

Contributing to Local Food Industry Development with Disaster Foods and Rice

Niigata University Food Science Center



Food is a major industry in Niigata, an area rich in agricultural and marine resources. Niigata University has responded to local food industry needs by pursuing original research across a number of related fields. The results of research into “disaster foods” and processed foods made from rice have created food technology with potential global and local benefits.



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Established as a campus-based independent entity in 2002, the Niigata University Food Science Center (FSC) undertakes collaborative R&D with the food industry in Niigata Prefecture, which is a major regional employer.

The FSC functions as an interdisciplinary research hub, with over 60 academics and researchers collaborating in fields ranging from agriculture and engineering to medicine, dental science and education. It has already secured a number of competitive industrial research grants from the Ministry of Education, Culture, Sports, Science and Technology, the Japan Science and Technology Agency and the Ministry of Agriculture, Forestry and Fisheries. It has also opened its doors to the food industry to enable shared use of the latest testing and analytical equipment, including high-pressure devices, taste sensors, protein structure analyzers and X-ray machines for studying ingested substances.

The FSC’s Director is Professor Motoni Kadowaki. “Food-related issues are increasingly treated as social issues,” he explains. “Besides self-sufficiency, they include food safety, food and health, and dietary or nutritional education. We can no longer hope to address all of these issues using traditional knowledge and technology from agriculture. We have to collaborate with many other fields. For example, food science involves engineering, while the link between food and health brings in medicine and dentistry. Cooking, diet and nutrition are issues linked to educational science. Here at the FSC, we have assembled experts from a wide range of fields to create a cross-functional academic organization that is truly unique within Japan.”

Self-heating Food for Disasters

The FSC undertakes a wide range of activities. It boasts a dynamic program of seminars and research conferences and hosts various lecture series on food science and technology. A special series of symposia on “disaster foods” has attracted widespread praise from food manufacturers



Participants sample disaster foods, at FSC’s symposium in Niigata, 2009

and government institutions alike.

The first of these special symposia on disaster foods was held in October 2005, a year after a major earthquake struck the Niigata area. The FSC organized further special symposia in September 2007, October 2009 and February 2010. These events analyzed information from studies of the aftermath of both of the recent earthquakes in the Niigata region (in October 2004 and July 2007) as well as the earthquake that struck Kobe in January 1995. For the first time, the symposia seriously addressed what sorts of foods are required in emergency and disaster relief situations, sparking a debate about “disaster foods.” The FSC compiled the knowledge garnered from these events into a book entitled “The Future of Emergency and Disaster Foods,” which is now in its third publication. In addition, based on the symposium discussions and working in collaboration with the FSC, local food manufacturers have developed a range of long-life disaster foodstuffs that are delicious and easy to prepare. These products are now on sale and fill a significant gap in the disaster preparedness market. They have attracted praise from the Japanese government and from overseas, generating a stream of requests to the FSC for samples.

“Today we are able to provide people in disaster areas with delicious hot meals such as curry rice or beef on rice. These products heat themselves without the need for heat or water,” comments Associate Professor Shinobu Fujimura, who heads up the administrative section of the FSC.

Developing Special Foods for the Swallowing-impaired or Seniors in Nursing Care

Besides disaster relief, in recent years the FSC has become involved in addressing the issue of feeding elderly people and the disabled in care and those with swallowing impairments.

Traditional medical approaches to swallowing impairment involve feeding patients by tube or other non-oral ingestion methods. The avoidance of eating meals has a significantly negative impact on the quality of life of such patients. Based on correct diagnosis of problems with swallowing, the goal of the FSC’s research in this area is to supplement



The fruit of the FSC’s research, at the Exhibition in Tokyo, 2009



APEC Press Tour in FSC, Niigata University, 2010

rehabilitation by enabling patients in care to eat safe, tasty meals.

Developing New Types of Functional Rice and Related Products

The FSC also undertakes specific research when commissioned by corporate clients. The center aims to provide companies with a “one-stop service” by matching resident researchers to specific themes to create targeted joint research projects.

The FSC specializes in rice-related research, reflecting the top domestic position of the Niigata region in terms of rice cultivation. A number of future-oriented research projects with rice-based themes are ongoing, divided into the five main topics. Examples of specific research topics include: the ameliorative effect of compounds derived from rice endosperm or rice bran protein in diabetic nephropathy; the bactericidal use of rice-derived peptides in tackling periodontal disease; use of taste sensors to evaluate high-quality sake from Niigata and related new product applications; development of new powdered rice products and related distribution technology for frozen products; and the development of a food menu based on rice powder for easy home cooking by students. Niigata University is developing these rice-related research activities as a general interdisciplinary field across the university.

Professor Masayuki Taniguchi, the deputy head of the FSC, explains that rice has a multitude of uses for possible investigation. “Besides creating delicious rice products, we are also seeking to expand the functional applicability of rice in medical and dietary fields. Japanese people tend to miss not eating rice, but we do not widely appreciate that it can also help to reduce the effects of diabetes. Projects have looked at putting rice into processed animal feeds.”

Food is a global issue. Rice is a staple food not only in Japan, but also across the entire region of East Asia. “FSC’s activities with rice will gain increasing attention from overseas in the future,” says Professor Kadowaki. “We hope to develop the FSC as an international center for research by accepting more students from overseas and by actively pursuing joint research programs with researchers from around the world.”