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RESEARCH & DEVELOPMENT NEEDS OF PALMYRAH BASED PRODUCT PROCESSING INDUSTRY

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The female palmyrah palms have a potential of producing 15,000 to 20,000 metric tons of palmyrah fruit pulp annually. The pulp contains as its major components (on a fresh weight basis), moisture 76%, sugar 15%, pectin 6.7%. The sugar comprises of sucrose 6.6%, glucose 3.5%, fructose 3.4% and unidentified sugar 1.5%.[1]

This fruit pulp has been used traditionally either in the dried form "Pinattu" or a fresh pulp mixed with rice flour or wheat flour and made into oil cakes "panankaipaniyaram" for decades. More recently the Palmyrah Development Board in an effort to popularize fruit pulp has converted it to a number of edible products such as fruit drinks, cordials, jams, concentrated pulp, fruit bread, chocolates, pulp mellows and pulp delight. The fruit pulp has a characteristic bitterness which is a drawback in efforts to popularize the product or even export it.

Hence, it is important to debitter the fruit pulp. Leaching, adsorption, ion exchange, masking and dilution had little effect on debittering. The technique of bio-conversion for debittering with Nariginase has been successful.[1]

Although debittering has been a success technically, it still had problems, Firstly nothing is known about the toxicity of the product of debittering. Animal feeding studies will be needed to test for physiological effects (if any) of the non-bitter products of Naringinase.[1] It is hoped that with the rapid strides made in the field of Biotechnology these costs will decline in the next few years.

Research on Starch

The palmyrah tuber is a rich source of starch which has an existing potential of 3000 metric tons of tuber flour annually.[2] The tuber is potentially comparable to other starchy stables like rice and wheat, maize, potato, cassava as a source of flour. It has however a serious drawback in the presence of a bitter after taste. Keeping this factor in mind it appears logical to convert the flour to a more purified product namely starch. Preparation of starch would also open a new avenue namely the production of nonedible industrial products from starch. Further studies could be carried out for the production of malt powder, liquid glucose, and high fructose syrup from tuber flour.

Research on Sap Products

Palmyrah sap, fermented (toddy) as well as unfermented (sweet toddy) are the major products of economic value from the palm. Total sap produced per year is approx. 80

million bottles[3] . The sale value from sugar and alcohol as by products is in the region of Rs 680 million. If the sap is used exclusively for alcohol production then the expected return would be Rs.13,000 million per annum.

High yield of alcohol could be obtained if the sweet toddy is fermented using special strains of yeast using the technology of cell recyling.[4] By using immobilized invertase and glucose isomerase the sucrose in the sweet toddy could be converted to high fuctose syrup, which is widely used in soft drinks like Coca Cola, Sprite etc.[5]

Table 1: Macro Constituents of Palmyrah Fruit Pulp.[6]

Moisture	76%	
Organic matter	16 - 61%	Fresh weight
Minerals	4.3%	Fresh weight
Sugars	14 - 16%	Fresh weight
Crude Protein	2.76%	Dry weight
Free Amino acid	1.52%	Dry weight
Fibre	1.5%	Dry weight
Pectin	20.8%	Dry weight
Lipids	1.02%	Dry weight

Table 2 : Macro Constituent of Sweet Toddy.[7]

Total Sugar	10.93% (W/V)
Protein	0.35% (W/V)
Reducing sugar	0.96% (W/V)
Phosphorus	0.14% (W/V)
Vitamin C	13.25 mg/100 ml
Vitamin B	3.9 I.U.
Minerals	0.54%

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