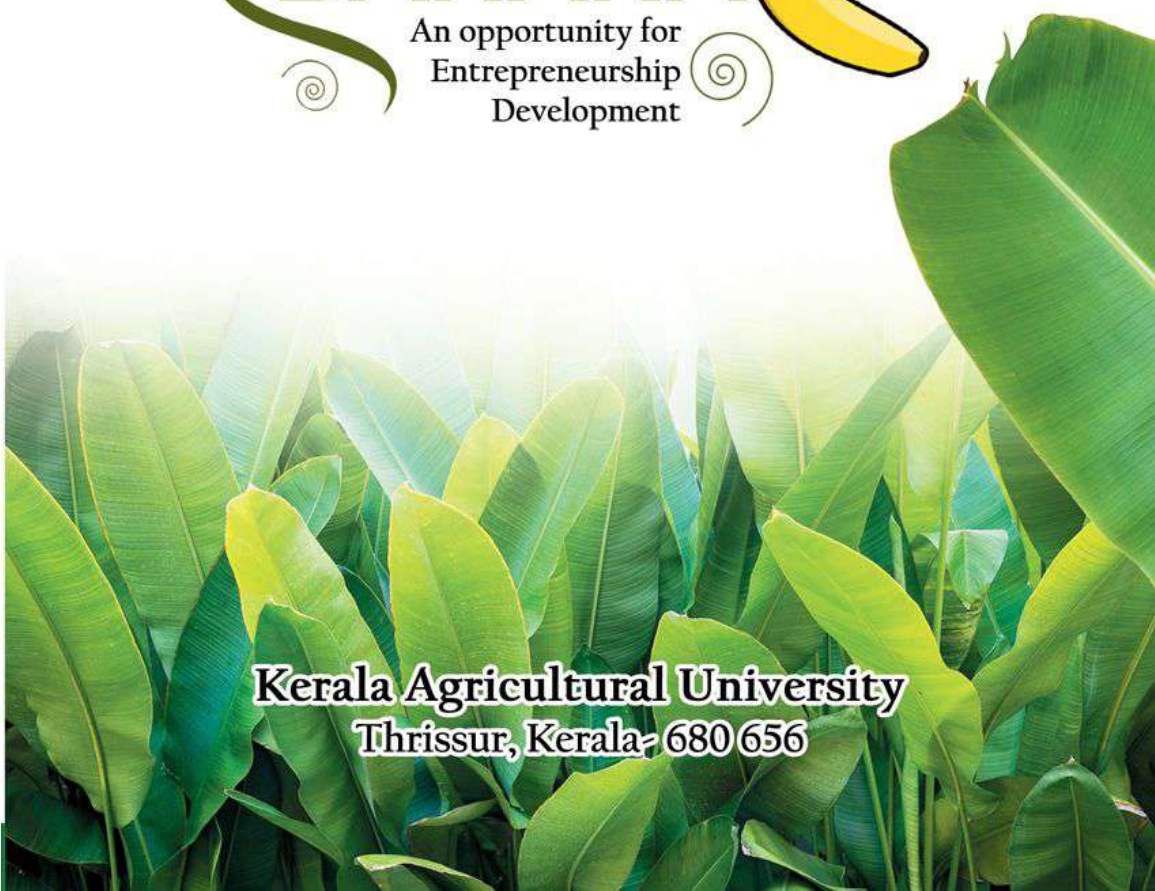


RAFTAAR Agribusiness Incubator
Department of Agricultural Engineering
College of Horticulture



TOTAL VALUE ADDITION OF BANANA
An opportunity for
Entrepreneurship
Development

Kerala Agricultural University
Thrissur, Kerala- 680 656



BANANA PROCESSING

Technologies & product diversity for budding entrepreneurs

Banana is a tropical fruit grown over 122 countries worldwide. Bananas and plantains are the fourth most important food crop in the world, after rice, wheat, and maize. It is considered to be one of the most important sources of energy and starchy staple food for the people of tropical humid regions. Bananas and plantains are rich in nutrients, starch, sugar, vitamins A & C, potassium, calcium, sodium and magnesium. Plantains are nutritionally low protein food material but relatively high in carbohydrates, vitamins and minerals. A number of changes take place inside the fruit that influence its appearance, flavor, texture and nutritive value, and that cause it to age and subsequently to rot and decay. When banana harvesters lose water from the peel that results in shriveling and weight loss. Therefore moisture loss should be minimized by proper post-harvest practices which lead to good quality and safe banana. Good post-harvest handling practice is important in maintaining the quality and assuring the safety of the banana fruit as it moves through the supply chain from producer to consumer. Over-ripening, mechanical damage caused by bruising and compression are the main causes of losses in banana supply chains. Post-production losses of banana can be reduced by adopting various post-harvest management practices. Banana can be processed into different value-added products to enhance its shelf life and market value. Processing is recognized as a way of preserving the fruit. The ripe banana can be utilized in a multitude of ways in the human diet, from simply being peeled and eaten out of hand to being sliced and served in fruit cups and salads, sandwiches, custards and gelatins, being mashed to be incorporated into ice cream, bread, muffins and cream pies. Thousands of value-added products can be made from banana. Some of the value-added products which are developed under RAFTAAR Agri Business Incubator, Kerala Agricultural University, Thrissur are briefed below.

Vacuum fried banana chips

Banana chips contribute to value addition of banana to extend its shelf life. Deep fat frying of banana increases the oil content and darkens the colour of chips since it contains sugar. Both browning and oil absorption during frying can be controlled by novel vacuum frying technology. This vacuum frying technology involves frying the ripe banana under reduced pressure. Both raw and ripen banana chips can be



produced using vacuum frying system. The raw banana chips are produced without removing the peel, this could enrich the fiber content of the banana chips also enhance its appearance. The advantage of vacuum frying is that the oil quality gets maintained and the oil can be reused more than 60 times. The vacuum fried product having very less oil content, nearly 90% of oil can be reduced compared to atmospheric fried banana chips. The vacuum fried banana chips can be stored for more than three months under modified atmosphere packaging using nitrogen flushing.

Osmo vac – IMF dried banana

Osmo-vac-dried banana is an intermediate moisture food product, and is not only delicious but also conserves attractive colour and nutritional elements. This processed product has six month shelf life, which could reduce wastage of surplus ripened banana. The ripen banana are sliced and soaked in sugar syrup for osmotic dehydration and further dried using cabinet dryer/blancher cum drier for IMF banana.



Banana flour based Ready-To-Eat products

Modern consumers are trending towards healthy nutritive processed products and also ready to eat foods. Diversified combinations of banana flour and other healthy ingredients such as Njavara rice, yarm powders, ragi flour etc can be utilized for the development of healthy RTE products. This healthy banana based RTE can be stored upto six months under modified atmosphere packaging using nitrogen flushing.

Spray dried banana Pseudostem powder

Banana Pseudostem (BPS) is an actively growing aerial stem with closely packed leaf sheaths. It functions as a vascular bridge for the flow of water and nutrients from roots to leaves and finally to banana fruit bunch. It is often used as a vegetable for culinary purposes in India. Juice from BPS is a well known remedy for urinary disorders. It helps in the removal of stones in the kidney, gall bladder and prostate. The banana Pseudostem juice possesses medicinal properties especially for stones in the kidney, gall bladder and prostate. It improves the functional ability of kidney and liver. It acts like a diuretic helping to eliminate waste fluids from the body. Spray drying of Pseudostem juice with maltodextrin was attempted to develop nutraceutical products. The juice was spray dried different proportion of maltodextrin, ginger and sugar.

The Pseudostem juice was combined with horse gram extract which is an ayurvedic remedy for weight loss and treatment for kidney stone. Both

the combination and processing parameters were optimized and final product was standardized with good sensory score and quality analysis. Both Pseudostem powder and Pseudostem horse gram powder have shelf life of more than six months with proper packaging.

Fibre enriched banana peel pasta

Modern consumers are trending towards healthy nutritive processed products. Refined wheat flour is the major ingredient to the pastas that are available in the market. Fibre enriched pasta were prepared using by-product of raw banana flour industry. The banana peels were washed, blanched, dried and powdered to form banana peel powder. All the processing parameters for the production of banana peel powder were standardized. The produced banana peel powder was then fortified with wheat flour in different ratio to produced banana peel pasta. This standardized fiber enriched pasta is good for weight loss, rich in anti-oxidants and reduces constipation problem. The shelf life of banana peel pasta is more than one year.



Raw banana flour

Banana flour is a powder made from processed bananas. Post production losses of banana can be reduced by adopting various post-harvest management practices. The banana flour has a good potential for use as a functional agent in bakery products on account of its high water absorption capacity. Banana flour contains high per cent of starch hence it is used for the formulation of nutritious weaning mixes and supplementary foods. The blanching, drying parameters were standardized and the developed banana powder has shelf life of more than one year.



Raw banana flour ethnic health mix

The banana flour contains the entire essential nutrient which is also easily digestible, but the protein source is not complete in banana, so fortifying the standardized banana flour with finger millet flour completes the nutritive need of an individual. With the intension of

providing cheap and complete nutrition to the diet of all age group. Different combinations of ragi, banana and sugar powder were mixed and were standardized through quality and sensory analysis. The quality and shelf life studies with sensory analysis have been done for the developed product. The shelf life developed ethnic health mix is more than one year.

Agri Business Incubator & Entrepreneurship development in Banana processing

New innovations/technologies in value addition of banana have enabled entrepreneurs to gain powerful economy and customer attraction and satisfaction. RAFTAAR Agri Business Incubator, Kerala Agricultural University will enable the entrepreneur by mentoring at each stage from product development to market pitching. KAU RABI promotes growth through innovation and application of technology, and support economic development strategies for small business development. KAU RABI supports agribusiness incubation by tapping innovations and technologies for venture creation in agriculture.

KAU Agri Business Incubator (ABI) provide facilities for enterprise support services component and other agribusiness information resources on value added products from banana, their process protocols, and related machineries. The hands-on training on banana processing, value added products, project report preparation on banana processing units and other related professional assistance makes the enterprise successful and achieve higher growth.



To catechize Agripreneurship enthusiasm in the state of Kerala, KAU RABI is launching two phase incubation programs. RAISE- Realising and Augmenting Innovations for Startup Enterprises, nurtures Idea to prototype development, and PACE- Promotion of Agriculture through Commercialization and Entrepreneurship, aids early-stage agri startups for product scale-up, commercial launching and funding support.



The Agripreneurship Orientation Programme KAU RAISE will be provided with two months internship cum hands on training, Rs.10,000 per month stipend, along with expert mentorship and assistance in development of ideas into prototype. After successful completion of program selected candidates will receive the grant in aid limited to Rs.5 lakhs. The Agri Startups looking to Commercial launch of their prototype can apply for Agri startup Incubation programme KAU PACE, which includes mentoring on commercialization of existing prototype, technical and business support, and long-term incubation support. After successful completion of program selected startups will receive the grant in aid limited to Rs.25 lakhs.



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