

Innovative Starch Derivatives

1. Absorbent Material According to R & D on innovative starch derivatives conducted by Mr.Chairat Wiwatworaphan (Thai Tapioca Development Institute, May 25, 1994), an absorbent material, namely, high-water absorbing polymer (HWAP) is a polymer capable of sequestering liquid such as water, electrolyte solution or human liquid from 15 times up to hundreds of times their weight of moisture.

HWAP has a number of applications. For hygienic and medical applications, for example, adult and baby disposable diapers for absorbing body liquid, sanitary napkins, and hygienic nappies used in hospital were developed from HWAP. For agricultural application, a water irrigation system for both plantation and gardening plants make use of HWAP to adjust soil condition in absorbing more water. In industry, HWAP is applied in a thickener for screening ink, water-absorbing material for fuel, and water-repellent material for underground cables. Other applications include liquid for preventing forest fires, insulated paper for controlling moisture and cold pads for reducing high temperature.

2. Biodegradable Plastics From R & D on innovative starch derivatives by Dr.Nipon Wongwisetsirikul and others, the utilization of biodegradable plastics will reach 75% per year. They are useful in a way to prevent our environment from pollution. Biodegradable plastics are replacing plastic in producing food containers. In agricultural area, biodegradable plastics are used to control the release of nutritious substances, insecticide, pesticide and fertilizer. In medical area, biodegradable plastics are useful to control active pharmaceutical materials at a slow and consistent rate. Using tapioca starch as a raw material not only produces biodegradable plastics but also reduces the production cost as well since starches derived from corn and sweet potato cost higher than tapioca starch possessing similar properties.

3. R & D on Cyclodextrin According to R&D on innovative starch derivatives done by Associate Dr.Piemsuk Pongsawat and others, cyclodextrin is another product which makes use of tapioca starch as a raw material. It is formed by the catalyst of Cyclodextrin Glycosyltransferase (CG tase), which can convert substrate starch into cyclodextrin by-product. It can retain flavor, odor, and color conditions, reduce vaporization, increase stability & solution in some substances, including eradicate undesirable substances from the system. It can be used in various types of industries and it is expected that it will be used more extensively.

4. Production of Alcohol Most cassava roots contain starch which can be converted to alcohol called ethanol. Gasohol is car fuel oil achieved through the mixture of ethanol, mixed with benzene at the rate of 10 - 20 : 90 - 80 for ethanol and benzene respectively. This can decrease Thailand's oil imports from abroad, help providing jobs for rural people, and reduce air pollution thanks to unleaded property of gasohol. Ethanol produced from tapioca as alternative fuel oil becomes of great interest. Some countries have launched gasohol projects. For instance, alcohol is produced from crops like sugar cane and tapioca in Brazil and corn in USA.

Scientific and Technology Research Institute, Science and Technology Ministry, have experimented with water-free alcohol production from fresh cassava roots and the effects of gasohol on engine and the results show that no problems have been found. Today, alcohol in Thailand is widely produced from molasses and rice. The main purposes of domestic alcohol production are producing alcoholic drink and for export. There has not been alcohol production for alternative fuel oil yet.



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