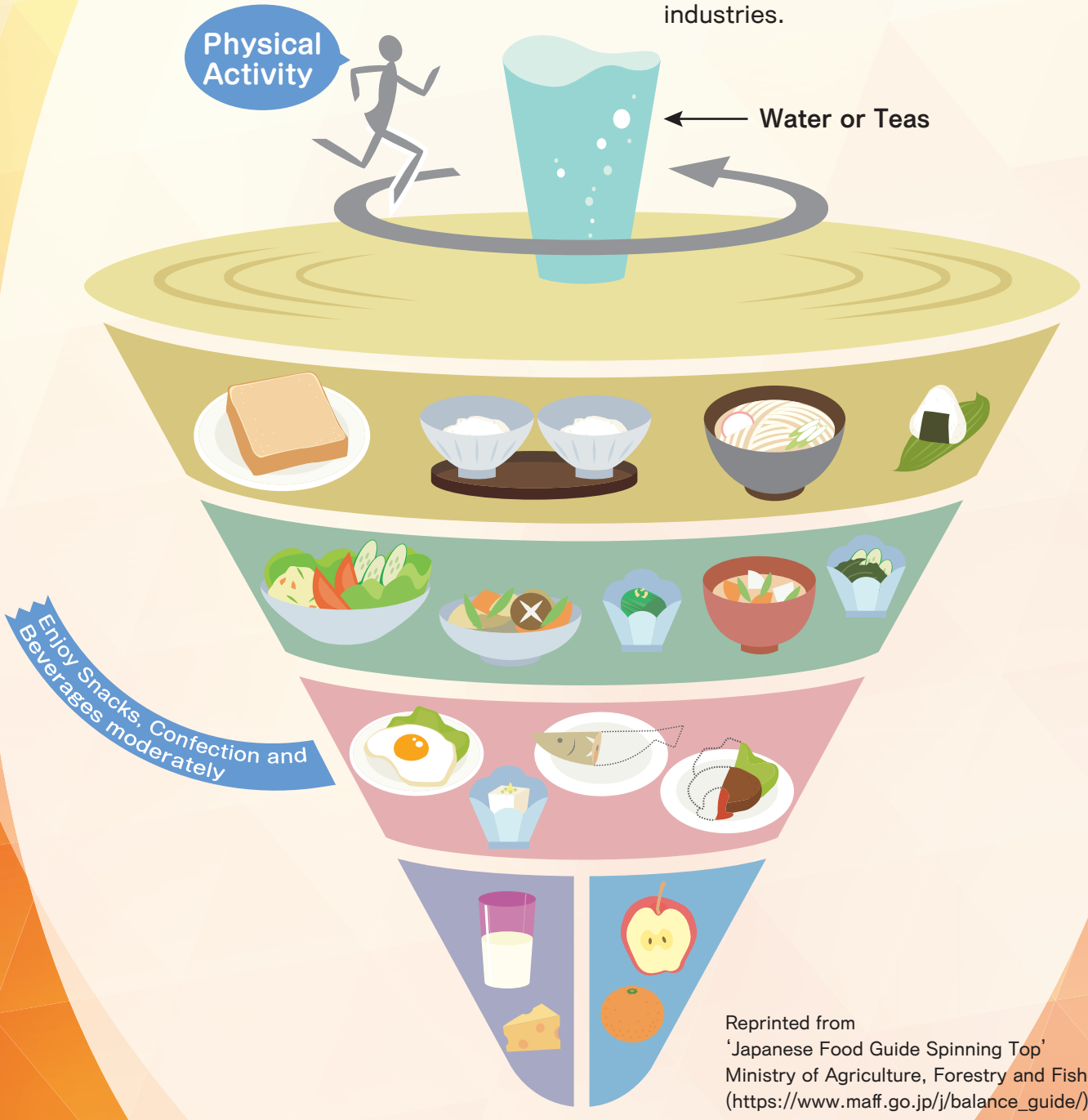
Food Research Institute, NARO

Focus on innovative researches for well-being of human and growing food industries.



Reprinted from
'Japanese Food Guide Spinning Top'
Ministry of Agriculture, Forestry and Fisheries HP
(https://www.maff.go.jp/j/balance_guide/)

The illustration of spinning top was created by Ministry of Health, Labor and Welfare and Ministry of Agriculture, Forestry and Fisheries in June 2005 as a food and nutrition education tool. The spinning top shows that the healthy life is supported by moderate quantity and quality of food and exercise.

Overview

Food Research Institute of National Agriculture and Food Research Organization (NARO) (National Research and Development Agency) was established as the Rice Utilization Research Institute under the Rice and Grain Management Bureau in 1934. Since then it has fulfilled its duty as a specialized national organization for food research as an institute affiliated with Ministry of Agriculture, Forestry and Fisheries of Japan. In April 2001, it was reorganized as an independent administrative corporation and then in April 2006, it became one of the internal institutes of the NARO. From April 2016, it has been reorganized as a research department of NARO and renamed as "Food Research Institute, NARO".

Food Research Institute, NARO provides useful technologies to food industry for the production of a wide variety of safe food, appropriate scientific information on foods to the public, and science-based data to governmental sections for foods, by conducting a wide range of studies on foods from basic to applied aspects.

The Council for Science, Technology and Innovation adopted the concept of “Society 5.0” in the “5th science and technology basic plan”. The plan shows in the new society, humans obtain a high-quality life, followed by making full use of artificial intelligence, computational technologies, and advanced mechanical technologies. NARO decides to contribute to the construction of “Society 5.0” in the field of agriculture and food industry.

Therefore we conduct researches aimed at realization of Society 5.0 addressing continuously evolving social needs as well as basic researches and state-of-the-art technological developments, focusing on the following three research areas under close cooperation among five research divisions.

- Evaluation and elucidation of three functions (nutrition, sensory and physiological functions) of agricultural products and foods and development of technologies for their effective utilization
- Development of technologies to ensure the safety and credibility of agricultural products and foods
- Development of distribution and processing technologies aiming at maintaining or improving the quality and functionality of agricultural products

Concerning the functionality of foods, so far, a plenty of research has been conducted by focusing on a certain ingredients targeted. However, recently, the development of technology for simultaneous analyses and so on has made it possible to evaluate effects of a combination of plural ingredients and/or a whole food product. Therefore, we are investigating the possibility of a system of comprehensively evaluating the three functions of foods.

In the research area for food safety and credibility of food control, we are involved in development of new analytical methods and scientific investigation in collaboration with various stakeholders including administrative sections such as Ministry of Agriculture, Forestry and Fisheries.

Also, in the research area of distribution and processing, Food Research Institute works together not only with other institutes within NARO, but also with research laboratories of private companies, universities, and public research institutions in mutual cooperation. Thus, we continue to provide new useful technologies for distribution and processing in food industrial field through introduction of new principles and concepts, improvement of conventional methods, and systematization of them.

Nowadays, it is necessary to introduce the concepts of “Sustainable Development Goals (SDGs)” to food researches because the SDGs imply many tasks related to food industry directly or indirectly. We, Food Research Institute, do our best for well-being of humans and growing food industries with researches that will help to supply delicious and safe foods stably, while focusing on realization of the sustainable growth of the world.

We cordially ask for your backing and cooperation.

Organization

Director-General

- Department of Research Promotion
- Healthcare Innovation Project
- Division of Food Function Research
- Division of Food Processing and Distribution Research
- Division of Food Safety
- Division of Analytical Science
- Division of Food Biotechnology

·Cross-departmental problem-resolution-type team

For current issues in food research, we organize flexible working teams to take prompt measures in cooperation with specialized or multi-disciplinary teams, depending on the scale of the issue.

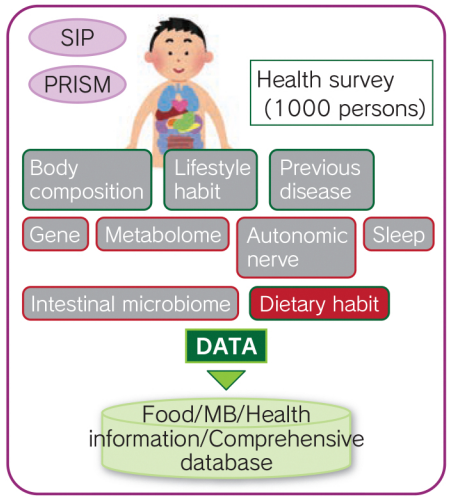
Current teams:

- ·Food analysis/standardization team
- ·Starch gelation analysis team
- ·Working group on effects of radioactive materials

Healthcare Innovation Project

Food function research is an important research area related to the healthcare industry based on food, the world market for which is growing. Therefore, it is necessary to accelerate its research in and out of NARO. The Director of Healthcare Innovation Research was appointed who is responsible for planning and controlling the research strategy to create the healthcare industry based on food by combining pre-harvest and post-harvest issues including the breeding research in NARO.

In addition, Healthcare Innovation Project was launched as an organization to promote the task of putting the fruits of research into practical use as quickly as possible based on the special assignment by the President, to make them usable for the society and to promote the research agilely.



Division of Food Function Research

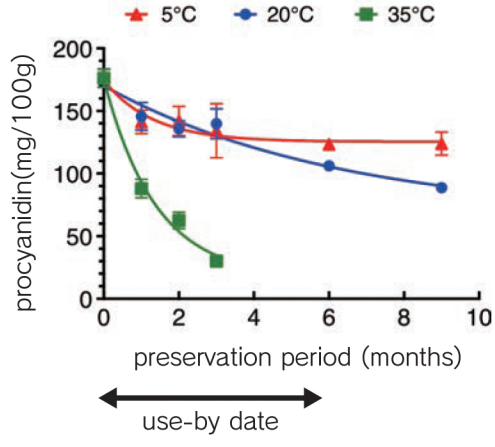
To be helpful in dietary lives with delicious and healthy foods, we are pursuing researches on, (1) nutrition/health function of agricultural products and Japanese foods, (2) development of functional agricultural products and foods, (3) development of evaluation technique of taste sensation of tasty foods.

[Organizational units] Nutritional Biochemistry Unit, Functional Food Factor Unit, Functionality Evaluation Unit, Food Physics and Functions Research Unit, Sensory Science Unit

Fresh apples and dried fruits as Foods with Function Claims

In vitro digestion of soybean curd (tofu) and cooked white rice by using a human gastric digestion simulator

Change in the amount of procyanidin, a functional ingredient, during the preservation test of apple dried fruits



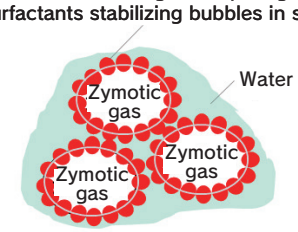
Division of Food Processing and Distribution Research

We are developing technologies of processing and distribution of foods to minimize the loss of quality of original materials and to add values, as well as the technologies of saving energy and recycling/reusing of natural resources.

[Organizational units] Food Process Engineering Unit, Food Resource Utilization Unit, Advanced Food Technology Unit, Food Quality Evaluation and Control Unit, Postharvest Science and Technology Unit

Bread dough made of rice powder containing no gluten / food additives

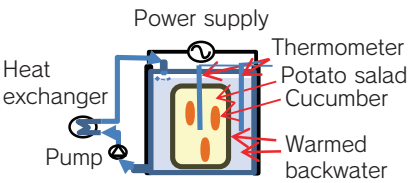
Rice starch granules stabilize zymotic gas bubbles in the dough, comparing to surfactants stabilizing bubbles in soap foam

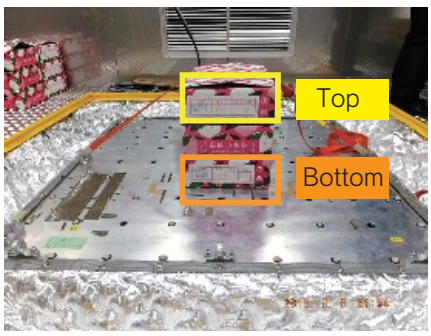


Bread dough foam as soft as meringue

Minimum heating process

Electro-magnetic heating of potato salad pouch in water (27 MHz)





Vibration test by using a three-dimensional vibration simulator

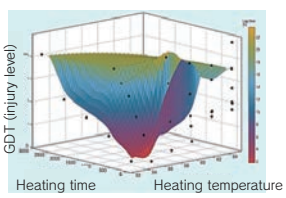
Simulation of vibrations imposed on agricultural produce and/or food products during transportation

Division of Food Safety

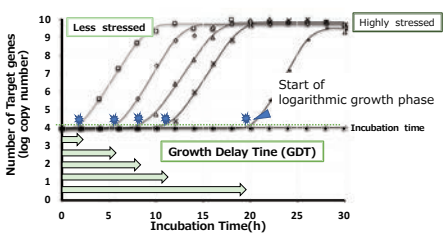
In order to ensure food safety, we are developing technologies to reduce chemical and biological hazards from farm to table in collaboration with researchers in other fields.

[Organizational units] Food Hygiene Unit, Chemical Hazard Unit, Food Entomology Unit, Food Safety Science Unit

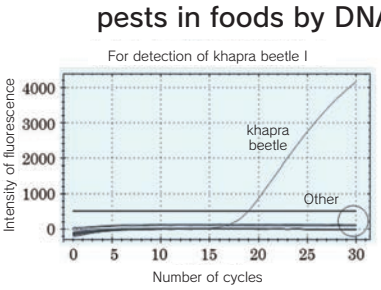
Assessment of the bacterial injury levels in food by using real-time PCR



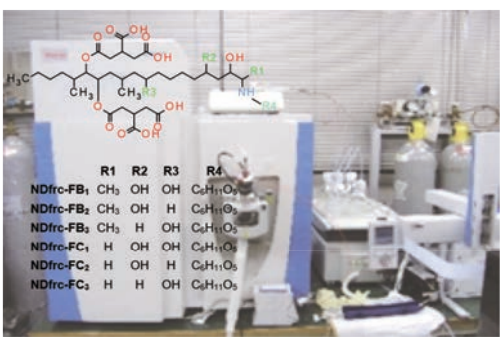
Assessment of injured *Salmonella* during heat treatment



Identification of contaminated insect pests in foods by DNA analyses

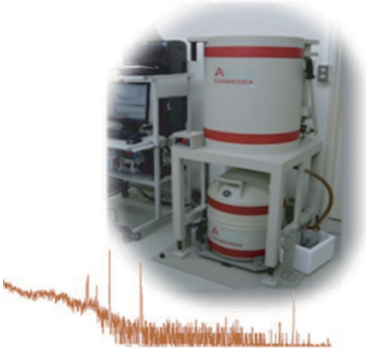


Development of analytical method for novel modified mycotoxins



Liquid chromatography-high resolution mass spectrometer

Measurement of radioactive cesium with gamma-ray spectrometry



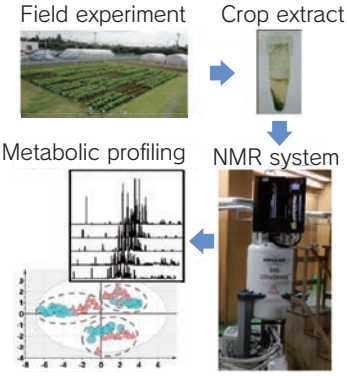
Certified reference material for quality assurance (brown Rice)

Division of Analytical Science

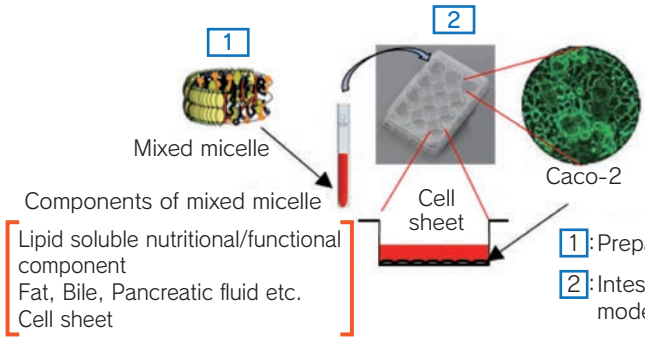
We are developing analytical technologies and evaluation methods for agricultural products and foods to ensure the credibility and quality of foods.

[Organizational units] Food Chemistry Unit, Nondestructive Evaluation Unit, Food Component Analysis Unit, Food Authenticity Analysis Unit

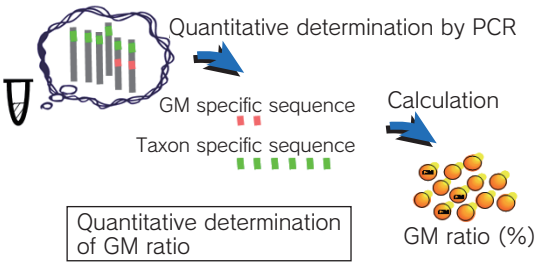
Application of NMR metabolomics to agricultural and food science



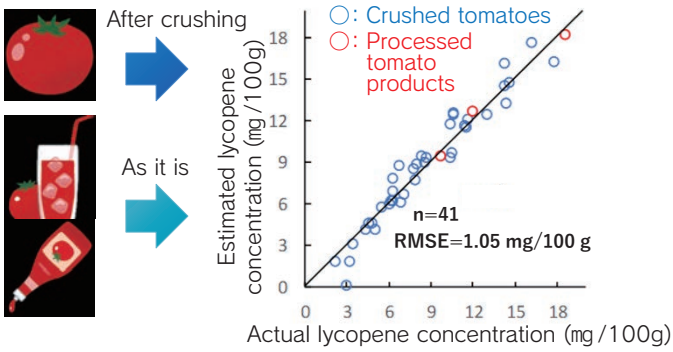
Digestion/Intestinal absorption test of lipid soluble nutritional/functional components



Development of detection methods of genetically modified foods



Development of quick and easy methods for estimating the content of functional components

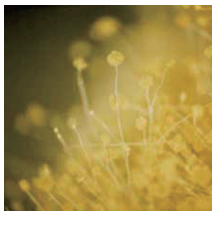


Division of Food Biotechnology

We are pursuing researches on the development of technologies for utilizing biofunctions and functional biomolecules of microorganisms, plants and animals. We are conducting a wide variety of researches, ranging from basic to applied aspects.

[Organizational units] Applied Mycology Unit, Applied Microbiology Unit, Enzyme Research Unit, Biomolecular Engineering Unit, Bioresource Conversion Unit

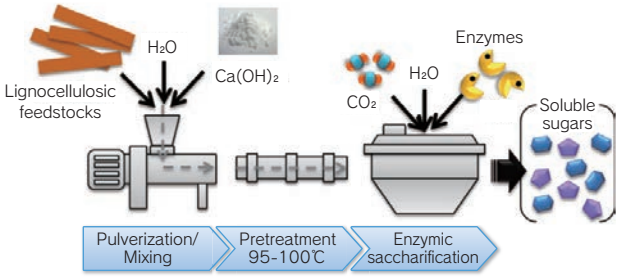
Researches related to traditional foods



Koji-mold (*Aspergillus oryzae, Aspergillus sojae, Aspergillus luchuensis*): Authorized as The National fungi

Bacillus subtilis (natto) and sticky ingredient (Polyglutamic acid)

Biomass-utilization research



Production of soluble sugars from lignocellulosic feedstock by the CaCCO (Calcium Capturing by Carbonation) process

Biotechnology-related researches

New material, polyol oil, produced by yeast

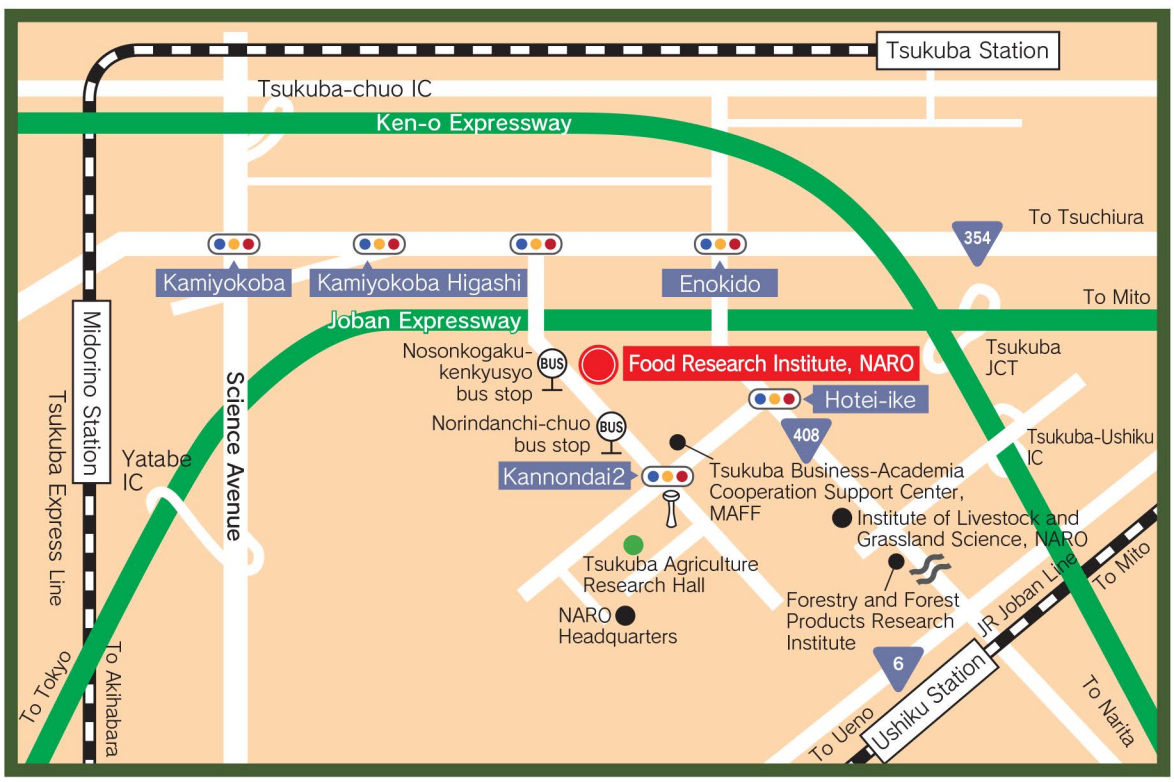
Tomato ripening mutants developed by CRISPR/Cas9 genome editing

Normal type G1#15A G1#29A

History

1934: Established as the Rice Utilization Research Institute under the Agricultural Bureau of the Ministry of Agriculture and Forestry in Tokyo.
1944: Reorganized as the Office of Food Administration Research Institute, Ministry of Agriculture and Forestry.
1947: Reorganized as the Food Research Institute, Ministry of Agriculture and Forestry.
1972: Reorganized as the National Food Research Institute, Ministry of Agriculture and Forestry.
1978: Reorganized as the National Food Research Institute, Ministry of Agriculture, Forestry and Fisheries.
1979: Moved to Tsukuba Science City from Tokyo.
2001: Reorganized as the Independent Administrative Agency, National Food Research Institute.
2006: Merged with the Independent Administrative Agency, National Agriculture and Food Research Organization (NARO).
2015: Reorganized as the National Research and Development Agency, National Food Research Institute, National Agriculture and Food Research Organization.
2016: Reorganized as the Food Research Institute, National Agriculture and Food Research Organization.

Location map



Access

[Railroad and Bus]

●**JR Joban Line, Ushiku Station** west exit
Take Kanto Tetsudo Bus at the West Exit Bus Stop for Yatabe-shako, Seibutsuken-owashi-campus or Tsukubadaigaku-byoin → (about 20 min) → Get off at Nosonkogaku-kenkyusho → 1 min on foot.

●**Tsukuba Express(TX) , Tsukuba Station** A3 exit
Take Tsuku Bus Nanbu Shuttle at Tsukuba Center bus stop No.2 for Kukizaki-madoguchi-center or Kukizaki-rojin-fukushi-center → (about 18 min) → Get off at Norindanchi-chuo bus stop → 5 min on foot

●**Tsukuba Express(TX), Midorino Station**
・Take Tsuku Bus Jiyuugaoka Shuttle at the bus stop for Fujimidai → (about 20 min) → Get off at Norindanchi-chuo bus stop → about 5 min on foot
・Take Kanto Tetsudo Bus at the bus stop for Tsuchiuraeki-nisiguchi or Norindanchi-junkan → (about 20 min) → Get off at Nosonkogaku-kenkyusho → 1 min on foot.

[Car]

●Joban Expressway : about 5 km from Yatabe IC
●Ken-o Expressway : about 4 km from Tsukuba-Ushiku IC
●Ken-o Expressway : about 5 km from Tsukuba-chuo IC

NARO
National Agriculture and Food Research Organization

NARO is the communication name for National Research and Development Agency, National Agriculture and Food Research Organization.

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