

TECHNOLOGIES AVAILABLE FOR TRANSFER AND COMMERCIALIZATION

PROMOTING WOMEN LED TECHNO-ENTREPRENEURSHIP THROUGH INNOVATIVE TECHNOLOGIES

“ नारी तू नारायणी ”

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NATIONAL RESEARCH DEVELOPMENT CORPORATION
[An Enterprise of DSIR, Min. of Science & Technology, Govt of India]

(PROMOTING INNOVATION TRANSFORMING LIVES)

FOREWORD



India is celebrating its 75th year of independence as Azadi ka Amrit Mahotsav and successfully assumed the G20 Presidency with the motto "Vasudhaiva Kutumbakam" or "One Earth-One Family-One Future". Science, technology and innovation has been playing a momentous role in strengthening the global ecosystem in achieving SDGs. National Research Development Corporation (NRDC), a Govt. of India enterprise was established in 1953 for the development, promotion and transfer of technologies emanating from R&D organizations and academic institution in India and abroad. It is functioning under the Department of Scientific and Industrial Research, Ministry of Science & Technology, Government of India.

Over seven decades of its existence, NRDC has developed a wide network with R&D organizations viz. CSIR (Council of Scientific and industrial Research), NIOT (National Institute of Ocean Technology), DRDO (Defence Research and Development Organisation), ICMR (Indian Council of Medical Research), ICAR (Indian Council of Agricultural Research), universities, industry associations & many more. NRDC nurtures new ideas and inventions by providing support and rewards; ensuring intellectual property protection; effective transfer of know-how from laboratories to industry; providing access to new technologies from India and abroad; exporting indian technological expertise and offering an array of IP and technology consultancy services.

It has been recognised as the largest depository of wide range of technologies ranging from agriculture, agro-processing, food processing specific to millets, chemical, herbal, electrical and electronics, biotechnologies, mechanical, marines etc. During its long journey NRDC has gained very rich experience in the field of technology/ IPR management, technology transfer and commercialisation. It has signed about 5000 technology license agreements and filed 2000 patents in India and abroad. It has also exported technologies and services to over 20 developing and developed countries including African countries like Senegal, Nigeria, Ivory Coast, Gabon, Madagascar, Ghana, Egypt, Kenya, and Ethiopia. NRDC is recognised, particularly in the developing countries as the source of reliable appropriate technology, machines and services, which are typically suitable for the socio-economic and technological upliftment of these emerging countries

NRDC is prioritizing in innovative technologies design, development assistance and assessment in advancing research result through patents to make product-driven ecosystem. We are into building expertise in technologies assessment, fostering collaboration between academia and industry, building trust in indigenous R&D and IP protection support and mechanism. NRDC act as both customer and facilitator, advocating for innovative technologies transfer to MSMEs, startups & industries and increased mobility between academic research and industry.

This compendium is a collection and compilation of the latest innovative affordable technologies available for commercialization. A total of 80 technologies have been listed having technology readiness level 6 and above are summarized in the compendium. These technologies shall serve as a ready to leverage of techno-entrepreneurship in the country.

Jai Hind,
Cmde. Amit Rastogi (Retd.)
Chairman and Managing Director
National Research Development Corporation

LIST OF TECHNOLOGIES

Sl. No.	Name of the Technology
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2.	Apple Pomace Powder For Enrichment Of Bakery Products (Bun, Muffin And Cookies)
3.	Banana Bar
4.	Beverages From Banana Pseudo Stem
5.	Bifido Curd
6.	Bitter Gourd Functional Drink For Type-2 Diabetes Patient
7.	Chikki/ Nutra Chikki
8.	Coconut Beverage From Tender Coconut
9.	Composite Lentil Chips
10.	Composite Ragi Rusk
11.	Decorticated Ragi
12.	Dehydrated Bitter Gourd
13.	Dosa Making Machine
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15.	Eggless Cake Premix
16.	Finger Millet (Ragi) Based Murukku Mix
17.	Flaked Jowar Rte Low Fat Sweet & Savoury Snacks
18.	Flaking Foxtail Millet
19.	Flaking Of Ragi
20.	Fortified Mango Bar
21.	Ginger Beverage
22.	Ginger Paste
23.	Ginger Tea
24.	Groundnut Butter
25.	High Protein Rusk
26.	Honey Based Bakery Products (Plain Bread, Sweet Bread, Buns, Bar Cake, Muffins, Egg Less Cake, Sponge Rolls, Cream Biscuits, Cookies, Doughnuts, Rolls, Danish Pastry, Croissants)
27.	Improved Maize Flour
28.	Instant Mushroom Soup Mix
29.	Low Glycemic Index (Gi) Beverage For Diabetics
30.	Malted Ragi Flour – Enzyme Rich
31.	Mass Propagation Of Banana By Tissue Culture Technique
32.	Chicken Wafers
33.	Integrated Processing Of Mustard Seeds
34.	Mutton Pickle
35.	Preparation Of Non-Aerated Nutri Beverage In Glass Bottles
36.	Nutri Oil Blends
37.	Onion Flavored Biscuits

LIST OF TECHNOLOGIES

Sl. No.	Name of the Technology
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40.	Osmo Drying Of Mango Slices
41.	Osmo-Air Dehydrated Pineapple Slices
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60.	Sugar - Free Rusk
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71.	Process For Making Coloured Wax Crayons
72.	Process For Making Low Dust Chalk Pencil
73.	Herbal Lipsticks With Lipcare
74.	Solid Deodorant Freshener
75.	Liquid Deodorant Cleaner
76.	Mosquito Repellent Incense Stick
77.	Process For Making Handmade Paper
78.	Low Cost Non-Wood Honey Bee Box
79.	Mosquito Repellent Candle

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AMLA SPREAD

INTRODUCTION:

Amla, scientifically known as *Emblica officinalis*, or Indian Gooseberry, is a remarkable subtropical deciduous tree that flourishes in tropical regions across India, from the foothills of the Himalayas to Sri Lanka, Malaysia, and China. The tree also grows wild at elevations up to 1500 meters in southern parts on India. Amla varieties, though have not been classified according to their size, colours are named after the places of growing. The important varieties of Amla are: Banarsi, Bansi red, Chkiya, Desi, Hathi fool and Pink tinged. The variety chakiya is noted for its heavy and regular bearing habits while banarsi is reported for its fairly large sized fruits, though it is slightly shy. Amla gets ready for harvesting by November. In the Northern plains, the peak harvesting period is from mid-December to January end. Bacterial or fungal spoilage may occur during post-harvest handling of Amla fruits. Processing of Amla not only results in curtailing the spoilage of fresh fruits but also results in value addition through new products with better nutritional properties.

The following Product characteristics are,

- The Amla spread is packed in glass jars for optimal preservation and can be stored at ambient temperatures, ensuring convenience for consumers.
- Its microbiological stability guarantees safety and freshness, making it suitable for long-term use.
- This versatile product can be enjoyed as a delicious jam for bread or used in sandwiches, as well as paired with chapatti and dosa, adding both flavor and nutrition to meals.

BENEFITS:

- High in vitamin C and antioxidants, supporting overall health.
- Strengthens the immune system, helping to fend off infections.
- Aids in digestion and promotes gut health.
- Antioxidants improve skin health and reduce signs of aging.
- Can be used as a spread for bread, in sandwiches, or as an accompaniment for chapatti and dosa, enhancing meals.

RAW MATERIAL:

Mature Amla fruits, cane sugar, citric acid, pectin, mixed fruit pulp, Sodium benzoate, flavor, etc.

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AMLA SPREAD

PLANT AND MACHINERY:

- Principal equipment: Fruit washing machine, Pulper, Fruit mill, Bottle washing machine, sealing machine, Hot air drier, Refractometer and Steam jacketed kettle.
- Auxiliary equipment: Preparation tables, Boiler, Trolleys, weighing machine, Holding vessels and miscellaneous items.

PROJECT COST:

- Land & Land development (500 m²) – ₹ 1,00,000/-
- Building and civil works (100 m²) – ₹ 7,00,000/-
- Plant and machinery – ₹ 5,00,000/-
- Miscellaneous fixed assets – ₹ 2,00,000/-
- Pre-operative expenses – ₹ 1,50,000/-
- Total Fixed Capital – ₹ 16,50,000/-
- Working Capital Margin – ₹ 2,15,000/-
- Total Project Cost – ₹ 18,65,000/-
- Total Working Capital Required at 15% of Turnover – ₹ 4,50,000/-
- Promoters Contribution – ₹ 4,65,000/-
- Term Loan – ₹ 14,00,000/-

PRODUCTION CAPACITY:

- Suggested economic capacity: 100Kg /day
- Working: 1 shift/day, 300 working days/year
- Capacity: 30 Ton

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APPLE POMACE POWDER FOR ENRICHMENT OF BAKERY PRODUCTS (bun, muffin and cookies)

INTRODUCTION:

A novel approach has been developed for enhancing bakery products using apple pomace powder, a by-product of the apple juice industry. Apple pomace, which constitutes about 25% of the fresh weight of apples, is often discarded despite its potential value. This process transforms this residue into a functional ingredient that can be used to enrich bakery items such as buns, muffins, and cookies.

BENEFITS:

- Contributes to sustainability by converting apple pomace, a waste by-product, into a valuable resource.
- Enriches bakery products with added nutritional and bio-functional properties.
- Reduces the environmental impact of apple juice production by utilizing pomace waste.
- Enhances the shelf life of bakery products to approximately 4 months.

USE:

Apple production in our country is estimated to be ~2 million tonnes. Most of it is crushed for juice that is processed for consumption all over the country and in off seasons. A mega residue of apple juice industry is the solid pomace (~25% of fresh weight of apple) that has no pertinent economic use.

The present technology, based on the chemistry of apple pomace generated, bakery products are developed that are labeled for bio-functional properties. Process of preparation of dry apple pomace for enriching bakery products through supplementation that adds bio-functional value. Thus, the invention emphasizes on useful conversion of residue into upgraded bakery products.

RAW MATERIAL:

Apples

EQUIPMENT:

Cabinet drier, Hammer mill, Dehumidifier etc.

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APPLE POMACE POWDER FOR ENRICHMENT OF BAKERY PRODUCTS (bun, muffin and cookies)

Capacity:

800 kg of fruits/day

PROJECT COST:

- The project requires approximately 500 square meters of land to accommodate the necessary infrastructure.
- Within this area, the building itself will cover around 242 square meters (approx.).
- The estimated cost for plant and machinery is Rs. 15,00,000/-
- Contributing to a total project cost of approximately Rs. 63,00,000/-.

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BANANA BAR

INTRODUCTION:

Banana is one of the largest produced fruit in the country, the fruit is mainly consumed as fresh and is also processed into pulp. Banana is a good source of carbohydrates, carotenoids, soluble and insoluble dietary fiber. Banana pulp extracted from mature ripe banana can be used for the manufacture of banana bar.

Banana bars offer a solution to this problem by providing a durable, shelf-stable product that adds value to the raw fruit, supporting farmers and reducing food waste.

Banana bars are created from banana pulp, which is processed and concentrated into a chewy, energy-rich snack. This product is not only nutritious but also has a long shelf life, making it a viable option for various applications. Its chewy texture, appealing color, and overall quality make it a highly acceptable product among consumers.

BENEFITS:

- High nutritional value and easy to consume.
- Rich source of energy for quick boosts.
- Contains essential micronutrients like potassium and vitamin B6, supporting heart health and muscle function.
- Ideal snack for children, teenagers, and the elderly, promoting overall health.
- Long shelf life (around 6 months).

RAW MATERIAL: Mature banana, and other additives etc.

EQUIPMENT: Fruit washer, Stirrer, fruit pulper, SS Preparation tables, Boiler, SS blending tank with agitator and pump, SS steam jacketed kettles, Hot air drier

CAPACITY: 100 kg/day.

PROJECT COST:

- The project requires an estimated land area of approximately 800 square meters.
- A building space covering around 288 square meters.
- The estimated cost of plant and machinery is Rs. 28,56,000/-
- The total projected cost for the entire project is approximately Rs. 61,00,000/-

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BEVERAGES FROM BANANA PSEUDO STEM

INTRODUCTION:

Banana is one of the major fruit crops grown in India and with respect to area and production it stands only second to mango. The banana stem, called the pseudo stem, is a juicy material rich in fiber. It is one of the various other common foods in some regions of India. It has great medicinal value too. It is available in India as any other vegetable in the markets. Juice from banana stems is a well-known remedy for urinary disorders. It improves the functional efficiency of kidney and liver thereby alleviating the discomforts and diseased condition in them.

The product could be consumed or its medicinal value. Due to its high content of phenolics and tannins its consumption is limited. Its astringent taste could be masked by blending it with suitable fruit juices or spices to render the product palatable.

RAW MATERIALS: Banana pseudo stem, sugar, citric acid, ascorbic acid, fruit juices.

PROCESS: In this process, banana pseudo stem juice is extracted overcoming the problem of browning. The juice is made palatable by blending it with other fruit juices, fruit juice concentrates. The product has a good shelf life and higher export potential due to the availability of the raw material in large quantities.

PLANT & MACHINERY: S.S. Crusher, Steam Jacketed Kettles, Bottle Filling Machine, Bottle Washing Machine, SS Fruit Preparation Tables, Boilers, Weighing Balance, Crown Corking Machine, Saucepans and Trolleys.

MARKET: With the increasing demand for newer and healthier products, the above product has good market potential as it contains banana pseudo stem beverage which has been vouched for many kidney related diseases especially in the condition of urolithiasis.

PRODUCTION CAPACITY: (estimate) Suggested economic capacity: 500 Kg juice/ beverage/ day Working: 1 shift/day, 200 working days/ annum Capacity: 100 MT /annum

FINANCIAL ASPECTS:

Project Cost – Fixed Cost – Working Capital (in Rs. '000)

Land & Land development (1000 Sq. m) : - 400.00

Building and civil works (200 Sq. m) 1000.00 : - 1000.00

Plant and machinery:- 1143.00

Other fixed assets: - 50.00

Pre-operative expenses:- 314.00

Total fixed capital:- 2907.00

Working capital margin :- 305.00

Total Project cost:- 3212.00

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BIFIDO CURD

INTRODUCTION:

Bifido curd is a probiotic curd prepared by fermenting milk exclusively using bifidobacteria as a starter culture. As probiotic curd contains Lactobacillus bacteria it may be used to prevent the action of harmful bacteria causing dental caries and periodontitis. This health promoting bacteria can replenish bifidobacterial count in colon and provide microbial homeostasis.

It is a unique probiotic product prepared using market milk, and is enriched with sole bifidobacteria, that possess additional starter culture property. High viability is ensured satisfying the Minimum Biological Value (MBV) for probiotic product.

BENEFITS:

- Supporting digestion and reducing gastrointestinal issues.
- Probiotic Boost.
- Immune Support and providing better protection against infections.
- The curd maintains a high count of live bifidobacteria.

RAW MATERIAL:

Toned milk, skim milk, sucrose and bifidobacteria.

EQUIPMENT:

Incubator 37°C, Basket bowl Centrifuge, mixing tank with Stirrer, Holding Tank, Jacketed holding tank, Plate Heat Exchanger for Heating/Cooling, Filling and sealing machine, Curd Incubator, Refrigerator/Cooler.

PRODUCTION CAPACITY:

- The installed capacity can produce 1000 liter per shift and three shifts can be run per day.
- working for 300 days in a year.

PROJECT COST:

- Land and Building: ₹ 8,00,000/-
- Plant and Machinery: ₹ 33,00,000/-
- Auxiliary Equipment: ₹ 13,00,000/-
- Total Project Cost: ₹ 54,00,000/-

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BITTER GOURD FUNCTIONAL DRINK FOR TYPE-2 DIABETES PATIENT

INTRODUCTION:

The developed drink is a functional drink for person suffering from type-2 mellitus or Health conscious peoples. Who would like to prevent this disease, the drink is prepared from Bitter gourd or Karela (Momordica charantia). The drink is not bitter intake and it can be taken like Frooti, Slice and Majaa drink. Karela is well known ayurvedic herb to regulate blood sugar level. In this process karela juice is extracted with unique art of technology. Developed process also increased the shelf life of the processed Bitter guard juice up to 12 months during storage it was also noticed that the Taste, colour and appearance is acceptable. At present this type of drink not available in Indian markets and not consumed as functional drink.

ADVANTAGES:

- 1: The product is rich in iron, beta-carotene, and potassium. It can relieve constipation and improve circulation, thereby producing slimming effects on the body.
- 2: This drink contains essential vitamins and minerals; its regular use helps to prevent many complications such as hypertension, eye complications, neuritis and defective metabolism of carbohydrates.
- 3: It is also helpful as a blood purifier due to its properties.
- 4: It is extremely effective in the treatment of diabetes and psoriasis.

PLANT PARAMETERS

Capacity, TPA - 300

Number of shifts - 1

Working days/Year - 300

Land Required, m² - 500

Covered Area, m² - 400

MANPOWER

Managerial - 01

Skilled - 05

Unskilled - 05

RAW MATERIAL:

Fresh Bitter gourd Sugar Citric acid

UTILITIES:

Power, Kwh Water, KL Fuel (LDO),

PLANT AND MACHINERY:

Kettle, pulveriser, Filling machine, Weighing machine etc.

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CHIKKI/ NUTRA CHIKKI

INTRODUCTION:

Chikki is a ready to eat traditional sweet snack consumed by all sections of the population in India. It provides protein, carbohydrates and fats. Currently, the demand for functional foods is increasing at a fast pace. This popular sweet snack is a good vehicle to transfer some essential nutrients into needy and health conscious consumers.

In addition to providing energy, macronutrients, and the pleasure of sweetness, it could provide some essential nutrients if it is fortified. Some such natural nutraceuticals having specific health benefits are chosen to fortify chikki.

RAW MATERIALS:

The important raw materials required for the preparation of chikki/ nutra chikki are jaggery, peanut and other ingredients.

PLANT & MACHINERY:

Principal Equipments: - Drum roaster, splitting machine, stainless steel trays, candy cooker, sheeting and cutting machine, working tables, hand refractometers, sieves, powdering machine, syrup filtration unit, jacketed tank and digital balance

PRODUCTION CAPACITY: (estimate)

The installed capacity is 100Kg finished product per shift/day and working for 300 days in a year. Optimum capacity utilization: 70%

FINANCIAL ASPECTS

Project Cost – Fixed Cost – Working Capital (in Rs. '000)

- Land & land development (500 m²) - 125.00
- Building & civil construction (150 m²) - 600.00
- Plant and machinery - 400.00
- Miscellaneous fixed assets - 60.00
- Pre-operative expenses - 210.00
- Total fixed capital - 1395.00
- Working capital margin - 111.00
- Total Project cost - 1506.00

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COCONUT BEVERAGE FROM TENDER COCONUT

INTRODUCTION

Tender Coconut water refers to the liquid endosperm of a tender coconut at an age of approximately 9 months from time of pollination, the period before the solid endosperm or white meat forms. It is a pure and nutritious beverage in the natural state. The coconut husk is an excellent package for the water, which contains sugars, minerals, amino acids and vitamins.

Tender coconut water is a natural source of electrolytes, minerals, vitamins, complex carbohydrates, amino acids and other nutrients. The natural carbohydrate content is between 4-5% of the liquid solution. This make coconut water particularly suitable for the burgeoning sports drink market. According to Sports Science Institute (USA), sports drinks containing under 5% carbohydrates are likely to provide benefits, while those exceeding 10% carbohydrate content, like most soft drinks are associated with abdominal cramps, nausea and diarrhea.

MARKET POTENTIAL

The tender coconut beverage can be packaged, distributed and sold commercially with high keeping quality due to the presence of natural electrolytes, refreshing and fresh taste of coconut. Production of tender coconut beverage without any artificial flavouring agents has nice market to cater the consumers with high awareness who prefer least chemical additives.

RAW MATERIAL : Good quality of Tender Coconut

PROCESS: The process involves collection of tender coconut water under hygienic conditions, up gradation and pasteurization, filtration and packaging either in Bottles or cans as the case may be. Additives such as nissin and sweeteners will be added to the product.

SHELF-LIFE: The technology has been developed for packing tender coconut water in pouches / aluminium cans with shelf life of more than six months under normal ambience condition and 12 months under refrigerated condition.

PLANT & MACHINERY:

Kernel washing tank, tender coconut water collection tank, fruit mill, colloidal mill, formulation/ heat treatment tank, vibratory screen (for wet filtration), beverage storage tank, bottle washer, rotary bottle filler, SS slat conveyor, exhaust box, crown corking machine, canning retort, label gumming machine, printing and marking machine, transfer pump, generator, boiler, etc.

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COCONUT BEVERAGE FROM TENDER COCONUT

PROJECT COST & LAND REQUIREMENT

- Land Requirement – 600 Sq. mts
- Buildings – 300 Sq. mts
- Total Project Cost –120 Lakhs (Tentative cost)

PRODUCTION CAPACITY: Suggested capacity 5000 tender coconuts/day/shift
Working 300 working days/ year Optimum utilization capacity 70%

ADVANTAGES OF TENDER COCONUT WATER

- It has caloric value of 17.4 per 100gm.
- Ayurveda considers it as unctuous, sweet, increasing semen, promoting digestion and clearing the urinary path.
- It's a natural isotonic beverage with the same level of electrolytic balance as we have in our blood. It's the fluid of life.
- Good for feeding infants suffering from intestinal disturbances
- Oral rehydration medium; Keeps the body cool.
- Application on the body prevents prickly heat and summer boils and subsides the rashes caused by small pox, chicken pox, measles, etc.
- Presence of saline and albumen makes it a good drink in cholera cases.
- Checks urinary infections; Cures malnourishment.
- Effective in the treatment of kidney and urethral stones and many more.



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COMPOSITE LENTIL CHIPS

INTRODUCTION:

Composite Lentil Chips are a type of snack food made primarily from lentils, which are legumes known for their high protein and fiber content. These chips are designed to be convenient, nutritious, and versatile. Composite Lentil Chips are a ready-to-prepare dehydrated snack made from lentils, designed for convenient consumption. These chips can be easily prepared by microwaving, toasting, or deep-frying, making them a versatile snack option for consumers. With a focus on health, the chips offer a low-fat and high-fiber content, making them a healthier alternative to traditional fried snacks. Additionally, the product is cost-effective and has a long shelf life, remaining stable for up to 6 months, allowing for flexible consumption at the consumer's convenience.

BENEFITS:

- Low in fat and high in fiber, making them a healthier snack option compared to traditional chips.
- Ready-to-prepare format allows for easy consumption.
- Cost-Effective.
- Can be prepared in various ways (microwaved, toasted, or deep-fried).
- Long shelf life of up to six months.
- Nutrient-Rich.

RAW MATERIAL: Lentil, Tapioca starch, Hydrogenated fat, Salt, Sugar, Chilli powder etc. **EQUIPMENT:** Grinder, Sieve shaker, Autoclave, Dough mixer, Forming extruder, Dryer, Toaster etc.

PROCESS:

Lentil dhal Grinding → Sieving → Flour + Tapioca starch → Mixing → Dough → Steaming → Kneading → Extruding/Shaping → Drying → Chips → Toasting → Coating/Flavoring → Packing.

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COMPOSITE LENTIL CHIPS

PRODUCTION CAPACITY

- Ability to process 500 kg of raw materials per day.
- Production of 546 kg per day per shift.
- 1 shift per day, 300 working days per year.
- Total annual production capacity of 163.8 tonnes.
- Target production utilization at 70%.

PROJECT COST:

- Land & Land Development (374 m²): ₹ 75,000/-
- Building and Civil Works (165 m²): ₹ 6,50,000/-
- Plant and Machinery: ₹ 12,00,000/-
- Miscellaneous Fixed Assets: ₹ 50,000/-
- Pre-operative Expenses: ₹ 2,20,000/-
- Total Fixed Capital: ₹ 21,95,000/-
- Working Capital Margin (30 days): ₹ 370,000/-

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COMPOSITE RAGI RUSK

INTRODUCTION:

Ragi, known for its rich nutrient profile, is a particularly valuable ingredient in the realm of health conscious bakery products. This ancient grain is renowned for its high calcium content, which is essential for bone health and metabolism. Additionally, Ragi is an excellent source of dietary fiber, which aids in digestion and helps regulate blood sugar levels.

In the evolving landscape of bakery products, the integration of nutritious ingredients into traditional recipes has gained significant traction. One such innovation is the composite Ragi rusk, a product that leverages the health benefits of Ragi to offer a wholesome alternative to conventional bakery items. The rising interest in diversifying bakery products is driven by an increasing consumer awareness of health and nutrition. Composite Ragi rusk exemplifies this trend by combining the traditional appeal of rusk with the nutritional advantages of Ragi. However, Ragi Rusk has greater potential because of its better nutritional value due to high content of calcium, palatability, touch of familiar taste above all variety and better affordability by the consumers at large.

BENEFITS:

- Provides a more nutritious option compared to conventional rusks.
- Ragi enhances digestive health, improves bone density, and helps control blood sugar levels.
- Ragi is more affordable than wheat, allowing for a cost-effective yet nutritious product.
- Attracts various consumer segments, including children, working professionals, and health-conscious individuals.
- Suitable for both rural and urban markets, offering a versatile addition to bakery products.

RAW MATERIAL: Raw material require are Ragi flour, Wheat flour, Yeast and yeast food, Sugar, Salt, Hydrogenated bakery fat etc.

EQUIPMENTS: Rotating bowl, Moulder, Baking oven, Slicer are required as major equipment's.

PROCESS: Ingredients → Sifting of dry ingredients → Mixing → Addition of flour, baking power, salt, oil → Mixing → Scaling of batter into moulds → Baking → Cooling → Slicing → Re-baking → Cooling → Packing

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DECORTICATED RAGI

INTRODUCTION:

Finger millet or Ragi is one of the popular minor cereals cultivated for food in several parts of South-East Asia and Africa. In India it is cultivated in Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, Orissa, Chhattisgarh and Uttaranchal. Karnataka has the distinction of producing nearly 40% of the millet harvested in the country. Ragi is a small seeded grain with brick red to dark colored fibrous seed coat. The millet is considered as 'nutri-cereal' because of its good nutritional qualities, especially with respect high level of calcium, micronutrient contents and Sulphur amino acids rich proteins.

The seed coat being colored and fibrous in nature, it affects the eating qualities of the Ragi foods. Moreover, Ragi is always pulverized of flour and the flour is used for various food preparations. This also limits its diversified uses, because it cannot be cooked similar to rice or wheat semolina.

These limitations have been overcome by the technology recently developed. It is possible to decorticate or separate the seed coat (husk and bran). By practicing the process, the decorticated or milled Ragi in shape and size with very light brown colour. The product retains most of the nutritional and technological characteristics of Ragi except malting.

BENEFITS:

- It cooks in just 5 minutes in boiling water, making it a convenient option for busy lifestyles.
- The grains maintain their shape and soft texture after cooking, making them suitable for a variety of dishes.
- The cooked grains are slightly brick-red and spherical, perfect for serving alongside traditional Indian dishes like sambar, rasam, and curd, or seasoned with spices to prepare chitranna (spiced rice) or tamarind rice.
- The decorticated millet can also be cracked into semolina or soji, allowing for the preparation of popular dishes such as upma, idli, and dosa.

RAW MATERIAL:

Fresh Ragi

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DECORTICATED RAGI

PLANT AND MACHINERY:

PRINCIPAL EQUIPMENTS: Cleaner, De-stoner, Magnetic separator, Parboiling tank, Dryer, Sifter-cumgrader, Dampner, Decorticator, Cyclones, Aspirator, Pneumatic lifts, Packing spouts, Boiler.

AUXILIARY EQUIPMENT: Rotameter, Trolleys, Weighing machinery, Containers.

PRODUCTION CAPACITY:

- The estimated production capacity of the product is 8.5 tons per day.
- The facility operates for 300 working days per annum. □ The optimum capacity utilization is projected at 70%.

PROJECT COST:

- Land & Land Development (500 m²): ₹ 68,000/-
- Building and Civil Works (250 m²): ₹ 10,58,000/-
- Plant and Machinery: ₹ 50,76,000/-
- Miscellaneous Fixed Assets: ₹ 1,30,000/-
- Pre-operative Expenses: ₹ 5,77,000/-
- Total Fixed Capital: ₹ 69,09,000/-
- Working Capital Margin: ₹ 5,27,000/-
- Total Project Cost: ₹ 74,36,000/-

MARKET POTENTIAL:

The process know-how for preparation of Decorticated Finger Millet (Ragi-Rice) has been tested successfully on industrial scale. The product is unique, as it enables utilization of Ragi similar to rice or to wheat, which was not possible hitherto. The decorticated millet can be popped to prepare the product similar to 'rice poori' or expanded rice or could be flaked for use as breakfast cereal. It can find application as adjunct in confectionery also.

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DEHYDRATED BITTER GOURD

INTRODUCTION:

Bitter gourd (*Momordica charantia*), also known as karela, is a widely recognized vegetable in the Asian subcontinent, celebrated for its unique bitterness and its multifaceted culinary and medicinal uses. This tropical vine, characterized by its trailing or climbing growth, features thin stems and tendrils, and yields green, wrinkled fruits known for their distinct bitter taste. Despite its bitterness, bitter gourd is valued for its nutritional benefits and versatility in food preparation.

The bitterness of bitter gourd can be moderated through various culinary techniques. For instance, steeping the fruit in salt water and subsequently cooking it after scraping off the skin can significantly reduce its bitterness, making it more palatable for a wider audience. The tender fruits can be sliced and preserved through drying, allowing them to be used in off-seasons. The dehydrated bitter gourds in the form of cubes, rings may be used for various curry preparations and brown bitter gourd is used for making bitter gourd tea. The main purpose of dehydration of bitter gourd is to extend the shelf life and reduce bulk storage, transportation and packaging.

BENEFITS:

- Bitter gourd is rich in Vitamin C, which supports immune health and skin vitality, provides Vitamin A for vision and immune function, and contains phosphorus and iron, contributing to bone health and energy levels.
- It may assist in managing blood sugar levels, is known for its anti-inflammatory and antioxidant properties.
- Bitter gourd can be enjoyed fresh, dried, or pickled, with dehydrated forms (slices, rings, cubes).
- Techniques like steeping in salt water and cooking can mitigate bitterness, making the fruit more palatable.
- Dehydration prolongs the shelf life of bitter gourd, facilitating long-term storage and reducing waste.

RAW MATERIAL: Bitter gourd and water

PLANTS AND MACHINERY:

Principal equipment: Tunnel dryer, Continuous conveyor dryer, Infra-red dryer, Cubing/slicing machine, Boiler, Heat sealer, Steam jacketed kettles, Digital balance, Washing tanks and Autoclave/pressure cooker

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DEHYDRATED BITTER GOURD

Auxiliary equipment: Chemical balance, Top loading balance, Refrigerator, Mixer grinder, Distillation unit, Rectangular water bath, Hot plate, Incubator, Potato dicing machine, Stainless steel vessel, Autoclave and Hot air oven

Apparatus/glassware: Burettes, Volumetric flask, measuring cylinders, Conical flask, Glass stoppered conical flask, Beakers, Thermometers, Petri-dishes, Porcelain dishes, test tubes, Tripod stand, iron stand with clamps, boss heads, tongs enamel trays and bushes

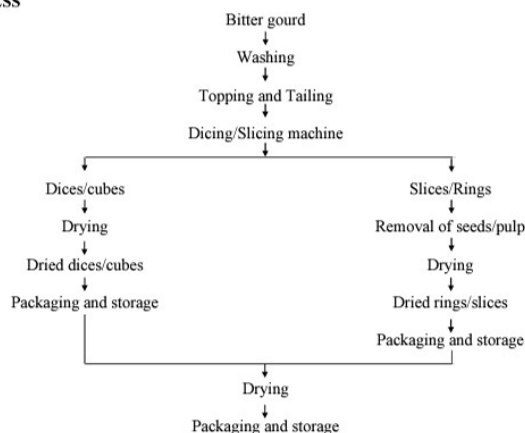
PRODUCTION CAPACITY: Capacity of the unit: 1600 Kg (raw material /16 hrs per day, 2 shift) Yield 115 Kg per day Working: 200 days per annum, Optimum capacity utilization: 70%.

PROJECT COST:

- The cost for acquiring and developing 4000 m² of land amounts to ₹200,000.
- Construction expenses for a 600 m² building total ₹1,800,000.
- Investment in plant and machinery is ₹25,00,000.
- Miscellaneous fixed assets are budgeted at ₹50,000.
- Pre-operative expenses are estimated at ₹150,000.
- The aggregate fixed capital required for the project is ₹47,00,000.
- A working capital margin of ₹600,000 is needed.
- The overall project cost, including both fixed capital and working capital, is ₹53,00,000.

PROCESS:

PROCESS



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DOSA MAKING MACHINE

INTRODUCTION:

The Dosa Machine, a groundbreaking innovation represents a significant leap forward in food processing technology. As a patented design, this machine is the first of its kind, specifically engineered to revolutionize the traditional dosa-making process by introducing automation and efficiency on an unprecedented scale. The Dosa Machine is designed to facilitate the continuous production of dosa an iconic South Indian delicacy while ensuring that each dosa is made with precision and without manual intervention.

The Dosa Machine represents a significant advancement in food processing technology, offering unparalleled efficiency, flexibility, and quality in dosa production. Its innovative design and features make it an essential tool for any large-scale food service operation.

BENEFITS:

- Allows precise control over the speed and output.
- Enables adjustment of time, temperature, and output combinations.
- Capable of preparing dosas of different kinds and sizes
- Suitable for industrial canteens, hotels, festivals, and large gatherings.
- Operates on 440 V AC. □ Requires a footprint of 3m×3m.

PROCESS:

The Dosa Machine automates the entire dosa-making process, including batter dispersion, spreading on the hot plate, toasting, and oil application. After the dosa has cooked for a set time, it is automatically rolled and discharged.

PRODUCTION CAPACITY:

Its ability to produce up to 400 dosas per hour.

MACHINE COST:

Costing approximately Rs 1.2 lakh.

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DRY MAIZE MILLING

INTRODUCTION:

Maize, a vital global staple, is produced in around 526 million tons annually, with India contributing 10 million tons, or 30% of the country's coarse cereals. Despite the significant production, there is considerable potential for processing maize through dry milling, with an estimated 4-5 million tons available annually. Currently, the industry is dominated by large, capital-intensive mills with capacities of 100-200 tons per day, which limits access for smaller operations. To bridge this gap, developed an indigenous dry maize milling technology. This technology features a pilot mill with a capacity of 1 ton per hour (TPH), aimed at small to medium-sized operations. The milling process includes cleaning and grading, de-stoning, conditioning, milling, sifting, and gravity separation to produce high-quality grits, bran, small grits, germ, and meal. This new technology offers a cost-effective solution for small-scale maize processing. It enhances the availability of high-quality maize products, supporting food security and economic development.

BENEFITS:

- Modern technology improves maize processing efficiency.
- Maximizes yield of high-value products and minimizes waste.
- Accessible for small and medium-sized enterprises with lower investment.
- Produces higher-quality maize products meeting market standards.
- Fosters local economic growth and job creation.
- Enhances availability of high-quality maize products.
- Decreases need for expensive imported milling equipment.
- Adapts production to market demand and accommodates various products.

PRODUCTION CAPACITY: The production capacity of the dry maize milling plant is 1 Tons Per Hour (TPH).

PROJECT COST:

- Land and building (4000 Sq. Ft) - 36 Lakhs
- Plant and machinery - 45 Lakhs
- Working capital - 20 Lakhs
- Power - 130 HP

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EGGLESS CAKE PREMIX

INTRODUCTION:

Introduction: The eggless cake premix shall be made using the ingredients specified in the Indian Standard specification and preservation of food adulteration act. The eggless cake premix should be white in colour, homogenous without any lumps and should possess a pleasant flavour. The premix to be packed in metallized polyester pouches and can be used for up to 3 months when stored at room temperature.

RAW MATERIAL:

Raw materials required are Wheat flour, sugar powder, baking powder, margarine, salt, whey protein concentrate, distilled glycerol monostearate, guar gum, sodium stearoyl lactylate, calcium propionate, acetic acid, flavour and butylated hydroxy anisole.

PROCESS:

Cleaning of Ingredients → Weighing → Sieving → Creaming → Blending → Premix Packing

EQUIPMENTS: Blender, Balance, Sealing machine, laboratory equipments, working tables etc

PROJECT ECONOMICS:

Capacity of production 100 Kg / day Building (300 M²) - rented Rs.0.25 Lakhs

Cost of plant and equipments - Rs.3.00 Lakhs

Miscellaneous & other expenses - Rs.1.20 Lakhs

Working Capital (margin) - Rs.0.40 Lakhs

Total project cost - Rs.4.85 Lakhs

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FINGER MILLET (RAGI) BASED MURUKKU MIX

INTRODUCTION:

MILLETS are traditionally grown in resource poor agro climatic regions of the country which include sorghum, pearl millet, finger millet and small millets. They are nutri-cereals which are highly nutritious and are known to have high nutrient content which includes protein, essential fatty acids, dietary fibre, B-Vitamins, minerals such as calcium, iron, zinc, potassium and magnesium. Millets are known for nutria rich content and having characteristics like drought tolerance and resilient to climate change etc. Hence developing technology that makes millet value added products available as convenient to make and easy access at reasonable prices will find great demand and market particularly in urban places where there is growing conscious for nutritive intake of food.

RAW-MATERIAL

Ragi flour, Tapioca starch, edible powdered table salt, sodium bi-carbonate, water Plant & Machinery De-stoner, Autoclave, Mixer, 2 – deck sieve shaker, Heat sealer

ABOUT TECHNOLOGY

The blend after mixing with salt and spices is made into dough and deep fat fried to an attractive crispy snack. Even though the product is all time snack, it is commonly used as an evening snack along with tea/ coffee. Since, the product is an energy rich snack; it is an ideal snack for school children. Apart from this procedure for quality control, packaging and packaging material specifications, equipment details are also provided by the institute.

Financial Aspects & Production Capacity

Project Cost (estimate) in Lakhs	
Total Project cost	10
<u>Note: Please note the above figures are tentative and needs updating</u>	
Production Capacity (estimate)	
Capacity processing	100 kg/day
Working days	300 days
Shelf Life	6 months

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FLAKED JOWAR RTE LOW FAT SWEET & SAVOURY SNACKS

INTRODUCTION:

The Jowar or sorghum snack is a ready-to-eat (RTE) product with either sweet or salt-spicy in taste. It is suitable as a low-fat snack because the step of frying in oil fat has been omitted to provide a good shelf-life without sacrificing the attractive taste and texture of eating a crispy snack. The product is low in cost and can also be considered as a health food.

This innovative snack is designed to provide a healthier alternative to traditional fried snacks by eliminating the frying process, resulting in a low-fat, crispy treat that maintains its appealing taste and texture. With a remarkable shelf life of up to 4 months under ambient conditions, this product not only ensures convenience but also promises excellent shelf stability.

BENEFITS:

- Rich in dietary fiber, vitamins, and minerals, contributing to overall health and wellness.
- Provides a healthier alternative to traditional fried snacks by omitting the frying process, significantly reducing fat content.
- Offers a delightful combination of sweet and salt-spicy flavors, appealing to diverse taste preferences.
- Maintains an appealing crispiness that enhances the eating experience without compromising on taste.
- Can be stored for up to 4 months at ambient conditions, ensuring convenience and minimal waste.
- A cost-effective snack option that provides value for money while meeting nutritional needs.

RAW MATERIAL:

Jowar flakes or Sorghum flakes, Sugar, Salt, Spices & Fat etc.

EQUIPMENT:

Grader, Drier, Toaster, Pan Coater, Heat sealer and miscellaneous items.

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FLAKED JOWAR RTE LOW FAT SWEET & SAVOURY SNACKS

PROCESS:

The unit operation involved in the process is Grading → Roasting → Flavoring → Coating → Drying → Packing.

PRODUCTION CAPACITY:

- The estimated economic capacity is 580 kg per day.
- The production operates on a single shift per day for 300 days a year.
- This setup results in an annual production capacity of 174 tons.

PROJECT COST:

- Land & Land Development (230 m²): ₹ 50,000/-
- Building and Civil Works (126 m²): ₹ 480,000/-
- Plant and Machinery: ₹ 820,000/-
- Miscellaneous Fixed Assets: ₹ 10,000/-
- Pre-operative Expenses: ₹ 140,000/-
- Total Fixed Capital: ₹ 15,00,000/-
- Working Capital Margin: ₹3,00,000/-
- Total Project Cost: ₹ 18,00,000/-

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FLAKING FOXTAIL MILLET

INTRODUCTION

The Foxtail millet flakes are ready-to-use convenience products similar to rice, wheat, sorghum and other cereal flakes. The flakes could be wetted with water and seasoned with spicy condiments or sweetened for consumption as snacks. The thicker grade flakes may be deep and fat fried to prepare crispy ready-to-eat snacks. The broken and pulverized flakes can be mixed with legumes and other ingredients to prepare traditional foods like bisi-bele bhath, idli and such other products. These flakes can be used after toasting or blistering similar to corn flakes.

RAW MATERIALS: Milled foxtail millet.

PROCESS: Pre-cleaning- Grading- Soaking- Draining- Steaming- Flaking- Drying- Grading - Bagging/Storage.

LABORATORY EQUIPMENTS: Grain quality measuring equipment – Standard sieves, Reflectance-meter, Hardness tester, Caliper, Moisture meters, Air ovens, Glassware, Heaters etc.

PLANT AND EQUIPMENT: Grader, Destoner, Soaking-cum-steaming tanks, Elevators, Slat conveyors, Vibratory feeder, Flaker, Dryer, Belt conveyor, Boiler etc.

PRODUCTION CAPACITY: (Estimate)

- Installed capacity: 4000 Kg foxtail millets – 2 shifts/day
- Total working days: 300 days

FINANCIAL ASPECTS: Project Cost – Fixed Cost – Working Capital (in Rs.Lakhs)

- Land & Land development (1500 m²) - 1.30
- Building and civil works (300m²) - 10.00
- Plant and Equipment - 36.90
- Other fixed assets - 2.40
- Administrative expenses - 1.00
- Preliminary & preoperative expenses - 1.00
- Total fixed project cost - 52.60
- Working capital - 8.40
- Total Project cost - 61.00

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FLAKING OF RAGI

INTRODUCTION

Finger millet or Ragi (*Eleusine coracana*) is one of the important minor cereals. It is a nutritious grain and contains about 7% protein, 1.5% fat, and is a good source of calcium, dietary fiber and other protective nutrients. The health benefits of the millets are being recognized globally and non traditional millet consumers are also looking for ready-to-use foods from the millet. Finger millet flakes are ready-to-use convenience products similar to rice, wheat and sorghum flakes. The flakes could be wetted with water and seasoned with spicy condiments, or sweetened for consumption as snacks.

The thicker grade flakes may be deep fat fried or toasted to crispy textured products, and ready to-eat snacks. The broken and pulverized flakes can be mixed with legumes and other ingredients to prepare traditional foods like bisibele bhat, idli and such other products. These flakes can also be used after toasting or blistering similar to corn flakes.

BENEFITS:

- Finger millet is rich in essential nutrients, containing approximately 7% protein and 1.5% fat, making it an excellent choice for a balanced diet.
- It is an excellent source of calcium, which is crucial for maintaining healthy bones and teeth, making it particularly beneficial for growing children and older adults.
- Convenient and Ready-to-Use.
- The fiber helps regulate blood sugar levels, making Ragi a beneficial food for individuals with diabetes.

RAW MATERIAL:

Decorticated Ragi

EQUIPMENT:

Cleaner-Cum-Grader, Destoner, Bucket Elevator, Grain conditioning unit, Steaming tanks, Boiler, Vibratory feeder, Flaker, Belt conveyor, Slat conveyor, Continuous vibro - fluidized bed dryer, Vibratory/ Gyratory grader.

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FLAKING OF RAGI

PRODUCTION CAPACITY:

- Installed capacity: 1000 kg/ day (125 kg/h)
- Total working days: 300 working days

PROJECT COST:

- Land Development (1,000 m²): ₹ 50,000/-
- Building & Civil Work (300 m²): ₹ 10,50,000/-
- Plant & Equipment: ₹ 3,500,000/-
- Other Fixed Assets: ₹ 10,00,00/-
- Auxiliary Equipment: ₹ 200,000/-
- Preliminary & Preoperative Expenses: ₹ 5,31,000/-
- Total Fixed Project Cost: ₹ 5,431,000/-
- Working Capital: ₹ 4,60,000/-
- Total Project Cost: ₹ 58,91,000/-
- Promoter's Contribution: ₹ 18,17,750/-
- Long Term Loan: ₹ 40,73,250/-

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FORTIFIED MANGO BAR

INTRODUCTION:

Mango varieties Totapuri and Alphonso are processed into pulp and concentrate. Mango is a good source of natural plant pigments carbohydrates, carotenoids, polyphenols and soluble and insoluble dietary fiber. Mango bar is a popular confectionary product widely accepted by the consumers for its texture, color and overall quality. Fortified mango bar is developed to contain beta-carotene supplemented from Carrots which is known to contain a very high carotene and beta-carotene content and minerals such as Calcium and Zinc.

Bioavailability of carotenoids and polyphenols from plant sources is reportedly higher which would render the fortified bar as an important food vehicle for the fortification of these important nutrients and minerals. Fortified mango bar also contains natural carbohydrates, pectin, dietary fiber, and other micronutrients such as calcium and zinc.

BENEFITS:

- It contains a high concentration of vitamins, minerals, and antioxidants. Calcium and zinc are added to support bone health and immune function.
- The carotenoids and polyphenols in the bar help protect cells from damage caused by free radicals, reducing the risk of chronic diseases.
- Beta-carotene is essential for maintaining good vision and preventing eye diseases. Calcium and zinc are crucial for bone development and strength.
- The bar's six-month shelf life makes it a convenient and portable snack or meal replacement option. It is suitable for individuals of all ages, from children to adults.

RAW MATERIAL:

Mature ripe mango pulp, dehydrated carrot powder, cane sugar, etc. EQUIPMENT: Fruit washer, Stirrer, Fruit pulper, SS Preparation tables, Boiler, SS blending tank with agitator and pump, SS steam jacketed kettles, Hot air drier.

CAPACITY: Capacity: 200 kg/day

PROJECT COST:

- Project involving approximately 800 square meters of land.
- A building of approximately 288 square meters was undertaken.
- The project required an investment of approximately Rs 20,00,00/- in plant and machinery.
- The total estimated cost of the project was around Rs 68,00,000/-.

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GINGER BEVERAGE

INTRODUCTION:

Ginger, a perennial herb with a pungent root, has been used for centuries for its culinary and medicinal properties. Its distinct flavor and aroma, combined with its potential health benefits, have made ginger a popular ingredient in various beverages. Natural Ginger beverage/concentrate is a good product, which possesses several combined qualities of refreshing, thirst quenching, nutritious as well as carminative and tonic beverage, has become very popular in almost every part of the country.

Ginger candy cubes, Ginger candy-titbits and Ginger powder are other products that can be made from fresh ginger during the process. In addition to their culinary appeal, ginger beverages have been associated with several potential health benefits. Ginger has been traditionally used to aid digestion, relieve nausea, and reduce inflammation. Some studies suggest that ginger may also help lower blood sugar levels and improve heart health.

BENEFITS:

- Digestive Aid.
- Anti-inflammatory Properties.
- Immune Boosting.
- Shelf life is about 4 months.

RAW MATERIAL: Fresh ginger

EQUIPMENT: Canning retorts, Tilting kettles, Stationery kettle SS, Pump roto, Syrup tanks, Tray drier, Mono rail with hoist, SS Vessels, Brix refractometer, Sugar grinder, Boiler etc.

PROJECT REQUIREMENT:

- Land (Approx. in Sq. meters) :600
- Building (Approx. in Sq. meters): 200
- Plant & Machinery; ₹40,00,000
- Total Project cost: ₹60,00,000 PRODUCTION CAPACITY:
- Suggested economic capacity: 1200 kg/day
- Working: 200 working days/ year

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GINGER PASTE

INTRODUCTION:

Ginger paste is a versatile and viscous product that captures the strong aroma and flavor of fresh ginger. Renowned for its culinary applications, this paste is made from high-quality ginger rhizomes, which are rich in volatile oils that contribute to its unique taste profile. The volatile oil content in the product is influenced by factors such as variety, raw material storage, handling and processing conditions.

The product is generally creamy- white or off white in colour the product is microbiologically stable and free from pathogenic bacteria. Packed in convenient glass jars, ginger paste can be stored at ambient temperatures, making it an accessible and ready-to-use ingredient for home cooks, restaurants, and institutional catering services. Its ability to substitute fresh ginger makes it an essential pantry staple, allowing for easy incorporation into a variety of dishes.

BENEFITS:

- Ginger paste saves time and effort in meal preparation by providing a ready-to-use alternative to fresh ginger.
- It delivers a consistent flavor profile, ensuring that dishes have the same delicious taste every time.
- Ginger is known for its numerous health benefits, including anti-inflammatory properties, aiding digestion, and boosting the immune system.
- Ginger paste can enhance the flavor of a wide range of dishes, from curries and soups to marinades and sauces.
- With its stable formulation, ginger paste has a longer shelf life.

RAW MATERIAL: Ginger rhizome, Common salt, Permitted acidulants (citric acid and acetic acid).

PLANT AND MACHINERY:

- Principal equipment: Fruit washing machine, Hammer mill, Colloidal mill, Sigma mixer, Steam jacketed kettle, Peeler, soaking tanks and Paste filling unit.
- Auxiliary equipment: Preparation tables, Boiler, Trolleys, weighing machine, Holding vessels and miscellaneous items.

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GINGER PASTE

PRODUCTION CAPACITY:

- Suggested economic capacity: 100Kg /day.
- Working: 1 shift/day, 300 working days/year.
- Capacity: 30 Tonnes /annum.
- Optimum utilization capacity: 70%.

PROJECT COST:

- Land & Land development (500 m²) – ₹ 1,00,000/-
- Building and civil works (100 m²) – ₹ 7,00,000/-
- Plant and machinery – ₹ 6,20,000/-
- Miscellaneous fixed assets – ₹ 2,00,000/-
- Pre-operative expenses – ₹ 1,52,000/-
- Total Fixed Capital – ₹ 17,72,000/-
- Working Capital Margin – ₹ 2,13,000/-
- Total Project Cost – ₹ 19,85,000/-
- Total Working Capital Required at 15% of Turnover – ₹ 4,50,000/-
- Promoters Contribution – ₹ 9,20,000/-
- Term Loan – ₹ 10,65,000/-

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GINGER TEA

INTRODUCTION:

The ginger tea is granulated free flowing dry mix. The ingredients present in ginger tea, generate a pleasant taste and fresh feeling, but stimulate the saliva glands. A 15 g of dry mix dissolved in water/ carbonated water and used as a beverage in place of other flavored beverages. Also it can be used in tea preparation in place of sugar. It can be enjoyed as an alternative to sugary or artificially flavored drinks, and can also replace sugar in regular tea, adding a subtle spiciness along with its health benefits.

BENEFITS:

- Ginger is known for its ability to soothe digestive issues, reduce nausea, and alleviate indigestion.
- Rich in antioxidants, ginger helps strengthen the immune system and protect against common colds and infections.
- The anti-inflammatory compounds in ginger may help reduce muscle pain, joint stiffness, and inflammation-related discomfort.
- Ginger tea can help maintain healthy blood sugar levels.
- In its tea form, ginger provides a flavorful and hydrating alternative to sugary beverages, helping to keep the body hydrated.

RAW MATERIAL:

Cane sugar, Ginger oleoresin.

EQUIPMENT:

Tray drier/ cross flow drier, Sigma mixer, Oscillator granulator, Digital weighing scales.

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GINGER TEA

PRODUCTION CAPACITY:

- Suggested economic capacity: 500 Kg Ginger Tea/ day.
- Working: 1 shift/day, 300 working days/ year.
- Capacity: 150 MT /annum.

PROJECT COST:

- Land & Land development (500 Sq. m) – ₹ 1,25,000/-
- Building and civil works (150 Sq. m) – ₹ 6,00,000/-
- Plant and machinery – ₹ 11,42,000/-
- Other fixed assets – ₹ 50,000/-
- Pre-operative expenses – ₹ 2,50,000/-
- Total Fixed Capital – ₹ 21,67,000/-
- Working Capital Margin – ₹ 3,21,000/-
- Total Project Cost – ₹ 24,88,000/-
- Promoters Contribution – ₹ 6,22,000/-
- Term Loan – ₹ 18,66,000/-

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GROUNDNUT BUTTER

INTRODUCTION:

Groundnut butter is one of the major oilseeds of the world and widely cultivated in tropical and sub-tropical countries. India occupies an important place among the major oilseed producers in the world. Groundnut is a good source of oil and protein.

The pleasant aroma and nutty flavor and smooth texture of roasted groundnuts have found great acceptance. Freshly dug, unshelled, immature groundnuts boiled in brine solution are eaten as a delicacy in some areas. Groundnut protein can be incorporated into a variety of food products without serious problems in terms of colour and flavor.

The potential uses of groundnut protein ingredients include bread & bakery products, snacks, beverages, frozen desserts, soups and spreads. Groundnut butter is used as bread spread and also as an adjunct with certain traditional foods such as Dosa and Idli. The shelf life of Groundnut butter is 3 months at ambient temperature.

BENEFITS:

- Groundnut butter is a nutritious food packed with protein, healthy fats, vitamins, and minerals that support heart health, weight management, energy levels, muscle health, and skin health.
- The versatility of groundnut butter allows it to be enjoyed in various dishes, adding flavor and nutritional value to meals.
- With its long shelf life, groundnut butter is a convenient and long-lasting food option.

RAW MATERIAL:

Groundnut kernels, Lecithin, Edible common salt, refined sugar, specialty fat, BHA/ TBHQ.

PLANTS AND MACHINERY: Principal equipment: Electronic weighing scales, Pre-cleaner, de-stoner, roaster, disintegrator, grinding machine, mixer, chiller etc. Auxiliary equipment: Plat form balance, Sorting tables, Handling vessels & Trolleys etc.

PRODUCTION CAPACITY: Suggested economic capacity: 480 kg per shift Working: 300 working day/ annum

PROJECT COST:

- Project involves land and land development spanning 339 m².
- Building and civil works will be conducted over an area of 113 m².
- The cost for plant and machinery is Rs. 9,03,000/-

PROCESS: Ground seeds → pre-cleaning → roasting → De-husking → Sorting Grinding → Mixing Groundnut butter → Bottling → Chilling → Stored at Room Temperature

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HIGH PROTEIN RUSK

INTRODUCTION:

High protein rusk, a delectable snack item, is a carefully crafted product designed to cater to individuals seeking a protein-packed and flavorful treat. Characterized by its golden-brown hue, crisp texture, and distinctive taste, this rusk has garnered significant popularity among consumers.

Its nutritional profile, coupled with its long shelf life, makes it a highly desirable snack option. High protein rusk offers a nutritious and delicious snack option that is well-suited for individuals seeking to enhance their protein intake and support overall health.

BENEFITS:

- Enhanced protein content
- Nutritional value
- Portability and convenience
- Taste and texture
- Versatility

MARKET POTENTIAL:

This product has a great potential in Indian market in view of their novelty, increased protein content of about 6% than ordinary rusks and long shelf life.

RAW MATERIAL: Raw materials required are Wheat flour, defatted soya flour, fat, yeast, sugar, salt, water etc.

EPUIPMENT: Weighing machine, Mixer, Baking pans, Baking oven slicing machine and cooling racks could be used for the preparation of sugar free layer cake.

PROCESS:

Mixing of sponge → Addition of flours → Scaling → Mixing → Scaling → Baking → Cooling & Slicing → Re-baking → Cooling → Packing

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HONEY BASED BAKERY PRODUCTS

(Plain Bread, Sweet Bread, Buns, Bar Cake, Muffins, Egg less Cake, Sponge Rolls, Cream Biscuits, Cookies, Doughnuts, Rolls, Danish Pastry, Croissants)

INTRODUCTION:

Honey has a unique flavour and taste, which makes it enjoyable. Honey is perhaps the oldest sweetener known to man. There are about 2, 76,000 beekeepers in India. The national production of honey is about 27,000 tonnes per annum. The per capita consumption of honey in India is 8.4 g/year, which is very low owing to high cost and utilization of major quantity for medical purposes. Honey has been recognized as a health promoter. It is beneficial to promote the use of honey directly or through value added products such as honey candy, honey yogurt, etc. It can also be incorporated in baked foods, which has got a lot of popularity. Also the current surge of interest in the production of “natural foods” can increase the usage of honey as an ingredient in baked and other processed foods.

MARKET POTENTIAL:

Honey has a wide range of characteristics and unique features. It is a natural ingredient. Due to the rise in the health awareness of the consumers, now-a-days natural foods are valued a lot. Honey also is considered wholesome and it offers functional advantages in baked products. It imparts a special flavour to the product making it acceptable. In the market that is becoming more diverse and competitive, introduction of new products with value, addition will have a positive bearing on the sales. Moreover, a strong need is felt to utilize the honey produced in the country. Owing to the special features of honey, bakery products prepared with honey because of improved acceptability have good marketing potential. Baked products with the goodness of honey are hardly being produced in the country currently.

RAW MATERIAL:

Wheat flour, sugar powder, crystal sugar, salt, yeast, fat, water, honey, baking powder, egg, margarine, milk powder, calcium propionate, acetic acid, glycerol corn starch, lecithin, glycerol monostearate, sodium stearoyl lactylate, etc.

PLANT & EQUIPMENTS: Weighing machine, Mixers, Baking oven, refrigerator, Slicing machine, Generator, Baking aids, etc.

PROJECT ECONOMICS: (Rs. '000) (Estimate for a model project)

- Building (35 m²) : 10.50
- Plant and machinery : 7.00

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IMPROVED MAIZE FLOUR

INTRODUCTION:

The improved flour, obtained from this process has mainly advantages over the whole meal flour that is commonly made by traditional consumers of these grains at home which involves grinding of the whole grain to flour tin plate mills or chakki mills. The habitual consumers at home use the flour for making roti. Due to absence of gluten, the flour when mixed with normal water does not give dough that is visco-elastic (similar to that of wheat flour dough). In order to impart some sheetability properties, flour is normally mixed with hot water and then kneaded thoroughly. In spite of this, a roller pin, as practiced for the wheat dough, cannot roll the dough easily. Instead, the traditional consumers try to flatten it by repeatedly tapping with palm of the hand while rotating it at the same time. This involves a knack and experience, and it is not easy to make good rotis with the maize flour.

On account of these characteristics of the flour, consumption of maize, and its utilization for preparation of rotis, is not popular among the nontraditional users, if a flour is made available to the common consumer, from which can easily rollable dough can be obtained by an addition of normal tap water, it is expected that it will have wide popularity among the traditional as well as the nontraditional consumers of the grain. Such product namely improved flour would also provide value addition to the grain and diversification of the products based on it.

PROCESS DESCRIPTION:

Cleaning → Grinding → Sieving → Extrusion cooking → Drying → Grinding → Sieving → Mixing → Packing

PLANT & MACHINERY:

Grinder, Sifter, Extruder, Drier, Mixer, Packaging machinery etc.

ABOUT TECHNOLOGY: This flour has all the desirable properties to render it suitable for rolling it into thin sheet as is common for the preparation of wheat roti or chapati.

FINANCIAL ASPECTS & PRODUCTION CAPACITY :

Project Cost (estimate) in Lakhs	
Total Project cost	50
Note: Please note the above figures are tentative and needs updating	
Production Capacity (estimate)	
Capacity processing	2.5 Ton/day
Working days	300 days
Land	2000 Sq Mt

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INSTANT MUSHROOM SOUP MIX

INTRODUCTION:

This is one of the fine value added products of the oyster mushrooms. The mushroom in dried powdered form finds a place to impart mushroom flavour in a mixture of starch, protein and fat, when the mix is dispersed & boiled in water. The product being in dried form can be stored for several months. The soup mix serves the function to generate mushroom flavour in hot beverage form.

BENEFITS:

- Long Shelf Life
- Enhanced Flavor
- Convenience
- Nutritional Value
- Versatility
- Reduced Waste

RAW MATERIAL:

Good quality fresh mushrooms and other ingredients needed for soup mix. Laminated aluminum foil polyester-polyethylene is the best packing material, preferably the product to be packed under nitrogen flushing.

PLANTS AND MACHINERY:

- Principle equipment: Tray dryer, Planetary mixer, Shredder, Sealing machine with facility for nitrogen flushing.
- Auxiliary equipment: Weighing scales, Preparation tables, Plastic trays, refrigerator etc.

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INSTANT MUSHROOM SOUP MIX

PRODUCTION CAPACITY:

Suggested economic capacity: 100 kg/ shift Working: 300 working day/ annum.

PROCESS:

- Start by cleaning and preparing fresh mushrooms for further processing.
- Dry the prepared mushrooms to remove moisture, which helps in preserving them.
- Shred the dried mushrooms into small, uniform pieces to ensure consistency in the final product.
- Combine the shredded mushrooms with other ingredients to create the mushroom soup mix.
- Pack the finished mushroom soup mix into containers for storage and distribution.

PROJECT COST:

- The cost for acquiring and developing 400 square meters of land is estimated at Rs. 120,000.
- The expenses for constructing and completing 100 square meters of building space amount to Rs. 400,000.
- Investment in plant and machinery is projected at Rs. 666,000.
- Budget for auxiliary equipment required for operations stands at Rs. 50,000.
- Costs for various miscellaneous fixed assets are estimated at Rs. 150,000.
- Pre-operative expenses, including initial setup costs, are calculated at Rs. 232,000.
- The aggregate fixed capital required for the project totals Rs. 1,618,000.
- Margin required for working capital is Rs. 594,000.
- The overall cost of the project, including fixed capital and working capital, amounts to Rs. 22,12,000/-.

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LOW GLYCEMIC INDEX (GI) BEVERAGE FOR DIABETICS

INTRODUCTION:

Diabetes is one of the major metabolic disorders affecting all strata of society which is characterized by altered carbohydrate, lipid and protein metabolism. Sustained hyperglycemia leads to micro and macro vascular complications which include nephropathy, retinopathy and neuropathy. Hence maintaining optimal blood glucose levels becomes imperative to prevent long term deleterious complications associated with diabetes. The product can be used as a beverage by reconstituting with warm milk and can be consumed preferentially before breakfast and snacks at least twice a day.

RAW MATERIAL:

Cereals, spices, etc.

PLANTS AND MACHINERY:

Tray drier, roaster, apex mill/ grinder, ribbon blender, walk – in – cooler, etc.

PROJECT ECONOMICS (in Rs. '000):

- Land & land development (900 Sq. M) - 900.00
- Building & civil construction (30 Sq. M) - 2700.00
- Plant and machinery - 2263.50

PRODUCTION CAPACITY- (estimate):

The installed capacity 100Kg/ shift/ day and working for 300 days in a year

ADVANTAGES OF INDIAN TECHNOLOGY:

- Low capital investment
- High employment potential

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MALTED RAGI FLOUR – ENZYME RICH

INTRODUCTION:

Finger millet or ragi is one of the important minor cereals of India and Africa. It has the uniqueness of being used for malting next only to barley in the tropical world. The millet is a good source of dietary carbohydrates, protein, calcium and micronutrients and hence, its malt is also a good source of protein, carbohydrates and many other nutrients besides hydrolytic enzymes. Malted ragi flour can be used in preparation of weaning food, infant food, geriatric food, medical foods and also as milk based as well as alcoholic beverage formulations. It can be used as amylase rich food (ARF) to reduce the ‘dietary bulk’ of energy food and such other supplementary foods. By products like seed coat & rootlets can be utilized in Cattle and Poultry feed formulations.

PROCESS:

The process involves the following steps: Finger millet → Cleaning → Soaking → Germination → Drying → De-vegetation → Green malt → Kilning → Moist conditioning → Grinding → Sieving → Malted ragi flour

RAW MATERIAL: Finger millet (Ragi)

PLANTS AND MACHINERY: Major equipments: De-stoner with elevator, Steeping tanks, Germination trays, Dryers, De- rooter, Dampner, Grinder, Vibro-sifter, Powder filling unit.

PROJECT COST – FIXED COST – WORKING CAPITAL (in ` ‘Lakhs)

(Estimate for a model project)

a)	Land & land development (3000 M ²)	4.00
b)	Building (975 M ²)	24.25
c)	Plant and machinery	43.15
d)	Miscellaneous fixed assets	10.00
e)	Pre-operative expenses	7.37
	Total fixed capital	81.27
	Working capital margin	5.39
	Total Project cost	86.66

PRODUCTION CAPACITY- (estimate):

The installed capacity 750 MT/ Annum (Malted ragi flour).

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MASS PROPAGATION OF BANANA BY TISSUE CULTURE TECHNIQUE

INTRODUCTION:

Plant Tissue Culture (PTC) has a direct impact on present day agriculture and has been the direct cause for face-lift of modern agriculture in developed countries. This has been possible because of the enormous supply of desired type of planting/sowing material obtained by mass micro propagation. At present several laboratories in the world are producing over 500 million plants annually.

The present process is the result of a complete scaled-up study where the performance of the product (banana plants) has been examined under field conditions. The TC plants had no abnormalities and were better than conventionally propagated ones in overall performance. The present process deals with the production of one million banana planting material per annum.

MARKET:

Bananas occupy, among tropical fruits, a position comparable to that of apples among temperate fruits. A larger number of edible clones are cultivated in India than in any other country. Recently India is the largest producer of bananas accounting for 14.18% in 1992 of world's production. In terms of both harvest weight (4-8 tonnes) and calories (2.5-5.6 million) the yield of banana per acre ranks higher than that of many other tropical fruit crops. Already there is a large market for banana fruits and therefore is the demand for planting material. However, popularizing the different aspects of banana cultivation and the advantages of Tissue culture banana plants may expand marketability of planting material.

MATERIALS AND PROCESS:

Raw materials: Single distilled water, nutrient medium and phyto-hormones
Process: The process involves the following steps

Collection of healthy plant material from the field → Surface disinfection → Cutting of meristems/buds aseptically → Culturing the shoot buds/meristems → Continuing the culture of said meristems/small shoot buds organized shoot buds/ Shoots are formed → Harvesting → Re culturing → Transferring the shoots for partial hardening

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MASS PROPAGATION OF BANANA BY TISSUE CULTURE TECHNIQUE

PLANTS AND MACHINERY:

Principal Equipment: Laminar flow hoods, Culture vials or bottles with screw caps, autoclave for sterilization, Stereomicroscope, refrigerators with freezer and refrigerators without freezer, air conditioners, heaters and large stainless steel wares.

Auxiliary Equipment:

Glass measuring devices, distillation units, balance, ordinary + fine.

FINANCIAL ASPECTS

Project Cost – Fixed Cost – Working Capital (in Rs. '000)

Land (4000 Sq. m) - 320.00

Building (450 m²) - 956.00

Plant and Machinery - 129.00

Miscellaneous fixed assets - 133.7

Pre-operative expenses - 77.5

Total fixed capital - 1616.2

Working capital margin - Nil

Total project cost - 1616.2

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CHICKEN WAFERS

INTRODUCTION:

Chicken wafers are to be used as a snack food. The product can be readily fried in any cooking oil or the dehydrated product can be used as ready to fry. Chicken wafers can be introduced in school feeding programmers.

Product can be prepared in shape with 1.5 to 2 mm thickness. It contains more energy material. It can be fried under normal condition. Product may be packed in flexible pouches at low moisture and oxygen transmission.

MARKET POTENTIAL:

The product has excellent market potential since product contains sufficient quantity of carbohydrate, protein and mineral content.

RAW MATERIALS:

All the raw materials are indigenously available. The raw material confirms the general Food Standard.

PROCESS:

The process for manufacturing of chicken wafer involves following steps:

De-boning → Mixing → Cooking → Cooling → Curing → Storing → Drying → Packing

EQUIPMENT:

Major equipment required are Meat Mincer, Cooker, Slicer, Fryer and Dryer

ECONOMICS OF PROJECT:

- Capacity of Production - 100 kg/day
- Cost of Plant/Equipment - Rs. 3 lakh (approx)

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INTEGRATED PROCESSING OF MUSTARD SEEDS

INTRODUCTION:

Mustard and rapeseed forms the second major oilseed crop in India. Most of the oilseed is used for oil extraction of Ghani or expellers. In the traditional processing of mustard/ rapeseed the material is crushed without any de-hulling. Mustard/rapeseed contains about 20% by weight of hull portions, which imparts dark colour, high amount of crude fiber (about 70%) in the mustard/rapeseed meal and also dark colour to the oil. Because of these qualities the cake finds very limited use for food/feed purposes.

To address these challenges, an integrated processing approach has been developed, aiming to produce high-quality mustard oil and low-fiber mustard cake that meets the standards for food and feed applications. By focusing on de-hulling the seeds before oil extraction, this method significantly reduces fiber content and enhances the nutritional profile, making the resulting mustard cake a valuable protein supplement in the poultry feed industry. The high pungency of the mustard oil also commands a premium price in the market, highlighting the economic viability of this integrated processing approach.

BENEFITS:

- Increased Ghani efficiency
- Increased capacity of the Ghani.
- Powder requirement is less by 40%.
- Superior quality of oil in respect of colour, flavor, lower FFA and high pungency in oil.
- The mustard cake is bright yellow in colour, low in glucosinolate and crude fiber content and can be used for feed/food purposes.
- Mustard cake can be used for preparation of mustard paste and use in the preparation of pickles.

RAW MATERIAL:

Mustards seeds

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INTEGRATED PROCESSING OF MUSTARD SEEDS

EQUIPMENT:

De-stoner, Seed grader, De-huller, Air classifier, Power ghanis, Mini expeller, Cake breaker, Oil filtration unit, Pump for filtration, Truck drier, Sieve shaker (small unit), Weighing scale, Conveyer system, Material handling vessels, etc.

PROCESS:

Integrated processing of mustard/rapeseed involves the following steps:

- Seed pre-cleaning for removal of extraneous material like stones, mud, etc.
- Seed grading to obtain uniform size seeds.
- Conditioning the cleaned seeds for de-hulling.
- De-hulling of the conditioned seeds.
- Separation of de-hulled kernels and hull fraction.
- Proper conditioning of de-hulled kernels for obtaining high pungent oil.
- Extraction of oil in Ghani and expeller.

PROJECT COST:

- The land area is 200 m².
- The building covers 100 m².
- Plant and machinery: Rs.9,00,000/-

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MUTTON PICKLE

INTRODUCTION:

Mutton pickle is a savory and spicy food adjunct, traditionally paired with bland staple foods such as roti, rice, chapatti, or bread. Originating from India's rich culinary heritage, this product is made from tender cuts of mutton, such as legs and shoulder portions, and is seasoned with a blend of spices, vinegar, garlic, ginger, and vegetable oil. The distinctive feature of mutton pickle is its long shelf life, which extends beyond one year without the need for external preservatives.

This longevity is attributed to its low moisture content, acidic pH of 4.2, and the naturally preserving qualities of salt and spices, which inhibit microbial growth and spoilage. The pickle's unique flavor profile, combining tangy, salty, and spicy elements, makes it a desirable accompaniment to a wide range of meals, providing a burst of flavor that enhances the overall dining experience.

MARKET POTENTIAL:

The development of mutton pickle has significant potential for commercialization, as the product contains sufficient quantities of protein and mineral content, particularly in hotels, restaurants, and student messes. Its long shelf life and ease of storage at room temperature make it a convenient product for large-scale catering services.

BENEFITS:

- It can be stored for over a year at room temperature without refrigeration.
- It is rich in protein and essential minerals, making it a healthy food option.
- Naturally preserved with acidic pH, salt, and spices, requiring no added chemicals.
- Ideal for hotels, restaurants, and households due to its ease of storage and ready-to-eat nature.
- High demand for flavorful, shelf-stable, ready-to-eat products.
- The pickles have a tested self-life of over one year at room temperature.

RAW MATERIALS: Mutton (tender) preferably legs and shoulder cuts may be used. The other raw materials used are salt, vinegar, sugar, vegetable oil, garlic and ginger.

PROCESS: The process for manufacturing mutton pickle involves following steps: De-boning → Mixing → Cooking → Drying → Roasting → Mixing → Conditioning → Bottling

PRODUCTION CAPACITY: The economics of the mutton pickle project, producing 120 kg per day.

PROJECT COST: With an estimated initial investment of Rs. 2.12 lakh for plant and equipment.

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PREPARATION OF NON-AERATED NUTRI BEVERAGE IN GLASS BOTTLES

INTRODUCTION:

In many countries, the normal diet might not essentially provide optimal levels of vital minerals and nutrients. Recent evidence suggests that nutritional zinc deficiency is common among the people of many developing countries where they subsist on diets of plant origin (e.g. cereal and legume). Many mineral deficiencies can be overcome by taking supplements. One practical approach would be to design a beverage composition fortified with a nutritional amount of minerals, which has palatability while preserving the bioavailability of the metal ions. Drinking water, as opposed to a beverage, should contain water as its main ingredient with the taste and appearance of water. Fortification of drinking water with soluble, stable and bioavailable minerals (e.g. iron, zinc) has been a challenge. In view of the above a process has been envisaged and developed for preparation of packaged nutritive beverage in glass bottles.

RAW MATERIALS: Water, minerals, vitamins, acidulants etc.

PLANT & MACHINERY: Mixing tank, Steam jacketed tank with stirrer, sparkler filter, bottle washer, bottle unscramble, bottle conveyor, bottle filling machine, bottle crown corking machine

PRODUCTION CAPACITY: 1000 bottles (180 ml)/ hour working 16 hours/ day Working: 300 days per annum

FINANCIAL ASPECTS:

A. Project Cost – Fixed Cost – Working Capital (in Rs.‘000)

Land & Site development (750 m²) - 750.00

Rented Building (300 m²) - 3000.00

Plant and machinery - 2300.00

Auxiliary Equipments - 1345.00

Miscellaneous fixed assets - 800.00

Pre-operative expenses - 500.00

Total fixed Capital - 8695.00

Working capital margin - 1400.00

Total Project cost - 10095.00

B. Means of Finance

Promoters contribution - 2523.75

Term loan - 7571.25

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NUTRI OIL BLENDS

INTRODUCTION:

The process consists of the preparation of two nutri oil blends based on rice bran oil (RBO) and ground nut oil (GNO) with efficient blending with other nutrient rich oils. These blends have been made with such a way that the fatty acid composition has been balanced with respect to saturates, monounsaturated and polyunsaturated and contains endogenous β -carotene, tocopherols, tocotrienols and oryzanol & tocopherols and tocotrienols respectively. The products have shown excellent stability during the storage study and retention of nutraceutical components. The products have good acceptability with respect to colour, appearance and taste. According to PFA "Blended Edible Vegetable Oil" means an admixture of any two edible vegetable oils where the proportion by weight of any edible vegetable oil used in the admixture is not less than 20 per cent. The individual oils in the blend shall conform to the respective standards prescribed by these rules. The blend shall be clear, free from rancidity, suspended or insoluble matter or any other foreign matter, separated water, added coloring matter, flavoring substance, mineral oil, hydrocyanic acid, castor oil and tricresyl phosphate. It shall also conform to the specification as listed under PFA.

BENEFITS:

- Balanced fatty acids
- Rich in antioxidants
- Improves heart health
- Enhances cholesterol management
- Contains natural oryzanol
- Contains tocopherols and tocotrienols
- Promotes skin health
- Supports anti-inflammatory effects

RAW MATERIAL:

Blend 1: Rice bran oil blended with another vegetable oil.

Blend 2: Groundnut oil blended with another vegetable oil.

PLANTS AND MACHINERY:

The plant & machinery list consists of SS jacketed vessels with stirrer, basket centrifuge, nitrogen gas cylinders, FFS machine, chilling plant, boiler, balance, trolleys, handling vessels, analytical laboratory equipment's etc.

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NUTRI OIL BLENDS

PRODUCTION CAPACITY:

Suggested economic capacity: 5000 kg of blended oil Working: 300 days per annum Production per day: 5000 kg of blended oil

PROCESS:

The process consists of blending the oils in the right proportion in specially designed blending units for the required time and at the optimized temperature conditions. The blend is then cooled to the ambient temperature, flushed with nitrogen and filled into co-extruded multi layered pouches using form-fill-sealing machine.

USE:

The nutri oil blends having balanced fatty acid composition, natural oryzanol, tocopherols, tocotrienols and phytosterols in RBO based blend and tocopherols and tocotrienols in GNO based blend can be used regularly in homes for day-to-day consumption. The oil blends have good stability and can be used for frying also.

PROJECT COST:

- The estimated cost for acquiring and preparing 750 m² of land is Rs. 172,500.
- The construction of a 250 m² facility along with ponds is estimated at Rs. 920,000.
- The cost for plant and machinery amounts to Rs. 39,66,200.
- An additional Rs. 50,000 is allocated for auxiliary equipment to support the core machinery.
- A budget of Rs. 20,000 is set aside for miscellaneous fixed assets required for the project.
- Pre-launch activities, including planning and setup, are estimated to cost Rs. 484,100.
- The total fixed capital investment sums up to Rs. 56,12,800.
- A working capital margin of Rs. 35,52,700 is required to manage operational expenses.
- The overall project cost is estimated at Rs. 91,65,500/- combining fixed capital and working capital.

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ONION FLAVORED BISCUITS

INTRODUCTION:

Onions have long been a staple in kitchens worldwide, celebrated for their distinctive pungency and versatility in both culinary and medicinal applications. The unique flavor profile of onions, primarily due to sulfur-containing compounds like allyl sulfide and propyl sulfide, adds a depth of taste that is both savory and aromatic. These compounds are released when onions are cut or cooked, contributing to their characteristic taste and aroma. The concept of incorporating onions into biscuits is both novel and intriguing.

While biscuits are traditionally associated with sweet or mildly savory flavors, introducing a strong, pungent onion flavor represents an exciting departure from the norm. This innovation taps into a growing consumer interest in unique and gourmet snack options, especially in markets where traditional flavors are well-established but new taste experiences are welcomed.

PROPERTIES:

- i) Product is ready to eat variety snack item
- ii) Product offer quality and strength of onion flavour
- iii) It has typical, familiar taste of onion.

BENEFITS:

- Provides a distinctive, bold onion flavor, offering a new and exciting taste experience compared to traditional biscuits.
- Contains onions, which may offer antioxidant and anti-inflammatory properties, supporting overall health.
- Fills a gap in the Indian market with a novel product, attracting consumers seeking innovative snack options.
- Ready-to-eat, making it a quick and easy snack choice for busy lifestyles.
- Opens opportunities for future product development and brand growth in the snack industry.

RAW MATERIAL:

Wheat flour, baker's yeast compressed, hydrogenated fat, sugar, salt, milk powder, baking powder, onion, sesame seeds, green Chilies, coriander leaves and water.

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ONION FLAVORED BISCUITS

PLANTS AND MACHINERY:

- Principle equipment's: Mixer, sheeter, laminator, rotary cutter, baking oven, cooling belt and packaging machine.
- Auxiliary equipment's: Trolleys, SS buckets, handling vessels for raw material handling.

PRODUCTION CAPACITY:

- The Suggested economic capacity is 569 kg onion flavored biscuits/shift
- To optimize production efficiency and maximize profitability, the facility should aim for a capacity utilization rate of 70%.

PROJECT COST:

- The fixed costs include land and land development expenses of Rs 1,44,000 for 500 m²
- Building and civil works amounting to Rs 9,72,000 for 267 m²
- Plant and machinery costs total around Rs 16,55,000/-
- Miscellaneous fixed assets at Rs 1,40,000/- and
- pre-operative expenses of Rs 3,67,000/-
- The total project cost Rs 40,66,000/-

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OSMO AIR DRIED AMLA (SWEET & SALT)

INTRODUCTION:

Emblica officinalis or Indian Goose-berry is highly valued for its medicinal properties. Amla Fruit is rich in Vitamin C and Pectin and is an important constituent of 'Triphala', a popular ayurvedic preparation. It inhibits Platelets aggregation and lowers cholesterol levels. It is a tonic, has a haematinic and lipalytic function useful in Scurvy and Jaundice, prevents Indigestion and controls acidity as well as it's a natural source of anti-ageing. It increases all-round immunity in the body against heart and nervous disorders.

USES:

Being rich in poly-phenols it is popularly used as an Astringent or mouth freshner. The fruit is known to have cooling properties and is used in several other preparations like Chutneys, Pickle, Murraba, Spread etc. Osmo air-dried amla is a ready-to-eat product wherein salt/sugar is incorporated into the amla pieces which makes the subsequent drying process less energy intensive and gives a good taste and texture to the finished product. This product has shelf-life upto 8-10 months at ambient temperature and finds varied application as it can be used in place of fresh fruits.

SALIENT FEATURES:

1. It is a concentrated fruit product with a good nutritive value
2. It is in ready-to-eat form
3. The product has a good shelf-life.
4. The product has a ready internal market & promising export potential.
5. Marketing With the increasing demand for natural and ayurvedic preparations owing to health consciousness and amla fruit being highly valued for its properties the above product have good market potential

RAW MATERIAL:

Amla fruits, Sugar, Salt, Spices & Preservatives etc.

PROCESS:

Amla fruits → Washing & Cutting → Syruping/Salting → Osmotic treatment → Draining → Dipping → Drying → Packing

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OSMO AIR DRIED AMLA (SWEET & SALT)

PLANT & MACHINERY:

Major equipments required are Fruit washer, Tray drier, Boiler, Syrup storage tank, Jacketed Kettles, Refractometer, Sealing machine, Platform & Counter scale etc.

PROJECT COST

Fixed Cost – Working Capital (In Rs. '000) (estimate for a model project)

- a) Land & Land development (500 m²) – 75.00
- b) Building and civil works (75 m²) - 225.00
- c) Plant and machinery - 1400.00
- d) Miscellaneous fixed assets - 150.00
- e) Pre-operative expenses - 150.00
- f) Total fixed capital - 2000.00
- g) Working capital margin - 202.00
- i) Total Project cost - 2202.00

Means of finance – 225.00

Promoters contribution – 1500.00

Term loan

PRODUCTION CAPACITY- (ESTIMATE):

Suggested economic capacity: - 132 Kg/day of Sweet amla & 24 Kg/day of Salted amla

Working : 1 shift/day, 150 working days/year

Capacity : 19.8 MT (Sweet amla) & 3.6 MT (Salted amla) /annum

Optimum utilization capacity: 70%

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OSMO AIR-DRIED JACKFRUIT

INTRODUCTION:

Jackfruit bulbs are a rich source of vitamins and mineral constituents, especially calcium. Much of the raw jackfruit is consumed locally for curry preparation and after ripening the bulbs are relished as such in India as it is considered to be a good appetizer.

Products such as fruit bars, jam, candy etc. can be prepared from this fruit. However, it has not so far been fully exploited by the fruit preservation industry. The osmo-air dried product prepared from jackfruit bulbs may be consumed as a snack. It can also find use in military rations in suitable packing. The osmo-air dried fruit products can be used in ready to eat type of foods, ice-creams, fruit salad, kheer, cakes and bakery products.



RAW MATERIALS:

Ripened Jackfruit, Sugar, Citric acid and Water

PLANT & MACHINERY:

Principal equipment: Drier, S.S. Jacketed kettles, Sealing machine, Boiler, Autoclave, Refractometer, Top loading balance

Auxiliary equipment: Filter press machine, Digital balance, S.S. Sieves and S.S. Vessels

ABOUT TECHNOLOGY/MANUFACTURING PROCESS

Jackfruit bulb → Separation of seed → Cutting → Osmotic-treatment → Drying → Packing

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OSMO AIR-DRIED JACKFRUIT

FINANCIAL ASPECTS & PRODUCTION CAPACITY

A. Production capacity- (estimate)

- Suggested economic capacity : 200 kg of osmo-dried jackfruit per shift
- Working days : 150
- Installed capacity : 30 tonnes/annum
- Optimum capacity utilization : 70%

B. Project Cost – Fixed Cost – Working Capital (in Rs.‘000)

(Estimate for a model project)

- Land and land development (652 sq.m) - 83.00
- Building and civil construction (70sq.m) - 424.00
- Plant and machinery/Auxiliary equipment - 954.00
- Miscellaneous fixed assets - 470.00
- Pre-operative expenses - 266.00
- Total fixed capital - 2197.00
- Working capital margin - 263.00
- Total Project cost - 2460.00
- Total working capital required at 15% of turnover - 879.00

C. Means of Finance

Promoters contribution : 695.00

Term loan : 1765.00

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OSMO DRYING OF MANGO SLICES

INTRODUCTION:

Osmo dried mango slice is a ready to eat product wherein sugar is incorporated into the mango pieces which makes the subsequent drying process less energy intensive and gives a good taste and texture to the finished product. This product has a shelf life of up to 8-10 months and has found varied application as it can be used in place of fresh fruits.

SALIENT FEATURES:

1. It is a concentrated fruit product with a good nutritive value
2. It is in ready-to-eat form
3. The product has a good shelf-life.
4. The product has a ready internal market & promising export potential. Market : The demand for the processed products from mango in the global market is steadily increasing. Mango (*Mangifera indica*), is the most important fruit cultivated throughout India. Alphonso, Badami, Mallika and Totapuri varieties can be successfully dehydrated as slices.



RAW MATERIALS: Mango, Sugar & Preservatives etc.

PLANT & MACHINERY:

Vacuum dryers, SS Kettles, Sealing Machine, autoclave, trolley, hand refractometer, boiler, sauce pans, syrup storage tank and colony counter.

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OSMO DRYING OF MANGO SLICES

ABOUT TECHNOLOGY/MANUFACTURING PROCESS

Osmotic dehydration, a novel approach, involves two stages. In the first stage, water is removed from the fruit pieces by dipping in concentrated sugar syrup which not only improves the taste but also helps in reducing the moisture content of the pieces as seen by weight loss. In the second stage, the drained pieces are then dried in a hot vacuum drier to the desired moisture level.

FINANCIAL ASPECTS & PRODUCTION CAPACITY

A. Production capacity- (estimate)

- Suggested economic capacity: 100 Kg/day of mango slices.
- Working : 1 shift/day, 150 working days/ year
- Capacity : 15 MT/ annum

B. Project Cost – Fixed Cost – Working Capital (in Rs.‘000) (Estimate for a model project)

- Land and land development - (500 sq.m) (Rented) - 75.00
- Building and civil construction - (75sq.m) - 225.00
- Plant and machinery/Auxiliary equipment - 1400.00
- Miscellaneous fixed assets - 150.00
- Pre-operative expenses - 150.00
- Total fixed capital - 2000.00
- Working capital margin - 202.00
- Total Project cost - 2202.00

C. Means of Finance

- Promoters contribution - 702.00
- Term loan - 1500.00

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OSMO-AIR DEHYDRATED PINEAPPLE SLICES

INTRODUCTION:

Osmo-air dehydration is a novel approach in the dehydration of fruits. It involves two stages of dehydration. The first stage is the removal of water using sugar syrup as an osmotic agent. The second stage is dehydration in an air circulation drier where the moisture content is further reduced to about 15%. The process is found to give a better dehydrated product, which would be nearer to fresh fruit from colour, flavour and texture point of view. The sugar syrup is found to have a protective effect not only on retention of fresh fruit flavour during drying but also during subsequent storage. Canned pineapple is the most popular canned fruit throughout the world. But it has become highly prohibitive in India mainly due to the high cost of container, processing and distribution. Investigations were therefore taken up to develop a process for osmo-air dehydrated pineapple tit-bits. Of all the fruits tried, pineapple was found to give the best osmo-air dehydrated product.

The dried product was found to be soft in texture, sweetish in taste, yellowish in colour with good retention of flavour. It could be consumed as snack fruit. It can find a place in military ration and other special rations meant for expeditions. Osmo-air dehydrated pineapple slices, when reconstituted by soaking in dilute sugar solution at room temperature overnight, are found to give slices almost equivalent to canned pineapple slices. The reconstituted slices were found to be approximately cheaper by 50% as compared to canned slices. The shelf-life of the product was found to be about 5 months at RT. The process has thus indicated the commercial possibilities in this country where canned products are becoming increasingly prohibitive. The sugar syrup could be recycled up to six times and at the end it could be converted into pineapple syrup with quite acceptable flavour and could easily be marketed. During preparation of pineapple for osmo-air dehydration about 10- 15% juice will be available as by product, which could also be easily marketed as juice or utilized in the preparation of osmotic syrup

PLANT & MACHINERY :

All the machinery and equipments required in this process are indigenously available. If the process is taken up by an existing pineapple processing unit, additional investment required is only about Rs.60,000/ on a 96 tray cross flow air drier, for producing about 100 kgs. of dried products per day of 10 hours working using 1.38 tonnes of pineapple. For a new unit the total investment on plant and machinery would be approximately 1.7 lakhs for the same capacity of 100 kgs. of finished product a day.

ASSISTANCE THAT CAN BE RENDERED TO THE LICENCEE:

The following assistance can be rendered to the Licencee.

1. Process Know-how
2. Demonstration of the Process
3. Training of the Personnel
4. Advice on machinery and equipment



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PICKLES AND CHUTNEYS

INTRODUCTION:

Man is a sophisticated being and he is not satisfied by eating just wholesome and nutritious foods. He requires spicy adjuncts along with his food to make it palatable so that he can enjoy his meal. In this context pickles - an adequately spiced unfermented preparation – have gained importance in the Indian menu and occupy a special place. Preservation of fruits and vegetables in the form of pickles is an old art and a variety of these products are made in Indian homes and consumed. However, the taste and method of preparation varied, though the basic principle of pickling i.e. curing prepared fruits and vegetables by salting, acidifying, addition of vinegar and/or by using oil, and in almost all cases mixing of spice powders of a varied composition. Pickles are of different types: pickle in oil, pickle in citrus juice, pickle in brine and pickle in vinegar. Fruit chutney is a preserved product similar to a pickle, which contains a minimum of 40% of fruit content and 50% of solids (TSS) and with acidity not more than 20%. It is a product of Western preference and hence spiced less. Both pickles and chutneys are consumed along with staple foods such as rice, chapathi, bread, samosa, upma, etc. as a side dish to increase appetite. The market for pickles and chutneys are on the increasing side both in domestic and export markets. The present production of pickles and chutneys is about 50,000 MT valued to Rs.100 150 crore per annum of which substantial quantity is exported.

RAW MATERIAL:

Fruits and vegetables are available during different seasons, which vary from product to product, in abundance. Green mangoes- Feb. to May, Tomatoes – July to Oct. & Dec. to March, Acid limes – Dec. to March & July to Sept., Green chillies – Almost throughout the year, Carrot – July to Feb. and so on. The raw materials are to be processed during the season, prepared, cured, dehydrated and stored for ready use all round the year. Powdered spices are the other raw materials of importance in instant pickles preparation. Good quality dry spices only are to be used. They are cleaned, sun dried/mechanically dried and ground to the required particle size and used as freshly ground spices. Edible oil such as sesame oil/mustard oil has to be used. Glacial acetic acid can be used instead of vinegar (with required dilution). Dry powdered salt is to be used. All the materials can be locally procured. Packaging materials also form an important input like glass bottles, caps, flexible pouches and so on.

PLANT AND MACHINERY : Principal Equipments: Mixing unit, mechanical dryer, spice grinding mill, heat sealing machine, frying pan, containers and stainless steel knives. Auxiliary Equipments: Storage barrels; SS topped working tables, weighing scales, etc.

PROJECT COST – FIXED COST – WORKING CAPITAL (in Rs. '000):

(estimate for a model project)

- a) Land & Land development (1000 m²) - 100.00
- b) Building & civil construction (250 m²) - 625.00
- c) Plant and machinery - 560.00
- d) Miscellaneous fixed assets - 90.00

- e) Pre-operative expenses - 75.00
- f) Total Fixed Capital - 1450.00
- g) Working capital margin - 305.00
- h) Total Project cost - 1755.00
- i) Total working capital required - 1225.00

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PRAWN PICKLE

INTRODUCTION:

The prawn pickle developed has an emulsion consistency, and contains fried prawn in an aqueous medium of acid, salt, spices, condiments and sugar. The pickle is preserved with a layer of covering oil to enhance its longevity and flavor. Notably, no external preservatives have been added, and the product boasts a tested shelf life of over one year at room temperature. Its rich flavor and long-lasting quality have been well-received, as demonstrated through consumer acceptance trials.

BENEFITS:

- The prawn pickle has a tested shelf life of over a year at room temperature, making it a convenient and long-lasting product.
- The absence of artificial preservatives enhances the natural quality and health appeal of the product.
- The product has been validated through consumer trials, ensuring it meets market preferences for taste and quality.
- With established demand in major Indian markets such as Goa, Bombay, Kochi, Mangalore, New Delhi, Calcutta, Mizoram., as well as export potential, the prawn pickle offers promising commercial opportunities.

RAW MATERIAL: Prawn, Salt, Spices, Sugar, Mustard, Tamarind, Acetic acid, Vegetable oil.
EQUIPMENT: Dressing Table, Knives, Container Icebox, Cooking/Frying/Heaters, Dry Grinding Equipment, Bottle, Filler and Weighing Machine.

PROCESS:

Frying of prawn → Preconditioning with salt and acid → Blending with spice mix → Bottling with covering oil

PRODUCTION CAPACITY:

The prawn pickle has a production capacity of 30 metric tons (MT) per annum.

PROJECT COST:

The investment required for plant and equipment is ₹2.60 lakhs, while the total project cost amounts to ₹17.74 lakhs.

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PRODUCTION OF CEREAL FLAKES - JOWAR

INTRODUCTION:

Jowar flakes are a new type of products. They are not traditional like rice flakes which are known since time immemorial. But jowar flakes are produced on the same lines as rice flakes are produced. The coarse nature of the grain has been the cause for not making the jowar flakes. The flakes were being produced in the olden days by pounding. As jowar is a coarse grain, it was difficult to pound. With the advent of modern machines, flaking has become easy paving way for the production of jowar flakes. It is suitable specially for preparing deep fat fried (chewda) products such as fried and seasoned mixture. It is also suitable for preparing toasted and seasoned mixtures, energy food, tamarind bhath, upma, sweet/savoury, pongal, sweet gravy (payasam), etc. For the preparation of bhath the flake thickness should be about 0.5 mm and about 0.8 mm to 1.0 mm for the preparation of chewda.

RAW MATERIAL: The main raw material used in the manufacture of jowar flakes is jowar. The total production of jowar in our country is little over 12.9 million tonnes. Of this Maharashtra's contribution is highest It produces 6.635 m. tonnes, while Madhya Pradesh and Karnataka produce 1.783 and 1.624 m. tonnes taking second and third position. Jowar should be well matured, dean, uniform in size, light yellowish or white in colour. It should be free from insect infestation and other extraneous matter. The moisture content should be 12-14%. Any variety including hybrids can be used; normally bold kernels are preferred.

INSTALLED CAPACITY: Suggested economic unit Capacity - 3000 kg/shift/day Working capacity - 300 days/annum Annual capacity - 900 tonnes Optimum capacity utilization - 70%

PROCESS: The unit operations involved in the process are: cleaning, soaking, roasting, resting, polishing, flaking, sifting and drying. The jowar is cleaned free of contaminants, soaked in hot water overnight, roasted. The roasted jowar is rested to obtain wrinkle-free flakes. The yield is about 80% on clean jowar basis, depending on the degree of polish given and the bran content of jowar. During the process about 8% broken flakes are obtained.

PLANT AND MACHINERY:

Principal equipments: Hot water boiler/soaking tanks, roaster, cone polisher, flakers, grader and drier.

Auxiliary equipments: Weighing scales, trolleys, fumigation equipment set.

PROJECT COST:- FIXED COST - WORKING CAPITAL (in Rs.'000)

- | | |
|--|------------------------------------|
| a) Land (600 m ²) Hired Industrial. Shed - 60.00 | f) Total fixed capital - 1660.00 |
| b) Building (100 m ²) (Deposit) - 250.00 | g) Working capital margin - 165.00 |
| c) Plant and machinery - 1100.00 | h) Total Project cost - 1825.00 |
| d) Miscellaneous fixed assets - 150.00 | |
| e) Pro-operative expenses - 100.00 | |

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PULSE BASED PAPADS

INTRODUCTION:

Currently papad production and sale are carried out at home level or as a tiny scale industry, which is mostly in the unorganized sector. Even large producers of popular brands of papads such as “Lijjat” or “Amani” are also basically home industries. As practiced currently these are mostly manually operated units, which have minimal capital investment. The working capital needs are met by daily sales of late papad manufacturers, aiming at export markets, are in need of the semi or fully automatic plants and hence are on the look out for such developments. The total market is about four tonnes per day.

RAW-MATERIAL:

Black gram dhal flour, salt, Sodium bicarbonate, water potable, crushed cumin seed and black pepper, asafetida, Ca-propionate.

PLANT & MACHINERY:

Plate Grinder, Sieve shaker, Low-pressure boiler, steam- steam-jacketed kettle with stirrer, motorized mixing, forming and kneading machine, hand operated papad press, leg operated papad press and sealing equipment.

ABOUT TECHNOLOGY:

Papad is a thin wafer-like snack food particularly popular in South and South-East Asian countries. It is made from dough containing legume flour along with salt, khar and spices. It is either toasted or deep fat fried to an attractive crispy wafer like product that is commonly used as an adjunct to a full meal.

PROCESS :

- Grinding of black gram
- Mixing
- Kneading of the dough
- Shaping
- Drying at room temperature dough

FINANCIAL ASPECTS & PRODUCTION CAPACITY:

Project Cost (estimate) in Lakhs	
Total Project cost	8
Note: Please note the above figures are tentative and need updating	
Production Capacity (estimate)	
Capacity processing	100 kg/day
Working days	300 days
Shelf Life	6-12 months

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RAGI BASED PAPADS

INTRODUCTION:

Currently papad production and sale are carried out at home level or as a tiny scale industry, which is mostly in the unorganized sector. Even large producers of popular brands of papads such as “Lijjat” or “Amani” are also basically home industries. As practiced currently these are mostly manually operated units, which have minimal capital investment. The working capital needs are met by daily sales of late papad manufacturers, aiming at export markets, are in need of the semi or fully automatic plants and hence are on the look out for such developments. The total market is about four tonnes per day.

RAW-MATERIAL:

Ragi flour, salt, Bicarbonate, Water-potable, cumin seed and ajwan seed, Oil, Ca-propionate.

PLANT & MACHINERY:

Plate Grinder, Sieve shaker, Low-pressure boiler, steam-jacketed kettle with stirrer, motorized mixing, forming and kneading machine, leg operated papad press and sealing equipment.

ABOUT TECHNOLOGY:

It is a ready-to-fry crisp snack food adjunct. It is made from cooked dough containing cereal flour like ragi, rice, maize, sorghum, wheat flour or sago either alone or as blends with other pulse flours along with salt, khar and spices. It is deep fat fried to a attractive crispy wafer like product that is commonly used as an adjunct to a full meal.

PROCESS :

- Grinding of black gram
- Mixing
- Kneading of the dough
- Shaping
- Drying at room temperature dough

FINANCIAL ASPECTS & PRODUCTION CAPACITY:

Project Cost (estimate) in Lakhs	
Total Project cost	15-20
Note: Please note the above figures are tentative and needs updating	
Production Capacity (estimate)	
Capacity processing	500 kg/day
Working days	300 days
Shelf Life	6-12 months

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RAW BANANA POWDER (UNRIPE)

INTRODUCTION:

Banana is an important horticulture crop cultivated in large quantities throughout the year in different parts of the country. Cavendish (Pachbale), Nendran, Elakki, poovan, rasabale are some of the important varieties marketed as fresh. Raw banana is also used in various food preparations. Raw banana is used for the preparation of raw banana powder which is a rich source of carbohydrates and free from sugars. The technology facilitates the manufacture of raw banana powder under controlled conditions.

BENEFITS:

- High in Carbohydrates
- Rich in Fiber
- Low in Sugar
- Nutrient-Dense.
- Versatile

RAW MATERIAL: Unripe Banana

PLANTS AND MACHINERY: Fruit washer, preparatory equipment, hot air drier, Pouch Sealing machine, hammer mill, SS Steam jacketed kettles, boiler, SS preparation tables, weighing balance, utilities etc.

PRODUCTION CAPACITY: Capacity 100kg / day

PROJECT COST:

- Estimated Total Project Cost: - ₹11,43,000
- Plant and Machinery Cost: - ₹2,31,000

PROCESS: Unripe, mature bananas free from spoilage, with firm texture of any edible varieties viz., Cavendish, Nendran, Elakki, Rasbale, Poovan etc., can be used. Bananas are washed, peeled, pretreated and dehydrated. Raw banana powder is packed in glass bottles or flexible food grade packaging materials in unit packs.

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READY-TO-EAT EXPANDED HORSE GRAM

INTRODUCTION:

Pulses like Bengal gram and Peas are available in puffed/ expanded form but not Horse Gram because raw Horse Gram does not give puffed or expanded product at normal moisture content and conventional puffing conditions. Studies have indicated that suitable pretreatment is necessary for expansion of Horse Gram, which is followed by HTST to give an acceptable expanded product, which can be a RTE snack as such or offer appropriate spice coating. The product is free from anti-nutritional factors and have good digestibility. Innovative approach not only enhances the texture and palatability of Horse Gram but also preserves its rich nutritional profile. The versatility of this product allows for various spice coatings, catering to diverse consumer preferences while providing a healthy snacking option. By introducing expanded Horse Gram into the market, we can promote a sustainable and health conscious snack that highlights the untapped potential of this nutritious pulse.

BENEFITS:

- Rich in protein, fiber, vitamins, and essential minerals, making it a nutrient-dense food choice.
- Helps regulate blood sugar levels, making it suitable for diabetics.
- Contains antioxidants that combat oxidative stress and reduce chronic disease risk.
- Expanded form enhances digestibility for better nutrient absorption.
- Suitable pretreatment eliminates anti-nutritional factors, improving nutrient bioavailability.
- Can be enjoyed as a standalone snack or with various spice coatings for flavor variety.
- Promotes sustainable agriculture, requiring less water and thriving in poor soil.

MARKET POTENTIAL: At present, expanded product from horse gram is not available in the market. Hence the product has good potential in the market as the product is crisp, crunchy and shelf stable. It can be used as such as snack after salting or spicing. It can also be component of cereal bar/ chikki. It is anticipated that the market demand will be much more after successful launching of the product.

RAW MATERIAL: Horse Gram, Water, Sodium bicarbonate. **EQUIPMENT:** Soaking tanks, Sand roaster, hot air puffing unit, brushing machine/mini dhal mill, husk aspirator, hot air dryer and sealing machine.

PRODUCTION CAPACITY:

- Capacity of the unit: 100 kg/day
- Working: 300 working days

PROJECT COST:

- Land (140 m²): - ₹ 28,000/-
- Building (120 m²): - ₹ 480,000/-
- Plant and Machinery: - ₹ 700,000/-
- Miscellaneous Fixed Assets: - ₹ 100,000/-
- Pre-operative Expenses: - ₹ 200,000/-
- Total Fixed Capital: - ₹ 16,08,000/-
- Working Capital Margin: - ₹ 25,000/-
- Total Project Cost: - ₹ 16,33,000/-

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READY TO EAT LOW FAT FLACKED SPICY MAIZE/CORN SNACK

INTRODUCTION:

MAIZE is grown both (as sweet corn) for human consumption and (as field corn) for other uses such as animal feed and biofuels. Worldwide, only around 15% of maize production is used for food consumption with most production going to animal feed. However, the proportion of maize production for food production in developing countries is higher at 25% and even higher in regions such as South East Asia where it is an estimated 30-40%, whilst in parts of Sub-Saharan Africa it can be as high as 70-80%.

RAW-MATERIAL:

Maize/corn grain, sugar, salt, hydrogenated fat, chilli powder, asafetida and BHA/BHQ.

PLANT & MACHINERY:

Destoner cum cleaner, Soaking tanks, Water heater, Roaster with horizontal brushing unit, Polisher, Aspirator, Flaker, 2- deck sieve shaker/grader, Drier, Toaster, Pan coater, general heating and lighting and Heat sealer.

Auxiliary equipments: Handling equipments/vessels and trolleys, weighing scales, weighing counter scale, working tables and electric stoves.

ABOUT TECHNOLOGY:

It is a ready-to-eat maize/corn snack with spice-salt to taste. The product is suitable as a low-fat snack because the step of frying in oil/fat has been completely eliminated to provide a shelf life without sacrificing the taste of a crispy snack. The product is low in cost and can also be considered as a health food. The product can be shelf stored for more than 4 months at ambient conditions with good shelf stability.

FINANCIAL ASPECTS & PRODUCTION CAPACITY:

Project Cost (estimate) in Lakhs	
Total Project cost	30
Note: Please note the above figures are tentative and needs updating	
Production Capacity (estimate)	
Capacity processing	500 kg/day
Land	4,000 sq.ft
Working days	300 days
Shelf Life	4 months

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READY TO EAT LOW FAT MAIZE SNACK FROM MILLED MAIZE GRITS

INTRODUCTION:

Millets are nutri-cereals which are highly nutritious and are known to have high nutrient content which includes protein, essential fatty acids, dietary fibre, B-Vitamins, minerals such as calcium, iron, zinc, potassium and magnesium. Millets are known for nutria-rich content and having characteristics like drought tolerance and resilient to climate change etc. Millet crops primarily constitute a diverse group of small grains. These are categorized under Coarse Cereals in India. Millets are classified into major millets and minor millets or small millets. Hence developing technology that makes millet value added products available as convenient to make and easy access at reasonable prices will find great demand and market particularly in urban places where there is growing conscious for nutritive intake of food.

RAW-MATERIAL:

Maize grits, Sugar, Salt, Chilli powder, Black salt, Sodium bicarbonate, Malt powder, Hydrogenated fat, Food colour, Food flavour, Potable water etc.

PLANT & MACHINERY:

Soaking tanks, autoclave, flaker, 2-deck sieve shaker, Dryer, Toaster, Pan coater, Heat sealer, etc.

ABOUT TECHNOLOGY:

Snacks are made from maize grits to develop ready-to-eat products having either a spicy salty or sweet taste. The products are suitable as a low-fat snack because the step of frying in oil/fat has been eliminated to provide a good shelf life without sacrificing the attractive texture and taste of a crispy snack. The sweet product can be used as a breakfast cereal whereas the salt-spicy one can be consumed as anytime snack. In addition, the products are cost effective and can also be considered as a health food.

FINANCIAL ASPECTS & PRODUCTION CAPACITY:

Project Cost (estimate) in Lakhs	
Total Project cost	30
<u>Note: Please note the above figures are tentative and needs updating</u>	
Production Capacity (estimate)	
Capacity processing	500 kg/day
Working days	300 days
Shelf Life	4 months

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SHELF STABLE EGG ALBUMIN AND EGG YOLK CUBE

INTRODUCTION:

These laboratory has developed a unique and innovative product: shelf-stable egg albumin and egg yolk cubes. These cubes are a versatile and convenient alternative to traditional paneer, offering a delicious and nutritious option for various culinary applications. The production process involves combining egg albumin or yolk with stabilizers and binders, processing the mixture under optimized conditions, and forming it into cubes. These cubes are then dried to ensure a long shelf life and packed in metalized pouches to maintain their quality. When rehydrated, the shelf-stable cubes offer a taste experience similar to paneer. This versatility allows them to be used in a wide range of dishes, from curries and stir-fries to sandwiches and salads.

BENEFITS:

- The long shelf life and easy preparation make these cubes a convenient option for consumers.
- Eggs are a rich source of protein and other essential nutrients, making these cubes a healthy addition to any diet.
- The growing demand for convenient and nutritious food products presents a significant market opportunity for these innovative cubes.

RAW MATERIAL:

Chicken egg, binders, spices, salt, etc.

PLANTS AND MACHINERY:

Hobart Mixer, Autoclave, Cubing machine, tray drier, hand sealing machine, etc.

PRODUCTION CAPACITY:

The installed capacity 100Kg finished product (Yolk or Albumin cubes)/ day and working for 300 days in a year.

PROJECT COST:

- The estimated total cost for the project is Rs 31,15,000/-
- Land and land development, which is estimated at ₹125,000 for an area of 500 m².
- Building and civil construction costs is ₹600,000 for a 150 m².
- The cost of plant and machinery is estimated at ₹18,50,000/-
- Miscellaneous fixed assets contribute ₹50,000/-

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SHELF STABLE EGG CRUNCHY BITES

INTRODUCTION:

Shelf-stable egg crunchy bites are an innovative snack product developed. This unique product is made using liquid eggs, consisting of both albumin and yolk, blended with natural binders and approved food additives. The mixture undergoes a meticulous process, where it is shaped into pieces, dried under optimized conditions, and finally roasted to achieve a crunchy texture. These bites are then coated with a balanced mix of spices to enhance flavor and are packed in metallized pouches, which ensure the product's long shelf life. The result is a savory, nutritious snack that can be consumed on the go, making it an ideal alternative for health-conscious consumers seeking protein-rich options. The global snack industry is experiencing rapid growth due to evolving consumer preferences for healthy, convenient, and protein-rich products. The increasing awareness of egg-based snacks as a nutritious and accessible food source is driving demand in both domestic and international markets.

BENEFITS:

- Egg crunchy bites are a nutritious, high-protein snack made from eggs.
- The snack is shelf-stable and does not require refrigeration.
- Suitable for diverse environments, including areas with limited cold storage.
- The long shelf life helps reduce food waste, aligning with sustainability goals.
- Convenient, ready-to-eat snack option for health-conscious consumers.

RAW MATERIAL:

Raw materials used are chicken egg, garlic, binders, etc.

PLANTS AND MACHINERY:

Planetary mixer, autoclave, generator machine, cooling table, cubing/ cutting machine, tray drier/ cross flow drier, semi-automatic leg/ hand operated impulse sealer, etc. PRODUCTION CAPACITY: The installed capacity 100Kg egg crunchy bites/ shift/ day and working for 300 days in a year.

PROJECT COST:

- The estimated total cost for the model project is Rs 42,49,000/-
- Land and land development, which is estimated at ₹125,000 for an area of 500 m².
- Building and civil construction costs is ₹1,200,000 for a 150 m².
- The cost of plant and machinery is estimated at ₹23,39,000/-
- Miscellaneous fixed assets contribute ₹50,000.

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SPICE OLEORESINS

INTRODUCTION:

Spice oleoresins are the most concentrated viscous liquid form of the spice and reproduce the character of the respective spice and spice oil fully. They are obtained by the solvent extraction of the powdered dried spices with subsequent removal of solvent. The oleoresins are used mainly as a flavouring agent in the food processing industry. They are more economical to use, are easier to control for quality and are cleaner than the equivalent ground spices. Their distinct advantage over the equivalent essential oils is that they are more stable when heated. The main products in a spice oleoresin plant are oleoresins of chilli, pepper, ginger, turmeric and marigold.

The co-products are corresponding spice oils, which are widely used in food and pharmaceutical industries. Spent meals of spice powders after oleoresin extraction are by-products and are devoid of essential oils, pungent principles, fixed oils and resinous matter for which the spices are valued. This may be considered for incorporation in animal feed formulations, as spent meal is rich in carbohydrate and cellulose.

MARKET POTENTIAL:

India is one of the largest producer and exporter of spice oleoresins. In spite of this domestic market for this product is virtually nil/very limited. The main spice oleoresins/oils produced and exported from India are pepper, ginger, cardamom, chilly, turmeric etc. USA, Canada and West Europe are the major markets to where about 80% of the total production of India is exported. As per the International survey, the estimated demand of spice oleoresins except paprika is about 1800 MT.

India has a share of roughly 50% in this. At present there are about 12 manufacturing and exporting units in India. They are not utilizing their full capacity as the utilisation mainly depends upon export demand. In this context, it would be advisable to go in for market tie-ups to ensure sales and to get a share in the existing and future demands for various items. In global terms, consumption of oleoresins rose fastest during the period 1965-75, slowed down considerably thereafter and today continues to rise slowly but steadily.

RAW MATERIALS:

Dry chillies, pepper, turmeric, ginger etc.. are available in large quantity from the state of Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamilnadu.

PRINCIPAL EQUIPMENT:

Pulverizes, steam distillation unit, driers, batch wise solvent extraction units, miscella collection tanks, solvent distillation unit, pulverization unit etc. Auxiliary equipments: boiler, weighing scales, solvent storage tank etc.

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SPICE OLEORESINS

PROCESS IN BRIEF:

Spice oleoresin is the concentrated viscous liquid form of the spice and reproduces the character of respective spice fully. It is obtained by the solvent extraction of the powdered dried spice with subsequent removal of solvent. Process is simple and versatile without causing loss of aroma and flavour. The finished product provides excellent quality with good yields. The volatile oil is distilled out from the ground spices.

The wet powdered spice/s free from volatiles are dried and then extracted with suitable solvent systems to remove the fixed oil and resinous/gummy materials. The solvent is removed from the miscella, dried and the extract is mixed with the dry spice oil to the required level and the product is suitably packed in containers.

CAPACITY:

To process 2 Tons raw materials / day (pepper/ginger/chilli/turmeric) Working – 300 days / annum

Estimate of for a model unit Project cost Rs. '000

- a. Land and land development – 5000 Sq. M - 150.00
- b. Building and civil construction - 600 Sq. M - 1800.00
- c. Plant and machinery - 12500.00
- d. Auxiliary items - 1250.00
- e. Other Fixed Assets - 800.00
- f. Pre-operative and Preliminary expense - 1500.00
- g. Working capital margin - 2500.00
- h. Total project cost - 20500.00

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SUGARCANE DE-SKINNING MACHINE

INTRODUCTION:

India, despite being a leading sugar producer and the second-largest sugarcane producer globally, relies on outdated technologies, leading to production fluctuations. Mini sugar plants, or Khandsari units, which could benefit from modern upgrades, face challenges such as fermented smells during storage due to waxes on sugarcane skin. The traditional de-skinning methods are labor-intensive and inefficient. To address this problem, there is a proposal to develop a prototype semi-commercial unit designed specifically for de-skinning sugarcane. This machine aims to enhance the processing efficiency by removing the waxy outer layer of the sugarcane, which will, in turn, reduce the fermented smell and improve overall product quality.

BENEFITS:

- Improved hygienic conditions and cleaner products.
- Enhanced quality of sugarcane juice and jaggery.
- Increased efficiency and reduced labor intensity.
- Higher product quality leading to better market prices for rural producers.
- Positive impact on urban industries producing nutritious beverages.

RAW MATERIAL:

MS. Angles, SS sheets, Bearings, Motor, Pulley.

PRODUCTION CAPACITY:

Machine: 125 kg/ hour, 0.75 Kw Suggested economic capacity: 1 Tons/ day Working: 8 hour shift
20 machines/ year working for 10 months

PROJECT COST:

- The cost for land and land development, covering 240 square meters, is estimated at ₹60,000.
- The expense for building and civil works, for a 120 square meter area, totals ₹480,000.
- The investment required for plant and machinery amounts to ₹850,000.
- Miscellaneous fixed assets, including various essential tools and equipment, are expected to cost ₹50,000.
- Pre-operative expenses, covering preliminary costs before project commencement, are estimated at ₹200,000.
- The total fixed capital for the project is ₹16,40,000/-

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BOTTLING OF SUGARCANE JUICE

INTRODUCTION:

India holds, perhaps a second position in the production of sugarcane, next only to Brazil. All the sugarcane produced in the country is not lifted by the sugar mills, leaving almost one third for use in the production of gur and khandsari. Again, there is not much market potential for these products. This necessitates finding ways and means of using sugarcane for other purpose. It is in this context, a process has been developed for the preservation of sugarcane juice as a bottled beverage. The beverage, being natural, possesses a lot of medicinal and curative properties in the treatment of several ailments. The beverage is calorific and nutritive.



MARKET POTENTIAL:

With the ever-increasing demand for soft beverages and fruit-based beverages, both carbonated and still are available in the market in plenty. India offers itself a potential market for these products. Since, India produces sugarcane in plenty there is scope for diversification of the uses of sugarcane in various products.

RAW-MATERIAL: Sugarcane containing 50-55% juice

PROCESS: Sugarcane → Cleaning → Soaking → Washing → Crushing → Filtering → Homogenization → Bottling → Pasteurization → Cooling → Storage

PLANT & MACHINERY

Crusher, filter press, Bottle filling machine, Sealing machine, Hot water generator, Demineralizer, Heating kettles, Material handling equipment, High pressure jet washer, soaking tanks

FINANCIAL ASPECTS & PRODUCTION CAPACITY:

Project Cost (estimate) in Lakhs	
Total Project cost	40.0
Note: Please note the above figures are tentative and needs updating	
Production Capacity (estimate)	
Capacity of raw material processing	2.5 Tons
Finished Product per day	1000 Liters of juice
Working days	250 days
Shelf Life	3 months

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SUGAR - FREE BREAD

INTRODUCTION:

Sugar free sweet bread is a novel therapeutic product especially suited for the diabetic patients. The sugar free sweet bread prepared using this technology possesses crust and crumb characteristics and sweetness comparable to that of normal sweet bread making it highly acceptable to the customers. As no such therapeutic products are currently being sold over the counter, there is very good scope for marketing of such products in the country.

MARKET POTENTIAL:

Tremendous market potential exists for this therapeutic product, as no such product with quality characteristics similar to normal sweet bread is available in bakeries.

RAW MATERIAL:

Raw materials required are Wheat flour, yeast, salt, fat, sugar, ascorbic acid water etc.

PROCESS:

Cleaning of Ingredients → Weighing → Fermenting → Knock
Back → Scaling → Moulding → baking → cooling → slicing → Packing

EQUIPMENTS:

Weighing machine, Mixer, Baking pans, Baking oven slicing machine and cooling racks could be used for the preparation of sugar free sweet bread.

PROJECT ECONOMICS:

- Capacity of production : 500 breads / day
- Building (50 M2) : Rented
- Cost of plant and equipment's: Rs.7 Lakhs
- Working Capital (margin) : Rs.0.25 Lakh
- Total project cost : Rs.7.25 Lakhs

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SUGAR FREE BISCUITS

INTRODUCTION:

Sugar-free biscuits are made from soft dough based on the creaming method and processed in rotary moulder. The biscuits are baked in a continuous tunnel type oven as followed for sweet "gluco" type biscuits. Ordinary "gluco" type biscuits contain about 450 calories and contain 20 - 25% sugar. Sugar-free biscuits do not contain any added sugar. This biscuits can be stored at ambient condition packed in polypropylene pouches/metallized polyester/biaxial oriented polypropylene for more than four months without changes in the texture, flavour and eating quality.

RAW MATERIAL:

Wheat flour & skimmed milk powder

PROCESS:

Blending → Ingredients → creaming → mixing → dough mixing → dough resting → molding → baking → cooling → packing

PLANT & EQUIPMENTS:

Mixer, Sheeter, Laminator, Rotary cutter, baking oven, cooling belt and Packaging machine etc.

COST ESTIMATE FOR A MODEL PROJECT (Rs. '000)

- Land & Land development (500 m²) : 144.00
- Building and civil works (267m²) : 972.00
- Plant and machinery : 1655.00

PRODUCTION CAPACITY- (estimate)

- Suggested economic capacity : 569 kg sugar free biscuits/shift
- Working : 1 shifts/day; 300 working day/ annum
- Installed capacity : 170 tonnes/annum
- Optimum capacity utilization : 70%

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SUGAR - FREE CAKE RUSK

INTRODUCTION:

Sugar free cake rusk is a novel therapeutic product especially suited for the diabetic patients. There is a good scope for the marketing of therapeutic products as it is not being produced in the country.

MARKET:

As the health awareness of the people is on the increase, production of sugar free cake rusk specially intended for diabetic subjects will definitely boost the sales and thereby increase the growth of the industry.

RAW MATERIALS:

Wheat flour, Eggs, Oil, Salt, Baking powder and Cake gel

PROCESS

Ingredients → Sifting of dry ingredients → Mixing → Addition of flour, baking powder, salt, oil & essence → Mixing → Scaling of batter into moulds → Baking → Cooling → Slicing → Re-baking → Cooling → Packing

PLANT AND MACHINERY:

Weighing machine, Mixer, Baking pans, Baking oven slicing machine and cooling racks could be used for the preparation of sugar free cake rusk.

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SUGAR - FREE CUP CAKE

INTRODUCTION:

With the increasing health awareness in the people, there is tremendous scope for the market of the health bakery products. Presently, 2.5% of the urban population and 1.5% of the rural population suffer from diabetes. Sugar free cup cake is a novel product developed to suit the needs of diabetic population. Sugar free cake is a therapeutic bakery product intended for the use of diabetic subjects. Currently, there are over 25 million people in India who are afflicted with diabetes. Presently, no such sugar free bakery products are being produced in the country using sorbitol to cater to the needs of diabetic patients. Hence, sugar free cake is a novel product with good potential for the growth of industry. Product is moist, uniform in texture and spongy. Sugar free cup-cakes can be wrapped or packed in clean waxed paper, greaseproof polyethylene or any other suitable wrapper or tins.

RAW MATERIALS

Wheat flour, Eggs, Oil, Baking powder, Calcium propionate, Cake gel and Acetic acid

PROCESS

Ingredients → Sifting of dry ingredients → Mixing → Addition of flour, baking power & calcium propionate → Mixing → Addition of other ingredients → Scaling of batter into moulds → Baking → Cooling → Packing

PLANT AND MACHINERY:

Weighing machine, Mixer, Baking pans, Baking oven and cooling racks could be used for the preparation of sugar free cup cake

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SUGAR - FREE RUSK

INTRODUCTION:

Sugar free rusk is a novel therapeutic product specially suited for the diabetic patients. The shelf life of the product is about 3 months.

MARKET:

The production of such sugar free products will certainly benefit people suffering from diabetics. The therapeutic bakery products sector need to be exploited and there is a good growth potential for the industries which start the production of therapeutic bakery products in addition to the manufacture of variety products.

RAW MATERIALS:

Wheat flour, yeast, salt, milk powder, etc.

PLANT AND MACHINERY:

Weighing machine, Mixer, Baking pans, Baking oven slicing machine and cooling racks could be used for the preparation of sugar free rusk.

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TOMATO INSTANT PRODUCTS

INTRODUCTION:

Tomato is produced in large quantities throughout the year in different parts of the country. Tomato with its unique flavor and red color imparts characteristic flavor to the different food preparations. Tomato production increases during the months of winter and early summer seasons. The excess production results in glut there by resulting in price drop and less returns to the farmers. Fresh tomatoes are perishable with a short shelf life at ambient temperature and need to be transported from fields to marketing yards immediately after the harvest. Tomatoes are used in various traditional food preparations. The technology for the tomato instant products facilitates the production of tomato crush, tomato rasam mix and tomato rice bath mix. These products are ready to use mixes for the preparation of different culinary products.

BENEFITS:

- Ready-to-use mixes save time and effort in meal preparation, making them ideal for busy households.
- Processed tomato products have a longer shelf life compared to fresh tomatoes, reducing food waste and allowing for better inventory management.
- Tomatoes are rich in vitamins, minerals, and antioxidants, providing health benefits that support overall well-being.
- The products can be used in various recipes, enhancing the flavor of dishes while simplifying the cooking process.
- Processed products ensure a consistent taste and quality, regardless of the season or availability of fresh tomatoes.
- The production of these products can help stabilize prices for farmers during periods of glut, providing them with a sustainable source of income.

RAW MATERIAL:

Tomatoes: Bright red, firm, ripe tomatoes of any variety. Spices: Onion, Garlic, Red chili powder, Pepper Turmeric.

EQUIPMENT: Fruit washer, Fruit pulper, SS Steam jacketed kettles, bottle washing machine, boiler, SS preparation tables, weighing balance, utilities etc.

PROJECT COST:

- Land & Land Development (500 M²): ₹ 25,00,000/-
- Building & Civil Construction (300 M²): ₹ 45,00,000/-
- Plant and Machinery: ₹ 35,00,000/-
- Other Fixed Assets: ₹ 50,000/-
- Pre-operative Expenses: ₹ 7,09,000/-
- Total Fixed Capital: ₹ 1,15,90,000/-
- Working Capital Margin: ₹ 5,11,000/-
- Total Project Cost: ₹ 1,21,01,000/-

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TOMATO PRODUCTS

INTRODUCTION:

Tomato is one of the most versatile fruit. Tomatoes are grown throughout India. The surplus production during seasons could be suitably processed and preserved in bottles and cans in the form of tomato juice, paste or puree, ketchup/sauce, tomato chutney and tomato pickles which are popular ready-to-serve products relished very much in local as well as export markets. The production of tomato products, though negligible has been showing arising trend during the last few years. From a mere 2,800 MT in 1976, the production shot up to around 30000 MT per annum. The product mix of which includes besides tomato puree/paste, ketchup, sauces and soups. The products are mostly utilized in the domestic market. With fast-food sector expanding, the demand for tomato ketchup and sauces is estimated to have expanded as indicated by the trend. Service sectors like flight catering and hospital catering, armed rations etc. are the potential markets for tomato products.

RAW MATERIALS

The main raw material is tomato and only sound fully ripe tomatoes, Pusa rubi or similar variety is to be used. Production of tomatoes in India is of the order of 8.2 million metric MT out of which processing varieties are 2.0 million metric MT. Tomatoes are grown almost round the year. Other raw materials are also easily available. Tomato concentrate can also be converted as juice, Ketchup/sauce, chutney etc. Other raw material needed are sugar, salt, acetic acid (glacial), onion, garlic, sodium benzoate and the spice powder mix consist of clove, cinnamon, black pepper, cardamom, cumin, mace, red Chilli powder, etc.

The required packaging materials are all available easily from Bangalore, Mumbai, Calcutta, Chennai, etc. Except tomato juice all the other products are packed and marketed in bottles. Tomato juice can also be bottled and marketed as RTS juice (spiced/salted & plain/salted). Tomato juice is packed in OTS cans (425 and 800 ml). Raw materials includes: Tomato sugar, salt sodium benzoate and spice powder pepper, cardamom, cumin

PLANT PARAMETERS

Capacity - 750 Kg /day
Working days/Year - 300

MANPOWER

Managerial - 1
Skilled - 3
Unskilled - 8

UTILITIES

Boiler Platform, weighing scale,
Al./S.S topped, working tables, vessels,
knives, etc

PLANT & MACHINERY

Pulper, SS steam jacketed, kettles, fruit mill, spice, grinder, crown corking Machine, bottle washing, machine, insulated tank, retort, etc

ECONOMICS

Total project cost Approx. 25 Lakh

(The above figures are for budgetary purpose only and subject to change in subsequent offers.)

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TURMERIC POWDER PROCESSING TECHNOLOGY

INTRODUCTION:

Indian turmeric is considered to be the best in the world market because of its high curcumin content. Turmeric is an important tropical spice primarily valued for its color, aroma, antioxidant property and powder could be used in food, perfumery and pharmaceutical industries. This ground spice is used as a condiment. It is an essential ingredient of curry powders and is extensively used in traditional medicines. Traditional Indian medicine claims the use of its powder against biliary disorders, anorexia, coryza, and cough. The process developed reduces the extensive processing steps involved in making turmeric powder especially the heat treatment of rhizomes; enhance the extractability of high colour and flavor of constituents. The newer technology directly converts the farm fresh wet turmeric rhizomes into dry powder with qualitative as well as quantitative improvement in turmeric powder.

Market Potential

Turmeric is mainly used as a spice in Indian foods and has medicinal value. The rhizomes of the this plant, when dried and ground, provide a yellow and flavoring powder, used for centuries as a natural coloring agent in food, cosmetics and textiles, and also as insect repellent. Recently, it has been valued worldwide as a functional food, due to its health promoting properties. Additionally, anti-cancer and antiviral activities of turmeric may also increase its demand from pharmaceutical industries. The increasing demand for natural product as food additive makes turmeric an ideal natural food colorant. Due to its various medicinal, biological, pharmacological activities is high on demand the natural turmeric high market potential, Raw-material Fresh turmeric rhizome

Plant & Machinery

Weighing machine, Weigh Bridge, Slicing machine, Drier, Grinding mill, Shifter, Bag sealer, High pressure washer, Inspection conveyer and Miscellaneous



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TURMERIC POWDER PROCESSING TECHNOLOGY

PROCESS

Many processing steps are involved in processing of turmeric powder by traditional methods. The traditional methods comprises boiling, drying and polishing to obtain the dry rhizomes followed by grinding to turmeric powder. The heat treatment influences the colour and the aroma of the final product. Excess thermal treatment (cooking) spoils the colour of the final product while under-cooking renders the dried product brittle. The new process technology developed reduces processing steps especially the heat treatment of rhizomes; enhance the extractability of high colour and flavor of constituents. The processing stages include: Grading or separation of fresh turmeric rhizomes, Slicer or dicer stage to get turmeric slices, drying and powdering. Downstream processing time for production of hygienic turmeric powder starting from freshly harvested turmeric rhizomes is very low (within 24 hrs) compared to traditional method which takes around 25-30 days.

SALIENT FEATURES

- Direct conversion of farm fresh turmeric rhizomes into dry powder without using any chemical and preservative.
- The process bypasses the turmeric boiling, open drying and polishing steps of traditional turmeric processing.
- Curtails down the processing period from 25-30 days to One day.
- Recovery of turmeric powder is more than 20% without losing its colour and aroma.
- Recovery of curcumin, an active ingredient is about double than in the traditional boiling/cooking method.
- Higher curcumin and volatile oil content in the finished product.

FINANCIAL ASPECTS & PRODUCTION CAPACITY

Project Cost (estimate) in Rs. '000	
1 Land & Land development (600 m ²)	600.00
2 Building & civil construction (400 m ²)	1600.00
3 Plant and machinery/Auxiliary equipment	8685.00
4 Miscellaneous fixed assets	50.00
5 Pre-operative expenses	650.00
Total fixed capital	11585.00
Working capital margin	680.00
Total Project cost	12265.00
Note: Please note the above figures are tentative and needs updating	
Production Capacity (estimate)	
Suggested Economic Capacity	2000 kg/shift/day (fresh rhizome)
Working days / annum	120 working days
Optimum utilization capacity	70%

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WATER SOLUBLE TURMERIC COLOURANT (ODOURLESS) FORMULATION (WTCF)

INTRODUCTION:

Curcumin enriched colourant (CEC) is prepared from spent turmeric oleoresin, a disposable industrial waste also known as Curcumin –Removed Turmeric Oleoresin (CRTO) by employing a suitable extraction procedure to separate the turmeric oil. The CEC is then converted to a water soluble formulation. This odourless and water soluble formulation can be used as a natural colourant to foods to make them acceptable, recognizable and appealing.

MARKET POTENTIAL:

The potential use of natural colours is mainly as natural food colourant to replace the synthetic colours. Apart from this they find applications as nutraceutical and pharmaceutical formulations.

PROCESS:

The steps involved in the production of WTCF are as follows:

- CRTO is refined to get rid of the turmeric oil
- The colour fraction suitably processed and blended to get the formulation of desired strength

PLANT & MACHINERY

The principal plant and machinery includes process vat, pressure filter, distillation unit, blending units, bottling unit etc. The auxiliary equipments include boiler, electricity generator, weighing scales, quality control laboratory facilities, effluent treatment system etc.

PLANT PARAMETERS:

- Capacity Turmeric oil - 72 Kg/Shift
- Capacity WTCF - 396 Kg/Shift
- No. of shifts / day - 1
- Working days/Year - 300
- Covered Area, m² - 1000

MANPOWER

Managerial - 1
Skilled - 3
Unskilled - 6

UTILITIES

Power Water

PLANT & MACHINERY: pressure filter, distillation unit, blending units, bottling unit boiler, electricity generator, weighing scales, quality control laboratory facilities, effluent treatment

ECONOMICS:

Total Project Cost Approx. 80 Lakhs.

(The above figures are for budgetary purpose only and subject to change in subsequent offers.)

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READY-TO-EAT MALTED WEANING FOOD BASED ON MULTICEREALS

INTRODUCTION:

Weaning food is a semi-solid food given to an infant in an age group of 6 months to 2-3 years. Weaning foods are generally texture modifications of adult foods to make them easily digestible and promote healthy growth of a child. Wheat and Ragi exhibit excellent malting characteristics, while rice is known for easy digestibility. Malting all these three cereals and combining them uniquely, improves both the taste and nutritional quality of the end product. Weaning foods based on malted cereals are still scanty in the present market. By supplementing malted cereals with malted legumes, the protein content and quality are significantly improved, providing a rich source of essential proteins critical for the child's growth and muscle development. Additionally, the combination of malted grains and legumes offers a complete nutrient profile, ensuring the infant receives the right balance of carbohydrates, proteins, and micronutrients for optimal development.

BENEFITS:

- The malting process breaks down complex starches, making the food easier on the infant's digestive system.
- It provides essential vitamins, minerals, and proteins, supporting physical and cognitive development.
- As a ready-to-eat product, it offers ease of preparation for busy parents. □ Promotes Healthy Weight Gain.

RAW MATERIAL:

Paddy, wheat, Ragi green gram, milk powder etc.

EPUIPMENT:

Destoner, steeping tanks, Drier, Huller, Aspirator, pulveriser, drum drier, boiler, sifter, ribbon mixer.

PRODUCTION CAPACITY:

- Daily production: 500 kg finished product/day/Shift
- Working: 300 days

PROJECT COST:

- Land & land development: ₹ 5,00,000/-
- Building & civil construction: ₹ 18,75,000/-
- Plant and machinery: ₹ 64,24,000/-
- Miscellaneous fixed assets: ₹ 1,00,000/-
- Pre-operative expenses: ₹ 3,50,000/-
- Total fixed capital: ₹ 69,48,000/-
- Working capital margin: ₹ 12,74,000/-
- Total project cost: ₹ 12,023,000/-

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BIODEGRADABLE TABLEWARE

INTRODUCTION:

Plastics, non-biodegradable by nature, persist in soil, causing erosion, water pollution, and landfill issues, harming aquatic life. Many Western nations partially ban single-use plastics (SUP), echoed in India's 2019 Ban on Single-Use Plastic Bill. Indian states follow suit, curbing SUP production. With 60% of Indians in agriculture, agro-waste abounds, posing air pollution risks when burned. Yet, these by-products offer a solution. Rice husks, straw, fruit peels, and more can be utilized. Rich in cellulose and lignin, agro-waste proves promising for biodegradable tableware. Catering, from railways to social events, could benefit, mitigating health and environmental hazards posed by waste accumulation.

SALIENT FEATURES:

- Less number of unit operations
- Easy to set-up production unit
- Minimum production/recurring cost
- Eco-friendly production with less effluents
- 100% biodegradable product
- Potential market in various day-to-day applications in food and allied sectors such asin Railway stations, Catering Services, Airports, inflight services, Restaurants and hospitals etc.
- Raw materials includes Rice & Wheat waste (Straw, bran, Husk, Flakes), Sugar cane Bagasse, Banana pseudo stem, Apple tree prunes, Water hyacinth, Tea prunes & waste, Palm leaves, plant fibers, Eucalyptus Prunes, Pineapple leaves & peels, Coconut waste, coconut leaf, fruits and vegetable peels), Sea food waste.
- Products developed such as Plates, cups for Ice cream cups, Jam cups, Serving Bowls, Trays and serving boards, Spoons, Forks, Straws, knife, Chopsticks, Coffee/Tea mugs



TECHNO-ECONOMICS (TENTATIVE):

1. Single use Tableware with only plant material - Hot Press Process,

*Machinery : Manual (around 5000 samples per day): 60 lakhs, Semi-automatic (around 7000 samples per day): 60-70 lakhs, Automatic (around 12000 samples per day): 100 -120 Lakhs

*Cost of one plate Rs.2.0/-, Cost of one plate with oil coating Rs. 2.30 to 2.50/-

2. Reusable table ware – Injection moulding Process

*Machinery → 30 -35 Lakhs,

*Cost of one container → Rs.12-14/-

Conditions applicable: The costing is dependents upon the selected raw materials & binders, type of Process and product type.

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ECO-FRIENDLY AND BIODEGRADABLE COIR FILTERS

INTRODUCTION:

Coir filters are a sustainable and environmentally beneficial filtration or separation or drainage option. These filters, made from the fibrous husks of coconuts, provide a natural alternative to conventional synthetic filter materials which causes the generation of hazardous micro and nano plastics (MNPs). With growing concerns about environmental sustainability and the need to reduce dependency on non-biodegradable materials, coir filters have gained popularity for their efficiency and eco-friendliness. Coir filters use the natural qualities of coconut husks, such as their high porosity and filtration effectiveness, to give a novel solution for various applications, including water filtering, agricultural mulch, and wastewater management. As industry and consumers value sustainability, the need for coir filters grows, fuelling innovation and encouraging a greener approach to filtration solutions. This technology developed offers process know-how for fabricating thinner, biodegradable coir filters using coir fiber hot-pressed with a bio-based polymer binder. The combination of the bio-based resin and the coir was done using pre-conditioning in a calendaring or hot-pressing unit.



SALIENT FEATURES:

- Simplified operations
- Easy setup of the manufacturing plant
- No Effluents
- Less wastage (Coir pith powder) which can be used as soil alternatives/fertilizer.
- Contributes to circular economy, especially in coconut farming regions (rural sectors)
- Minimise environmental pollution, leading to cleaner and healthier communities.
- Raw materials includes: Coir needle felt and Biodegradable bio-binder

TECHNO-ECONOMICS (TENTATIVE):

- Machinery cost approx - Rs. 35,00,000 (min) to Rs. 50,00,000 (max)
- Capacity about 250 to 330 sheets per single shift (variable)
- Cost of filter sheet (50 cm x 50 cm): - Rs. 224 (min) to Rs. 337 (max)

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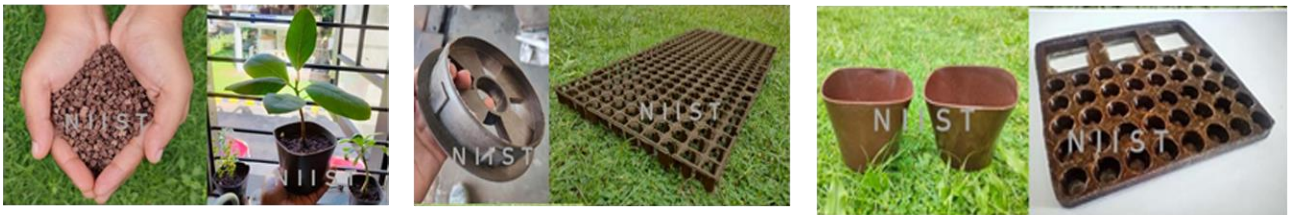
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INJECTION MOLDABLE, BIODEGRADABLE COIR COMPOSITE PELLETS

INTRODUCTION:

Conventional plastics can turn into micro/nano-plastics (MNPs) cause environmental pollution. Therefore, scalable, affordable, biodegradable alternatives for large volume manufacturing is in high demand. Coir fibers possess excellent mechanical properties, thermal properties and insulation properties. This is a cost-effective technology to produce scalable, biodegradable coir pellets by harnessing agricultural by-products such as coconut husks. Injection moldable 100% biodegradable coir composite pellets are new material made from coir, the fibrous husk of coconuts blended with the bio-degradable polymer matrix. These pellets can be injection molded into a wide variety of shapes and products, making them a promising alternative to conventional plastics. These pellets are sustainable, versatile, durable and compostable. Some of the potential applications are agricultural products, garden products, construction materials, packaging materials, healthcare products and even complex structures like geo-composites etc. TRL – 5



SALIENT FEATURES:

- Reduce exposure to harmful chemicals, promoting safer workplaces
- No Effluents
- Minimise pollution, leading to cleaner and healthier communities
- Simple operations and scalable process
- Easily adaptable to the existing pellet-making machinery or injection molding machines
- Easy setup of the new manufacturing units
- Less wastage (Coir pith powder) which can be used as soil alternatives/fertilizer.

TECHNO-ECONOMICS (TENTATIVE):

a) Small-Scale (Production up to 50 kg per hour)

- Machinery (up to 50 kg per hour) : Rs. 63,75,000 to Rs 86,00,000
- Cost of pellets for simple shapes (per kg): Rs. 48 to 178
- Cost of pellets for complex shapes (per kg): Rs.172 to 203

b) Large-Scale (Production up to 150 kg per hour)

- Machinery (upto 100 kg per hour): Rs. 1,80,00,000 to Rs. 2,25,00,000
- Cost of pellets for simple shapes (per kg): Rs. 142 to Rs. 171
- Cost of pellets for complex shapes (per kg): Rs. 166 to Rs. 196

*Based on area and demand - approx

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PLANT BASED MEAT ANALOGS

INTRODUCTION:

In the last five decades, the consumption of animal-based foods has tripled, propelling the expansion of industrialized animal farming. This method of meat production is both inefficient, converting fewer calories, and hazardous due to antibiotic misuse. It necessitates substantial resources and is the primary source of greenhouse gas emissions, exacerbating climate change and disrupting global food production. The UN climate panel urges a significant reduction in animal meat consumption to mitigate climate change and antibiotic resistance. To facilitate this shift, consumers require sustainable plant-based meat alternatives that match animal meat's nutritional and sensory qualities. High-moisture meat analogs (HMMA) created through high moisture extrusion cooking (HMEC) offer superior organoleptic properties compared to traditional texturized vegetable proteins. However, the scarcity of technology and equipment for HMMA production domestically discourages sector investment, resulting in expensive products. To address the problem, a technology has been developed an alternative method for the production of plant-based high moisture extrudates using a twin screw extruder and a custom-designed cooling die. Ingredients are subjected to the pre-treatment step and then fed into a twin screw extruder with the required solid and moisture content. Custom-made, indigenous cooling die with multiple temperature control cooling chambers helps in the texturization of the proteins in an anisotropic fashion within the extrudate matrix. Overall, the technology reduces the initial capital costs involved in setting up the processing line and encourages the growth of the plant based meat sector.

SALIENT FEATURES:

- Improved & simple process
- Indigenous machinery
- Limited additives
- Texture similar to meat
- Industrially scalable process
- By-product utilization and Value addition
- Low carbon foot print food product
- Reduced zoonotic and food borne disease
- Raw material includes: Protein isolates, Native and modified starch, Permitted food additives and Enzymes



TECHNO-ECONOMICS (TENTATIVE):

- Machinery (500 kg capacity): Rs. 2.5 – Rs.3.0 Crores (Indigenous) and Rs. 6.0 – Rs. 8.0 Crores (Imported)
- Product cost (at the end of production line) Rs.350-450/kg (variable)
- * - approximate cost – might vary with supplier and market conditions

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PROCESS FOR MAKING COLOURED WAX CRAYONS

INTRODUCTION:

Coloured wax crayons are popularly used in schools especially by elementary students for drawing or colouring sketch books. The product is also popular amongst artists and drawing enthusiasts. Improved plas-wax crayons can be sharpened with normal pencil sharpener and the markings can be erased with a pencil eraser.



SALIENT FEATURES:

- Eco-friendly process
- No sophisticated equipments required
- No highly skilled manpower required
- Low capital investment
- Quick return on investment

IMPORTANCE OF THE TECHNOLOGY

One of the main reasons for the exponential growth of stationery industry is the rise of the educational sector. The demand for stationery at schools has risen resulting in stationery retailers raking in good profits. Many schools provide stationery to students from their in-house stationery shops. Coloured wax crayons are often used by school students for drawing/art. In recent times, focus has been given on quality and affordable product.

LEVEL/SCALE OF DEVELOPMENT

The technology can be licensed/transferred to interested parties. Cottage scale (3000 crayons/day).

TECHNO-ECONOMICS (TENTATIVE):

Plant size: 250 boxes/day (12 crayons/box) and 300 working days/annum.

Capital investment (plant & equipment) cost: Rs.3.50 lakhs (approx).

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PROCESS FOR MAKING LOW DUST CHALK PENCIL

INTRODUCTION:

Chalk pencils are used for writing on blackboard in all the educational institution right from the pre primary school to the university. It is an essential educational aid having substantial demand in the domestic as well as international market. Presently the demand is met through conventional chalk pencils which release dust particles while writing on black board. Moreover, as they are soft and brittle in nature, there is a major problem of breakage during transportation as well as writing on the board. Patented in India (Patent No.185578)

SALIENT FEATURES:

- Generates low dust
- Less brittle thereby reducing wastage
- Bright marking and more mileage
- Less damage in transportation
- Eco-friendly process
- No sophisticated equipments required
- No skilled manpower required
- Low capital investment



IMPORTANCE OF THE TECHNOLOGY

Chalk pencil is a basic stationery item for writing purpose. The production of chalk pencils in India are mostly from unorganized sector with large number of manufacturing units of small and medium level engaged in the production and export. Over the course of time, improved products like dustless chalk pencils have gained importance because of its added advantage and demand in the market.

LEVEL/SCALE OF DEVELOPMENT

The technology can be licensed/transferred to interested parties. Cottage scale (15000 chalk pencils/day).

TECHNO-ECONOMICS (TENTATIVE):

Plant size: 250 boxes/day (60 chalk pencils/box) and 300 working days/annum.

Capital (plant and equipment) investment cost: Rs.2.00 lakh (approx).

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HERBAL LIPSTICKS WITH LIPCARE

INTRODUCTION:

Lipstick, a cosmetic product with enduring popularity, has been extensively used over the ages and continues to experience incredible demand. The manufacturing process is simple, cost-effective, and environmentally friendly. This product, enriched with natural herbals, serves as a remedy for lip healing, improving smoothness, and keeping the lips hydrated, resulting in supple and beautiful lips. Packed with vitamins and healthy ingredients, it helps alleviate hyperpigmentation, restores the lips' original color, acts as an antioxidant, repairs damaged and dry lips, and serves as a moisturizer for softening and smoothing the lips. Women can use it both as a cosmetic and remedial lip care product.



SALIENT FEATURES:

- The formulation is green, cost effective, easily available and environment friendly.
- No any hazardous chemicals and heavy metals.
- It can be used as a cosmetic as well as remedial lip care product by women.
- The product is loaded with vitamin rich and healthy ingredients.
- Manufacturing process is easy.

IMPORTANCE OF THE TECHNOLOGY

Lipstick Market was valued at US\$ 9.57 billion in 2021 and is projected to reach US\$ 14.68 billion by 2029, growing at a CAGR of 5.5% during the forecast period. Rising consciousness regarding personal grooming and appearance among young female consumers across the world is expected to be one of the key drivers. Furthermore, increasing purchasing power of the women population due to rising female workforce is expected to fuel the product's demand in the near future. So, the product has the prominent marketable price for the recent time.

APPLICATIONS/USES

The herbal lipstick with lip care is specifically aimed at individuals suffering from dry and chapped lips. It can both be used as a cosmetic as well as remedial lip care product.

TECHNO-ECONOMICS (TENTATIVE):

The technology can be licensed/transferred to interested parties. 2500 lipstick per day (4 gm).

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SOLID DEODORANT FRESHENER

INTRODUCTION:

Solid Deodorant Freshener, like its liquid counterpart, proves invaluable for cleaning various surfaces and floors while also serving as a versatile room/air freshener. Unlike common liquid deodorants, it overcomes drawbacks such as space-consuming transportation and leakage risks. The development of a solid dispersible freshener addresses these issues, utilizing easily available raw materials and a straightforward production process for practicality and efficiency.

SALIENT FEATURES:

- Use of eco- friendly raw materials
- Can be adopted as cottage scale technology in rural areas.
- No sophisticated machineries involved except for a Hydraulic Press (manual or automatic) with mould of required size and shape
- No highly skilled manpower is required
- No by-product generation
- Low cost investment



IMPORTANCE OF THE TECHNOLOGY

The surface cleaning market is booming, fueled by major companies' extensive promotion, boosting brand awareness. Household cleaning is dominated by surface cleaners like floor cleaner, specialized, and multipurpose cleaner. Versatile solid deodorant fresheners, appreciated for their dual use in cleaning and as pleasant room/car fresheners, are on the rise. This technology not only meets versatile cleaning needs but also holds promise for job creation and entrepreneurship, especially in the Northeast region..

LEVEL/SCALE OF DEVELOPMENT

The tablets can be dissolved in water and used for cleaning floors and surface cleaning of tiles, glass materials, etc. and also as a room/car freshener.

TECHNO-ECONOMICS (TENTATIVE):

- Small scale level (1200 Tablets/Day)
- Large scale level (10,000 Tablets/Day)
- Plant capacity: 1200 Tablets/Per Day or 10,000 Tablets/Per Day
- Capital investment (plant & machinery): Rs.5.00 lakhs (approx) for small scale
- Capital investment (plant & machinery): Rs.10.00 lakhs (approx) for large scale

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LIQUID DEODORANT CLEANER

INTRODUCTION:

Liquid deodorant cleaners are now extensively utilized for diverse purposes, such as cleaning floors, tiles, and polishing glass and ceramic articles. Widely adopted in nursing homes, hospitals, hotels, restaurants, private houses, seminar halls, and auditoriums as floor cleaners, these formulations are herbal-based, providing a pleasant fragrance while effectively cleaning surfaces. The development process involves easily accessible ingredients, ensuring simplicity and suitability for semi-skilled entrepreneurs and small-scale industries.

SALIENT FEATURES:

- Use of eco- friendly raw materials
- Can be adopted as cottage scale technology in rural areas.
- No sophisticated machineries involved
- No highly skilled labors required
- No by-product generation
- Low cost investment



IMPORTANCE OF THE TECHNOLOGY

The India Household Cleaning Market is expected to experience a significant growth rate of 22.74% in the next five years, according to the 2021 outlook. Floor cleaners take the lead in category revenues, closely followed by specialized and multi-purpose cleaners. Urban households are the primary target for surface cleaners, making them more popular in urban markets. The liquid deodorant cleaner is poised to capture the surface and floor cleaner market and holds substantial potential for the development of small and medium entrepreneurs due to its low capital investment.

LEVEL/SCALE OF DEVELOPMENT

The technology can be licensed/transferred to interested parties. Small scale level (200 L/Day).

TECHNO-ECONOMICS (TENTATIVE):

Plant capacity: 200 L/Day

Capital investment (plant & machinery): Rs.3.00 lakhs (approx)

Project capital cost will vary depending on site location and plant size.

The project-economics can be worked out as per location and client requirement.

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MOSQUITO REPELLENT INCENSE STICK

INTRODUCTION:

Throughout the ages, individuals in India have embraced the tradition of employing incense sticks during diverse religious and social events. These sticks are crafted by encasing incense paste around a bamboo stick through rolling or molding techniques. Apart from their religious significance, incense sticks are commonly utilized for their calming and psychological advantages. The formulation incorporates plant extracts and has proven to be highly effective in warding off mosquitoes. The technology involved is not capital-intensive, making it easily accessible for adoption by small and medium entrepreneurs, fostering income generation and entrepreneurship development..



SALIENT FEATURES:

- Effective for repelling mosquitoes
- Safe to use
- Can be used in indoor and outdoor conditions

IMPORTANCE OF THE TECHNOLOGY

Safe, eco-friendly and effective mosquito repellent products are basic home care products used by people on daily basis. Mosquito repellent spray is easy to handle, operate and fit for both indoor and outdoor use.

LEVEL/SCALE OF DEVELOPMENT

The technology can be licensed/transferred to interested MSMEs / industries / startups.

TECHNO-VALIDATION:

Found in abundance, mosquitoes thrive in warm and humid tropical areas, with India being a prime example. The country boasts a rich tradition of incorporating incense sticks into diverse religious and social events, indicating significant market potential for the product. Crafted from plant-derived sources, the formulation not only effectively repels mosquitoes but is also entirely safe for humans.

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PROCESS FOR MAKING HANDMADE PAPER

INTRODUCTION:

Handmade paper and boards have manifold uses in office stationery as file covers, file boards as well as in printing and packaging industries as invitation and visiting cards, lamp-shades, carry bags and a wide range of decorative items. This developed technology is a simple process for making handmade paper and boards from various materials such as natural fibres and waste papers. Apart from the conventional raw materials like rags and waste paper, a few other raw materials like water hyacinth, banana fibres, etc. can also be used depending on the availability in that locality. However, the process parameters will vary for each type of raw material.

SALIENT FEATURES:

- Utilisation of locally available bio-waste
- Eco-friendly process
- Products obtained are bio-degradable
- No skilled manpower required
- Low capital investment



IMPORTANCE OF THE TECHNOLOGY

According to the Khadi & Village Industries Commission, the handmade paper industry has huge potential to cater to the growing demand of paper products in environmentally sound manner. The last decade witnessed rapid growth in export as a number of Handmade Paper and paper products manufacturing units have become export oriented units and helped in increasing the foreign exchange of the country.

Though India is viewed as a potential country with maximum growth in the industry, there has been a phenomenal rise in the export of handmade paper and paper products especially to developed countries like US, Germany etc. over the past few decades. The industry can be vital for economy growth and generation of local entrepreneurs and local employment.

LEVEL/SCALE OF DEVELOPMENT

The technology can be licensed/transferred to interested MSMEs / industries / startups.

TECHNO-VALIDATION:

Approximate project cost for 200 Sheets/Day (size: 1x1 m): Rs.25.00 lakhs.

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LOW COST NON-WOOD HONEY BEE BOX

INTRODUCTION:

In beekeeping, honey bee box is one of the vital input required for keeping bee colony. The conventional honey bee box is made with wood, which is obtained from substantially large and selected tree- a precious environmental resources. The cost of honey bee box production is mainly depending on the raw materials cost i.e. wood and the wages of carpenter. Price of wood is accelerating and therefore, cost of honey bee box has exponentially increased. Further, the special skill requires to prepare wooden bee boxes is restricted to a few skilled person i.e. carpenter. Therefore, overall price of the bee boxes are high. In this circumstances, it is needed to look on alternate material, which are ecofriendly, low cost, required no special skill to prepare and overall is good for honey bee. By considering the sustainability, cost of raw materials, skill requires, this developed the technology of low cost honey bee box, where wood is not used as construction materials of the bee box and instead of wood, other renewable, eco-friendly alternate materials are used.

SALIENT FEATURES:

- A low cost Bee box
- Environment friendly material
- Avoid using wood for conservation of trees
- Promote sustainable beekeeping practice
- Easy to prepare
- Maintain required temperature inside box irrespective to seasonal variations
- Better performance of honey bee than the conventional box



TECHNOLOGY VALIDATION:

The bee boxes are used to rear Honey bees in the field for last few years and observations were made on behavior of the bees. Brood growth, cell growth, weight of the bee colonies were calculated and compared with the conventional box. The requirement of honey bee like aeration, temperature, comfortability was considered during preparing the technology.

IMPORTANCE OF THE TECHNOLOGY:

Honey bee boxes are prepared extensively from wood, which is obtained from the trees. Trees are very precious resources and for the check of environment, we have to reduce the use of trees. The wooden boxes are costly due to higher price of wood as well as skill required to prepare it. Affordability and lack of skill for preparing the wooden bee box is one of the major hindrances for beekeepers to initiate beekeeping..

ENVIRONMENTAL CONSIDERATIONS:

The materials used for making bee box are from renewable sources and no any chemicals are used in entire production process of the product.

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MOSQUITO REPELLENT CANDLE

INTRODUCTION:

Candle is commonly used as light sources and has already an established market. Candle having mosquito repellent properties will repel mosquitoes in addition to emit light and pleasant fragrance. Easily available non-toxic plants are used as ingredients for the mosquito repellent property.

SALIENT FEATURES:

- Effective for repelling mosquitoes.
- Safe to use.
- Can be used in indoor and outdoor conditions.
- Three in one product for providing light, emitting fragrance and repelling mosquitoes.

Technology Validation

The efficacy of mosquito repellent technology has been validated with trial applications/study. The technology has been licensed and demonstrated to industry client.

Importance of the Technology

Mosquitoes are widespread and prefer to live in warm, humid tropical regions. The incidence of mosquito transmitting disease is increasing around the world. Nowadays, plant based repellent products are much preferred by the people than the chemical based one. Herbal mosquito repellent liquid candle is effective to ward off mosquitoes



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Azadi Ka
Amrit Mahotsav



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Scan for Technology Details

