

Takamatsu

 (Fiscal Year 2002-2006)

Creating a new life science (sugar life science) and sugar bio-industry using “rare sugar”

Core Organization Kagawa Industry Support Foundation

Participating Research Organizations (Bold: Core Research Organization)

Industry--Fushimi Pharmaceutical Co., Ltd., Teikoku Seiyaku Co., Ltd., Shikoku Research Institute Inc., Ryusyo Industrial Co., Ltd., Hayashibara Biochemical Laboratories Inc., Organo Corporation, Matsutani Chemical Industry Co., Ltd. Santen Pharmaceutical Co., Ltd., Otsuka Pharmaceutical Factory Inc.

Academia--**Kagawa University**, Nagoya University, Meijo University, Tokushima University, Osaka Prefecture University, Tokushima Bunri University, Helsinki University of Technology(TKK), University of Oxford (U.K.), University of Verona (Italy)

Government--National Institute of Advanced Industrial Science and Technology(AIST Shikoku), National Agriculture and Food Research Organization(NARO),

Kagawa Prefectural Industrial Technology Center, Kagawa Prefectural Agricultural Experiment Station, Kagawa Forestry Center, Kagawa Prefecture Livestock Experiment Station, Research Institute for Solvothermal Technology(RIST)

Project Overview

We have perfected the world's first “Izumoring,” the production strategy for all monosaccharides and we developed the technology to produce rare sugars that occur only rarely in nature using this strategy. We aim to create new “sugar life science” and “sugar bio-technology” by promoting research on physical/chemical properties and physiological functions of rare sugars.

1. Rare sugar production

We established the technology to produce all rare hexoses using the “Izumoring” regime.

2. Characterization of physiological functions of rare sugars

We clarified that D-psicose is naturally sweet and has functions useful for the treatment and prevention of diabetes mellitus, atherosclerosis, obesity, etc, by suppressing increases in the blood glucose level or lipid accumulation.

Furthermore we also clarified that D-psicose and D-allose have growth-regulating effects on plants.

Main Results

1. Approach to the formation of a Glyco-Biocluster in Kagawa (Takamatsu) has been progressed.

Based on the function of D-psicose (non-calorie, suppression of lipid accumulation and increase in blood glucose), industrialization and commercialization of functional sweeteners (food for specified health use) which are effective to prevent obesity and “metabolic syndrome” are now carried out as the City Area Program (Development Stage) of the Ministry of Education, Culture, Sports, Science and Technology.

2. A food venture firm, targeting the practical use of rare sugar (D-psicose) started a business.

To obtain a business permit of food for specified health use based on rare sugar (D-psicose), the food venture firm “Rare Sugar Food Limited Liability Company” started a business in June 2007.

3. Currently, rare sugars and rare sugar alcohols are on sale as chemical reagents

Fourteen types of rare sugars including D-psicose, an 8- keto-hexose kit and a 10-sugar alcohol kit are now on sale.

4. Pharmaceuticals with protective action against ischemic disorders have been developed.

The antioxidant action of rare sugars provides effective protection against internal organ disorders that caused by oxygen radicals. Investigation on their effectiveness in various organs has been progressed and applications as injection and intravenous drip fluids has been aimed.

5. Environmentally friendly plant function control agents (“eco” agricultural chemicals) have been developed.

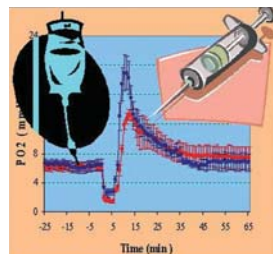
It was found that rare sugars (D-psicose, D-allose) have activities to control the growth of plants as well as enhance their anti-pathogenic activity (elicitor activity). The research to develop the novel agricultural chemicals which are friendly to human and environment using their functions started using the research fund of the Ministry of Agriculture, Forestry and Fisheries.



D-psicose:
The first candidate for functional foods



Being sold reagents of rare sugars,
including D-psicose



Rare sugar injection fluid to provide effective
protection against ischemic injuries