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RAFTAAR Agribussiness Incubator
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VALUE ADDITION & ENTREPRENEURSHIP OPPORTUNITIES IN PINEAPPLE PROCESSING

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Pineapple (*Ananus comosus,* Bromeliaceae) is a wonderful tropical fruit having exceptional juiciness, vibrant tropical flavour and immense health benefits. Pineapple contains considerable calcium, potassium, fibre, and vitamin C. It is low in fat and cholesterol. It is also a good source of vitamin B1, vitamin B6, copper and dietary fibre. Pineapple is a digestive aid and a natural anti-Inflammatory fruit. Fresh pineapples are rich in bromelain used for tenderizing meat. Bromelain has demonstrated significant anti-inflammatory effects, reduces blood clotting and helps to remove plaque from arterial walls.

Total annual world production is estimated as 14.6 million tonnes of fruits. India is the fifth largest producer of pineapple with an annual output of about 1.2 million tonnes. It is abundantly grown in almost entire North East region, West Bengal, Kerala, Karnataka, Bihar, Goa and Maharashtra states.

Pineapple is a prime table fruit, and perfectly suitable for conversion to frozen juices , nectars, drinks, jams, concentrates. It can be used in puddings, bakery fillings, fruit meals for children, flavors for food industry, and also to make the most delicious ice cream and yoghurt. While the raw fruits are utilized for products like chutney, pickle, sauce, pineapple beverage, etc., ripe ones are used in making pulp, juice, nectar, squash, leather, slices, etc. Major export products include dried and preserved pineapple, jams, fruit jellies and canned fruits. Some of the value added products from pineapple are given below.

Fresh cut pineapple

Fresh-cut pineapple is one of the most demanded fresh-cut fruit. Good manufacturing practices and hygiene procedures should be strictly followed to meet the consumers' requirements in terms of safety and quality. It can be packed in modified atmospheric packaging or controlled atmospheric packaging. It helps to prevent juice leakage, retain colour changes and inhibit microbial growth of fresh cut pineapples.

Required machineries:- Packaging unit (MAP/CAP)

Dried pineapple

In this product, most of the free water of the fruit is eliminated. Usually, chunks or slices are prepared for better presentation and make handling easier. Optimum time temperature should be maintained to obtain the good quality of dried pineapple. This allows the dried fruit to have a long shelf life with proper packing and it can be stored in normal atmospheric conditions.

Required machinery:-Cabinet drier

Osmo- dehydrated pineapple products

Osmotic dehydration is a process used for the partial removal of water from tissues by immersion in hypertonic (osmotic sugar) or brine solution. Pineapple are need to peel, decore and cut into rings. Keep these rings in osmotic solution and thendry to required moisture content.

Required machineries:-Tray drier or cabinet drier

Vacuum Fried Pineapple Chips

Vacuum frying is a technology where food products are deep fried under vacuum or near vacuum condition. Vacuum frying reduce the fat content compared to normal deep frying. This process produces healthy chips and also help in preserving the fruit's original colour, nutrients and antioxidant capacity.

Required machineries:-Vacuum frying unit

Vacuum Impregnation

Vacuum impregnation is the process for partial removal of water from tissues by immersion in hypertonic (osmotic sugar) or brine solution at low pressure or vacuum. The time required for the vacuum impregnation is less than one hour. This helps the pineapple pieces to retain its natural colour, flavour and texture compared to normal osmotic dehydration. Vacuum impregnation technology for pineapple was developed at RAFTAAR Agri Business Incubator, Kerala Agricultural University.

Required machineries:-Vacuum Impregnation unit, Tray drier or cabinet drier

Nectar

It is the product of blending juice with a certain amount of solids from the pulp containing the same amount of degree Brix as the original fruit. Normally, nectars are prepared by diluting fruit pulp to 30°Brix. Methods of preservation and packing are similar to juice.

Required machineries:-Industrial mixer, packaging unit

Pulp

It is the product of the basic processing of peeled pineapple pulp by crushing. Pulp may be preserved by thermal treatment, by preservatives addition and proper handling in either small packages, or in bulk packages. This can be further utilised for industrial processing and formulations like ice cream mixes, jellies, jams, sodas, juice, squash etc.

Required machineries:-Pulper, packaging unit

Juice

Pineapple juice is obtained from crushing fruit pieces and proper physical separation of the solids. Juice must be pasteurized and packed to extend its shelf life. Preservatives used as additional barriers to microbial spoilage and fermentation. Packing may be in plastic bottles, coated cans, multilaminate (plastic, paper, metal foil) or any newer materials. Juices from other fruits can be blended with pineapple's and interesting mixtures make novel products.

Required machineries:-Industrial mixer, packaging unit

Jelly

Jellies fall in the group of fruit preserves, which are defined as semisolid products prepared by mixing fruit juice and required amount of sugar. This mixture is cooked until the final solids contents reach 65 to 68%. It is hot-filled for better stability and it may or may not contain fruit pieces.

Required machineries:- Industrial mixer, fruit concentrator, packaging unit

Marmalades

This is also considered as a fruit preserve using the same proportions of fruit and sugar, and cooked until it achieves the same solid content as jellies. The consistency of marmalade is semi-fluid unlike jellies. In addition to this it consist of citrus shreds having definite thickness in it. Preservation criteria and shelf life considerations are similar to jellies.

Fillings

Pineapple pieces mixed with bakery cream may be used as cake fillings for institutional service and large-scale production of bakery goods. Stability of the product depends on the cleanliness and hygiene of the manufacturing process. Product may be packed in suitable plastic bags, plastic containers or metal bins. If no additives are used, the fillings must be kept in refrigerated condition. Due to its elevated nutrient and water content its shelf life is not very long.

Jam

Boil 1 kg pulp of ripe firm peeled fruit with 100 ml water and add 3 g citric acid and 10 g of pectin. Add 750 g sugar and cook to thick consistency. End point is confirmed by sheet test. Boiling mass is allowed to fall after cooking from a ladle which will flow in the form of a sheet. Pack in clean dry glass jars.

Required machineries:- Industrial mixer, fruit concentrator, packaging unit

By – product Utilization

Different value added products can be prepared from pineapple processing wastes that occurs in the field, packing houses and processing industries.They are detailed below.

Mill Juice

Most of the pineapple waste components can be milled and pressed to extract milled juice. A typical composition of soluble solids of milled juice contains sugar, citric acid, malic acid, protein, gum and several mineral constituents. Properly prepared high quality sugar syrup from mill juice has a high market demand.

Vinegar

Vinegar is prepared by an acetic fermentation of alcohol solutions derived from sugar or starchy materials. This is done by strains isolated from the raw materials. Peel and other pineapple by-products from processing can be used as raw materials to prepare natural vinegar and thus make a proper use of residuals. Vinegar must be pasteurized once it is prepared and bottled. It is stable at ambient temperature.

Agri Business Incubator & Entrepreneurship development in pineapple processing

New innovations/technologies in value addition of pineapple 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 pineapple, their process protocols, and related machineries. The hands-on training on pineappleprocessing, value added products, project report preparation on pineapple 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 & 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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