

Promoting the Creation of a Recycling-Oriented Society with the FRC

Fukuoka Prefecture



Background

In order to promote the creation of a recycling-oriented society, it is necessary to construct a resource circulation system, from developing the technology to make recycled products from waste, to the collection and sorting of waste, and the production and sales of recycled products. To construct this circle of resource recycling, steps should be taken to connect technology with the know-how of professionals in each field involved in the circle.

Fukuoka Prefecture established the Fukuoka Research Commercialization Center for Recycling Systems(FRC) in 2001 as a base to provide comprehensive support for such initiatives.

Purpose of Project

Aims to construct a recycling-oriented society through the following initiatives.

- Providing support for the development of recycling technology and for research related to the creation of social systems
- Providing support for the implementation of research results
- The sharing of information

Outline of Project

Providing support for the development of recycling technology and for research related to the creation of social systems

- To solve the problems that could become barriers to matching recycling technologies with social systems, support is provided for joint research teams formed by industry-academia-government collaboration to help with their research and development expenses and for coordinating with experts in certain research fields.

Providing support for the implementation of research results

- Providing a verification test site where the large-sized equipment can be installed, which is required to conduct the extensive tests needed if to realize the practical use of recycling technologies.
- Conducting promotion activities to disseminate and establish the technologies achieved through the research as social systems in local communities.

The sharing of information

- Raising the awareness of recycling by presenting the achievements of the research through attending large-scale exhibitions and holding workshops for companies, municipalities and joint researchers.

Progress and Achievements

Some examples of the recent research accomplishments at the FRC are presented below.

Establishment of a technology which enables the total recycling of waste edible oil

When waste edible oil is refined into biodiesel fuel (BDF), about 20% ends up as the by-product glycerin. The high impurity content makes its effective use difficult and so the waste oil has been disposed of as industrial waste.

This research team developed a technology which separates the oil layer from glycerin-containing water layer, and uses both of them effectively by applying a simple treatment to the by-product glycerin. The glycerin-containing water can then be used as a denitrification agent (a chemical agent used for the removal of nitrogen, one of the processes in waste water treatment) in sewage treatment plants and in night-soil treatment plants, while the oil can be used as fuel. This is the first technology of its kind established in Japan, which enables the total recycling of waste edible oil.

The glycerin-containing water demonstrates a level of performance comparable to methanol which has long been used as a denitrification agent. As it is also inexpensive and can be used in existing injection systems without any remodeling, there are high expectations for commercialization.



Equipment used for verification tests on the treatment method of the by-product glycerin

Construction of a system for recycling used disposable nappies

Used disposable nappies do not burn easily because they contain a large amount of liquid. Since the number of used disposable nappies is expected to increase in line with the ageing population, which will cause an increase in the costs required for incineration, their recycling is an urgent issue that needs to be tackled.

This research team established a technology for processing used disposable nappies and separating the components into pulp, plastic and polymer, which are used as raw materials for construction, solid fuel and soil improvement goods, respectively.

Furthermore, a recycling system for used disposable nappies has been created in some municipalities of Fukuoka prefecture, where the waste is collected separately from other types of waste.



Recycled pulp extracted from used disposable

Establishment of a production technology to make natural human-type ceramide from soy sauce lees

Soy sauce is one of the key Japanese seasonings. Soy sauce lees are produced when making soy sauce and have been used mainly as livestock feed in limited areas. This research team established a technology to produce natural human-type ceramide, which is a high value-add ingredient used in cosmetic moisturizing products, from soy sauce lees. It was also confirmed that the soy sauce lees can still be used as livestock feed after extracting the ceramide as they were before.

Fukuoka is one of Japan's main producers of soy sauce. Since large amounts of ingredients are used for brewing at the Fukuoka Soy Sauce Brewing Cooperation, which was established through the joint investment of many soy sauce manufacturers, they generate a significant amount of soy sauce lees. Using them can lower their costs because there is no need to collect the lees from the soy sauce manufacturers individually.

This natural human-type ceramide has already been used in some products and is expected to be used by leading cosmetics manufacturers both domestically and overseas.



Sample products exhibited at Cosmoprof International Beauty Trade Fair in Las Vegas (2015)

Effects of Project

Research results of 27 research themes have been commercialized so far, including the 3 mentioned above, which achieved 21,000 tons of waste reduction and had an economic effect of 870 million yen last fiscal year.

Problems and Responses

The prefecture continues to promote the development of recycling technologies and their commercialization while paying attention to such issues as the collection methods of waste that is turned into raw materials for new products, securing a sufficient amount of the raw materials, as well as ensuring the presence of customers, all of which are common challenges for any research theme.

Outlook

Research and development of recycled products has been the main theme of the research projects so far. In the future, the prefecture will also devote its efforts to the research fields of 2R (reduce/ reuse) and to creating a material-cycle framework in the region.

Reference URL

<http://www.pref.fukuoka.lg.jp/soshiki/1900519/>

(Recycling-Oriented Society Promotion Division,
Prefecture of Fukuoka)

<http://www.recycle-ken.or.jp/>

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