

Other products from cassava

1. Cassava Starch

Cassava roots are washed by hand and peeled with hand knives. These are then manually rasped to a pulp on a stationary grater, which is simply a tin or mild steel plate perforated by nails so as to leave projecting burrs on one side. The pulp is collected on a piece of fabric fastened by its corners to four poles, and washed vigorously with water by hand. Finally, the fiber is squeezed out while the starch milk collects in a bucket. When starch granules settle out, the supernatant water is decanted, and the moist starch is crumbled and dried on a tray or on a bamboo mat. In some places, the starch milk is squeezed through a closely woven thick fabric to trap the starch granules, or the fabric is hung overnight to remove gravitational water. Finally, the product is sun-dried. This simple process is used by many people in the rural areas of the tropics.

2. Cassava Starch Based Adhesives

Adhesives can be made from cassava starch using simple low-cost technologies. These include gums made by gelatinizing starch by heat treatment without any additives as well as those made by extraneous addition of different kinds of materials.

- ***Gums without additives***

The simplest liquid starch pastes are made by cooking starch with water, with preservatives being added later. These are useful in bill pasting, bag making and in tobacco products. These gums have extensive demand, and the quality and color of the starch are not very crucial. However, they lose their fluidity after a day or two. In spite of these defects, they are in high demand because of their low cost. The starch is cooked in stainless steel or wooden vats with excess water until all the starch has gelatinized. The consistency of the paste is gauged by the appearance and flowability of the gum. It should flow freely and pour out in a long, continuous stream. On cooling, the product becomes more viscous. Copper sulfate is added to resist microbial infestation. Cassava starch is preferred in view of its excellent

cohesiveness, clarity and bland flavor. However, it cannot be stored for more than two days as the pastiness is lost, and it becomes too thick to handle.

- ***Gums prepared using different chemicals***

Various chemicals may be added during the preparation of the gums. These include inorganic salts like calcium and magnesium chlorides, borax, urea, glycerol, carboxy methyl cellulose and carboxy methyl starch. The chemicals assist in increasing viscosity and flowability, and in humidity control. They are added by stirring while the starch is being gelatinized to prevent lump formation. The gums are useful in various applications like lamination of paper, wallpaper printing, for water-resistant formulations of pasting labels and other stationery applications.

3. Modified starches

Cassava starch is modified by chemical or physical means to improve its functionality for industrial applications. The commercially converted starches are acid modified, oxidized and dextrinized starches. The undesirable properties of cassava starch, such as high breakdown in viscosity and cohesiveness of starch paste, can be modified through physical and chemical treatments.

The physical treatments include heat, moisture, steam pressure and irradiation with x-rays. For example, the gelatinization temperature is enhanced and viscosity is lowered but stabilized with steam pressure treatment. This starch has properties resembling fats, and hence can find use as fat-mimicking substances.

The various chemical treatments which are used to modify starch include oxidation, esterification and cross-linking. Oxidation with hypochlorite gives a starch of lower viscosity suitable for the paper industry. It is expected that the paper industry is poised for tremendous growth in India.

Esterification/etherification can lead to complete transformation in starch

properties. The viscosities can be either lowered or enhanced and stabilized, and the pasting temperature can be altered. In fact, starch which gelatinizes in cold water, but does not gelatinize in boiling water, can be prepared by achieving the proper degree of substitution.

Modified starch can find use in canned foods, frozen foods and as dusting powders in food and other industries. Cross-linking can stabilize viscosity and also provide various types of starch for food and industrial applications. Cross-linking agents include phosphate, epichlorhydrin and thionyl chloride.. These products have wide applications in paper, textile and food industries.

5. Cold water miscible starch

The cold water miscible starch finds application in textile industries, for home use in starching the clothes and also for preparing some specialty foods. It is produced using alcohol / alkali and precipitation by alcohol. It is easily and completely soluble in cold water having good and stable viscosity.



4. Biodegradable plastic

Environmental pollution as a result of the extensive use of plastics is a serious concern of the government in India. CTCRI technology to produce biodegradable polymers incorporating cassava starch has given new hope to the country in tackling the problem effectively. The biodegradable nature of this polymer can to a certain extent control the pollution hazard.

Synthetic polymers filled, grafted or blended with cassava starch, either in its native form or modified, have been reported to impart biodegradability to the fabricated plastic goods. Incorporation of low-cost starch into synthetic polymers also provides a potential method for expanding their applications as well as improving the economics for making the plastics. Their superior utility has been deployed in specific applications such as short- service lifetime agricultural mulch, single-use disposable packaging and for controlled release of agro-chemicals, such as pesticides, pheromones, growth regulators and fertilizers.

5. Cassava alcohol

Cassava can be used for production of ethanol. CTCRI has perfected and patented the process for alcohol production from cassava. The process essentially consists in liquefaction, saccharification /neutralization and fermentation with yeast for 48-72 h at pH 4-4.5, followed by distillation to recover the alcohol. But the production of ethanol from sugar cane is more economic but by usage of developing technology we can tackle this problem.

6. Cassava leaf products

Cassava leaves can be used for the production cattle feed. It is also used in the production of bio-pesticides like Nanma and Menma produced by CTCRI.



Conclusion

There are a number of products which can be produced from cassava. As the climatic condition of Kerala favors the growth of the crop, it can be cultivated fairly here. The harvest of this cassava can be processed into various products which is having a high market demand. Industries and enterprises can be set up to produce various value added cassava products which include chips, sago, starch etc., which ensures a good income to the entrepreneur.