	Sr. Technical Assistant (Operations)	05-02-2025	Currently Working
7	Mr. M Suresh	Sr. Technical Assistant (Operations)	05-02-2025	Currently Working
8	Mr. K Shiva Kumar	Sr. Technical Assistant (Operations)	05-02-2025	Currently Working
9	Mr. M Srinu	Plant Manager	10-05-2023	22-12-2023
10	Mr. U Balashow Reddy	Senior Consultant	01-12-2021	01-05-2023
11	Dr. P. Amaranatha Reddy	Plant cum Business Manager	14-08-2017	20-11-2021
12	Mr. B Chaitanya	Marketing Manager	05-07-2022	20-09-2023
13	Mr. Abhinay Soodi	Marketing Manager	01-01-2022	20-06-2022
14	Mr. Tharun Kumar D	Junior Consultant	29-08-2023	13-12-2023
15	Mr. G. Shiva Goud	Technical Assistant	07-08-2017	06-12-2022
16	Mr. K Mahendar Reddy	Technical Assistant	07-08-2017	31-10-2017
17	Mr. Thrivikram Reddy T	Technical Assistant	08-08-2017	02-11-2020
18	Mr. Srinu M	Technical Assistant	07-08-2017	11-09-2019
19	Mr. Sagar B	Technical Assistant	16-08-2017	31-01-2018
20	Ms. Harish N	Technical Assistant	16-08-2017	18-05-2022
21	Mr. Kumar Raja	Technical Assistant	15-11-2017	31-10-2020
22	Mr. K Siva Sankar	Technical Assistant	14-10-2019	31-10-2020
23	Mr. Sajeed	Technical Assistant	01-05-2023	13-06-2024
24	Mr. N Naveen Kumar	Production Executive/ Technical Assistant	01-02-2024	31-12-2024

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