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# REGIONAL FOOD RESOURCE NETWORK

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*Kazuhiko Nakahara* holds a Doctorate degree in agriculture from the University of Tsukuba (in Japan). His expertise is in the area of food chemistry. He worked at the University of Tsukuba for 4 years, and at JIRCAS for 18 years. Currently, he is project leader of the “Advanced application of local food resources in Asia” project of JIRCAS.

# ABSTRACT

More than thousands of local food resources including indigenous plants, animals, insects and traditional fermented foods have been consumed in Asian countries for a long time. Some are collected from nature, or produced in small scale home gardens. Most area-specific fermented foods are not distributed to other places. Recent studies have indicated that those regional food resources have a high potential to be a source of health functional components and useful microorganisms. And, there will be some hints in the traditional way of food processing to develop new processed foods that are different in style from conventional ones. At the same time, among the components of regional foods made from indigenous materials, or metabolites of unique microorganisms, there would be novel effective functional compounds and useful enzymes.

Based on these backgrounds, JIRCAS together with its Asian counterpart organizations agreed to launch the 'Food Research Network of Asia,' for the efficient utilization of indigenous food resources. Members of the network started to keep close communications and shared their knowledge on major issues concerning food research, particularly food processing technology and physiological functionality of traditional food resources. Through the annual meetings in 2011 (at Bangkok) and 2012 (at Zhengzhou, China), it was discussed how to extend the activities of the network private sectors of each country. As an activity of the network, databases on indigenous foods of each region of Asia is now being constructed. The databases will be uploaded under the network homepage.

At the same time, JIRCAS will implement extensive projects (Advanced Application of Local Food Resources in Asia), re-evaluate previous empirical data, bearing in mind that our research outputs will be used in industries. A group of researchers from JIRCAS, Kasetsart University (Thailand) and Laos University elucidated the regional differences and time-dependent transition of bacterial and fungal species (e.g. lactic acid bacteria) living in fermented fish, which were produced in Indochina by analyzing DNA via denaturing gradient gel electrophoresis (DGGE) method. On the subject of food processing, researchers from JIRCAS and China Agricultural University developed a new and efficient coagulant agent to produce Chinese-style tofu. Electron spectroscopic characterization of sticky rice from Japan and Thailand was carried out to understand the properties of water-soluble polysaccharides, which are expected to be used for various food processing techniques.

## KEYWORDS

regional food resources, local food, traditional food, fermented food

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## Regional Food Resource Network



**K. Nakahara, JIRCAS**

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## Natural Food Resources in Asia

- indigenous plants
- mushrooms
- forest meats
- insects
- fishes




- forest
- paddy field
- home garden
- river, canal

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## Traditional Foods in Asia


- fermentation foods  
soybean, rice, fish, fruits....
- traditional processed foods



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## Possible applications



↓  
**Scientific knowledge**  
**Advanced technology**

- Development of new products adopted local culture
- Functional foods
- New processed foods

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## Research Network

**Networking**

- Core members (Thailand, China, Indonesia, Vietnam, Laos and Int'l Org.)
- Domestic organizations
- JIRCAS friends
- Private sectors

**Communication**

- Annual meetings
- Web
- Data Sharing

**Activity**


- Documentation of regional resources and traditional foods
- Collaborative research
- Human capacity building

**Application**


- Databases on regional food resources
- Books
- Managing Intellectual properties
- Recommendation to standards
- Product development



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## Core Members



- JIRCAS, CAU, KU, LIPI
- Satellite members:  
other research institutes, academic organizations in Asia, International organizations

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### Investigation on traditional foods

Pla-ra (fermented fish)      Nam pla (fish sauce)

DNA analysis of microorganisms

Miang (fermented tea leaves)

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### Local vegetables & Functionality

125%増加

● control  
● M. indicus  
● G. oxidalis  
● G. perakensis  
● M. indica  
● L. perfoliata  
● G. macrophylla

HOH<sub>2</sub>C  
|  
HO—C—NH  
|  
HO  
|  
OH

多環系ポリフェノール

ポリフェノール類の抗酸化活性

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### Properties of Local products

DSC (mW/g)

75  
70  
65  
60  
55  
50  
45

25 30 35 40 45 50

DSC (mW/g)

● 100% 籼米 (Indica rice)  
● 100% 粳米 (Japonica rice)  
● 50% 籼米 + 50% 粳米 (Indica/Japonica blend)  
● 25% 籼米 + 75% 粳米 (Indica/Japonica blend)  
● 75% 籼米 + 25% 粳米 (Indica/Japonica blend)

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### Product development

V-bite  
Nugget made from "antioxidative rice"

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### Meetings

Annual Research Meeting 2011 (Thailand)

Workshop in China (2012)

APEC seminar (2012), FAO regional conferences (2012 and 2013)  
MicrobialTech 2013 (Thailand)

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### Databases on the web

#### Tempeh (tempe)

1. 原料の選別と洗浄 (Raw material selection and washing)

2. 原料の乾燥 (Raw material drying)

3. 原料の粉砕 (Raw material grinding)

4. 原料の攪拌 (Raw material stirring)

5. 原料の発酵 (Raw material fermentation)

6. 原料の乾燥 (Raw material drying)

7. 原料の包装 (Raw material packaging)

8. 原料の流通 (Raw material distribution)

Local vegetables of Thailand  
Fermented foods of China  
Fermented foods of Thailand  
Traditional foods of Indonesia

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**Thank you for listening**



**Co-chair Saito:** Thank you. I am co-chair of this session and I would like to introduce the next speaker, Dr. Kazuhiko Nakahara. He is the project leader of a JIRCAS research project titled Advanced Application of Local Food Resources in Asia. His expertise is in the area of food chemistry. His presentation is “Regional Food Resource Network.” Dr. Nakahara, please.

**Dr. Kazuhiko Nakahara:** Good afternoon. So I will introduce the research network, not only research, the regional food resource network that we are making, currently making, I mean currently establishing.

This is under the JIRCAS project about utilization of natural food resources. And in Asian countries there are many natural food resources, such as indigenous plants, local plants, and mushrooms, forest meats, small animals, and insects and fishes, and the other many kinds of living things, and they are available in the forest or paddy fields and home gardens and around small communities in the rural area.

And in addition to that, they are making many traditional foods too. Fermentation foods made from soybeans, rice or fish or fruit, many of them, and non-fermented traditional processed food also. There are many variations, and some of them are common with each other.

And what we are thinking now is by collecting those scientific data from food resources in Asia and analyzing, for example chemical analysis or physical chemical analysis, we know something new from those food resources and create new products or adapted, or need to adapt to the local culture. If available, functional food also is possible to make, and new processed foods too. And to do that, we need advanced technology.

And to realize that, we are making a research network between Asian countries, and at present the core members are from Thailand, China, Indonesia, Vietnam, Laos, and international organizations, like AVRDC. And also, we want to have the company with domestic organizations, and JIRCAS friends, old fellowships, and the private sector too.

And what we will do is in communication we have annual meetings every year and show our activities on the web and publish the database on the web too.

And the other activities are, so this is the work of the researchers. Documentation of regional resources and traditional foods. And, for example, analysis of those food resources, we need to have collaboration. And at the same time, human capacity-building is also needed. And the application, this is like the outfit, I mean exit of this project, and making a database and open to the public. And managing intellectual property, this needs to be careful. The properties are basically based on each area or each country. And if possible, we will make the standards, the food standards for specific Asian food which do not exist in the Western world. And product development also, our purpose.

So I will introduce a little bit about what we are doing now. We are studying some fermented food from Asia. One is fermented fish and we analyze the chemical components and bacterial components by a DNA analysis method. And fish sauce and tea leaves also we are studying now. And in the past, we collected nutritional or functional properties data from indigenous vegetables in Thailand or fermented food from China, and they are, I mean the database of Thai vegetables is available already on the JIRCAS homepage.

And special properties of local products, such as rice noodles or some type of new food components from rice, are also studied. And we have some commercially-available products already.

And in 2011 we had the first annual meeting in Thailand with the core members of this network. And last year we also had a network workshop in China. In this meeting many small-scale private companies, private sector people joined. And the outside meeting in, for example, APEC seminar or FAO regional conference, we also



introduced our idea to the outside.

And we are going to have a new homepage of the food resource network under the JIRCAS webpage soon, planned for December or January. And we will put the database on fermented food in Indonesia, and so on. Thank you for listening.

**Co-chair Saito:** Thank you very much. Now we have general discussion and Dr. Nakahara is going to chair.