Volume 29

Enzyme Wave

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AMANO
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CONTENTS

Trend

Recent Policy Developments in Bio-based Manufacturing Worldwide

Author

Yuji Sakamoto

[Brief background]
1980 : Graduated from the Faculty of Agriculture, Kyushu University
1982 : Completed a master's degree at the Graduate School of Kyushu University
1982 : Joined Kirin Brewery Co., Ltd.
2013 : Seconded to the Japan Bioindustry Association (General Incorporated Foundation)
Became assistant director of the Japan Association of Bioindustries Executives
2023 : Became a research fellow at the Research Organization for Nano & Life Innovation, Waseda University
2024 : Appointed part-time director of the Planning Department at the Japan Bioindustry Association (General Incorporated Foundation)
2026 : Became director of the Hydrosphere BioGX Initiative (General Incorporated Association)

As biomanufacturing is currently being discussed in the Japanese government's growth strategies, this article outlines recent policy trends related to bio-based manufacturing in Europe, the United States, China, and South Korea.

Europe, which was the earliest adopter of bio-based manufacturing, has pursued a circular bioeconomy aimed at sustainable production, as exemplified by the Green Deal policy introduced in 2019. Taking into account the technological competition with the United States and China, it also has been strengthening the acceleration of real-world implementation through easing regulations under the Biotechnology Act proposed by the European Commission.

In the United States, the second Trump administration, beginning in 2025, has moved to repeal policies introduced under President Biden to promote bio-based manufacturing, including Executive Order 14081 issued in 2022 and the Inflation Reduction Act of the same year. At the same time, it is also strengthening new bio-based manufacturing policies that emphasize reshoring supply chains for national security considerations, in coordination with recommendations issued in 2025 by the National Security Commission on Emerging Biotechnology (NSCEB) established by the U.S. Congress, as well as initiatives such as BioMADE.

China, which is a key focus of U.S. policy attention, has positioned the bioeconomy as a national priority in its Bioeconomy Development Plan under the 14th Five-Year Plan announced in 2022. Under party- and government-led policies emphasizing nationwide mobilization and civil-military integration, it has established multiple major hubs for synthetic biology, while individual companies are accelerating efforts to set up dedicated divisions to promote the adoption of synthetic biology and AI and to build large-scale cultivation facilities. A total of 43 biomanufacturing pilot plant construction platforms have been announced, with one such example being in the field of polylactic acid, where production facilities capable of supplying several hundred thousand tons annually from a single company have been constructed.

In South Korea, the Presidential Bio Committee and the Korea Bio-Great Transformation Strategy were announced in 2025, and the world's first Food Tech Industry Promotion Act and Synthetic Biology Promotion Act were enacted the same year, reflecting efforts to position bio-based manufacturing as a new national growth engine after semiconductors.

Against this backdrop of global developments in biomanufacturing, stakeholders across industry, government, and academia in Japan need to engage in timely discussions and agreement on measures that are appropriate for Japan's future and enable it to maintain its strong international presence, and work together to implement said measures.

Column

Ancient and Ever Renewed: The Spirit of Sustainability Passed Down at Ise Grand Shrine

Author

Kiyomi Chikusa

[Brief background]

Born in Mie Prefecture, writer. Part-time lecturer at Kogakkan University. After serving as editor-in-chief of the Mie-based regional magazine *Ise-Shima*, she transitioned to a career in writing. She contributed the serialized column "Ise, the Eternal Sacred Place" to the monthly Shinkansen magazine, *Hitotoki*, for eight years. She covered the *Shikinen Sengu* ceremonies of 1993 and 2013 and has given lectures and written extensively on Ise Grand Shrine. Her publications include *Ise Jingu Shikinen Sengu Sanpai Guide* (A Visitor's Guide to the *Shikinen Sengu* of Ise Grand Shrine), Ise *Saigoku Sanjusan-sho Kannon Junrei: Mou Hitotsu no Oise Mairi* (The Ise Saigoku Thirty-Three Kannon Pilgrimage: Another Ise Journey), and *Megami no Seichi, Ise Jingu* (Ise Grand Shrine, the Sacred Land of the Goddess), which was selected by the National School Library Association of Japan. She has also served as a commentator for Mie Television and as a member of the Mie Prefecture Tourism Council.

In the "Biotechnology in Japan" series, we share contributions on Japanese culture and traditions. In this seventh installment, we feature an article by writer Kiyomi Chikusa, who has spent more than 30 years covering Ise Grand Shrine, exploring the history and significance of the *Shikinen Sengu* and the insights it offers for a sustainable society.

Sustainability has become a key concept of our time and is now regarded as an important consideration in many fields. The combination of Ise Grand Shrine, where deities are enshrined, and modern sustainability may seem unexpected. However, the shrine's largest ritual is called *Shikinen Sengu*. Held every 20 years, it involves rebuilding the shrine buildings and transferring the deities to newly constructed structures. This practice was first carried out 1,300 years ago. Despite interruptions that lasted more than 100 years and changes to the times and shifting values, the ritual has remained.

The first *Shikinen Sengu* was held in 690, over 1,300 years ago. Amid the influx of systems and cultures from China, including Buddhism, Empress Jito made a major shift by replacing the custom of relocating the palace with each imperial reign with the establishment of Fujiwara-kyo in present-day Nara, a permanent capital modeled after Tang China, while at the same time preserving a distinctly native Japanese Shinto tradition conceived by Emperor Tenmu of rebuilding Ise Grand Shrine every 20 years.

With this, two sacred sites were designated for rebuilding the shrine. There are two sites to the east and west, and the shrine is moved from east to west and from west to east every 20 years. Through this repeated rebuilding, Ise is home to shrine buildings that are new yet take an ancient form. In other words, by renewing the buildings, the traditional, original form of the shrine has been preserved.

I covered the *Shikinen Sengu* in both 1993 and 2013. In particular, for the 62nd ceremony in 2013, I was able to continue reporting for nine years, covering 33 rituals and events associated with the *Sengu*, known as *Sengu-shosai*, as well as the rebuilding of auxiliary shrines.

Each *Sengu* brought with it a new key concept. In 1993 it was "kinari" culture, and in 2013 it was "tokowaka." Kinari refers to the concept of an "undecorated state in its natural form" and originates from unbleached cloth or thread. Indeed, the shrine buildings at Ise Grand Shrine are not painted vermilion or other colors as is so common in Japan, but are left as bare wood, showcasing the beautiful grain of the cypress. The elevated buildings in the Shinmei-zukuri style also feature almost no ornamentation aside from metal fittings. It is this extreme simplicity that defines the buildings. This use of plain, simple materials is said

to make rebuilding every 20 years possible and also allows materials to be reused more easily.

Tokowaka, written with the characters meaning "eternally young," expresses the belief that the revered deities should always reside in new, well-maintained shrines. I first heard this term from a Shinto priest at Ise Grand Shrine. Here, “young” does not refer to age, but to a sense of newness. This can also be seen as connected to Shinto’s emphasis on purity. I believe this is one reason why the buildings are renewed even though they are not broken. This concept gained widespread support and was even used in the name of the Mie Tokowaka National Sports Festival*.

In recent years, Ise Grand Shrine has increasingly been discussed in connection with ideas such as sustainability and recycling. Essential to the *Shikinen Sengu* is the sacred cypress timber used for construction. The Yamaguchi Festival, the first of the *Sengu*-related rituals, prays to the mountain deities for safety when felling this timber. The *Sengu* begins with the cutting of sacred timber from the mountains. Today, the timber is sourced from national forests in Nagano and Gifu prefectures. Rather than leaving mountain forests untouched, they are managed through planned logging and use, which helps ensure their long-term sustainability.

Last November, a tree planting festival was held on Mount Kamiji near the Inner Shrine by shrine staff. Led by the chief priest, shrine priests and shrine maidens clung to the mountain slopes and hand planted 700 three-year-old saplings grown from seeds taken from cypress trees on Mount Kamiji. I was surprised to learn that this tree planting festival began in 1950. It started the year after the 1949 *Shikinen Sengu* was postponed following the end of World War II. The saplings are planted with prayers that, 200 years from now, they will become the sacred pillars of the shrine buildings. I cannot help but feel that the shrine’s approach to sustainability exists precisely because of the goal of being able to continue carrying out the *Shikinen Sengu*.

* It was canceled in 2021, but will be renewed as the National Sports Festival in 2035.

Tree planting festival held on November 18, 2025, in the Hanatsukidani area of Mount Kamiji.
The aim of this festival is to cultivate cypress trees for use in the *Shikinen Sengu*.

Trend

Universities as Catalysts for Open Science and Sustainable Future

Author

Dr. Karin Markides

[Brief background]
Executive Advisor, Okinawa Institute of Science and Technology
President Emerita, Okinawa Institute of Science and Technology
OIST is the third university Dr. Markides has led as President and CEO, following Chalmers University of Technology in Sweden and American University of Armenia. She was Chairman of DTU in Denmark and a member of several company boards. A former Chair Professor of Analytical Chemistry at Uppsala University, she supervised over 30 PhD graduates and published 300 scientific publications. She is Elected Member of the Royal Swedish Academy of Engineering Sciences (IVA) and the Royal Swedish Academy of Sciences (KVA) and contributes to the Nobel Prize in Chemistry selection.She earned her doctorate degree from University of Stockholm in Sweden.

Our world is currently facing diverse and pressing challenges – over 40 countries and regions are presently in active armed conflicts, civil unrest, or violence*1, highlighting that overly polarizing politics does not work for problem-solving towards the sustainable future of humanity. Universities are not exempt from such turbulence. In response, universities must act as a trustworthy stakeholder protecting the core values of higher education and in sync with civic society. More importantly, universities must proactively embrace a new role as catalysts for Open Science, unlocking global, national, and local solutions through multilateral collaboration and science diplomacy.

Catalytic incentives are needed for the three essential roles of universities: scholarship and knowledge creation in research and education, nurturing academic talent and future leadership, and translating discoveries into practical knowledge for dissemination and applications. By utilizing the power of digital platforms and generative AI and defining interactive strategies, universities' role will enhance and become essential for realizing true sustainable and resilient solutions.

Open Science goes deeper than a technical framework and introduces a cultural shift in collaboration for the macro community which includes academia, industry, and civic society and integrates across global, local and national opportunities. When universities provide creative incentives from diverse sources to foster and catalyze open science with interdisciplinary and inter-stakeholder interactions, breakthrough discoveries from the labs and open innovation with industry for pre-competitive research will more easily find pathways to converge and generate transformative societal impact.

At Okinawa Institute of Science and Technology (OIST), we catalyze open science and open innovation for a sustainable future. Built on an interdisciplinary, department-free model (see figure), OIST's 93 faculty-led research units foster excellence, agility, and exploratory collaboration across disciplines, supported by high-trust funding with a rigorous international post-evaluation. Beyond research, OIST integrates open science practices and mindset with innovation and outreach infrastructure—spanning collaborative physical and intellectual spaces, global visiting programs, entrepreneurship support, and real-world testbeds—to translate knowledge into responsible societal impact. By embedding the model of catalytic Open Science, OIST demonstrates how universities can align research, education, and partnerships to accelerate novel scientific discoveries and address complex challenges. Universities of the 21st Century invite society to participate and benefit through informed and trust-building engagement with the opportunities and responsibilities of rapidly expanding knowledge-based ecosystems.

*1 : Countries Currently at War 2026

Report

Food Enzyme Global Regulations

Food enzymes are essential to the production of many foods around the globe, including bread, dairy products, Japanese sake, juice, miso, and soy sauce. Enzymes make use of natural processes to stabilize the flavor and texture of foods. They also reduce production time and energy use, lowering environmental impact. As a result, they also contribute to reducing food loss.

Around the world, efforts have been made to establish rules to ensure the safe use of enzymes. The development of international regulations began in the 1970s, with early safety evaluations conducted by UN bodies such as JECFA (the FAO/WHO Joint Expert Committee on Food Additives) and the U.S. Food and Drug Administration, forming the foundation of today's regulatory systems.

In the European Union, all food enzymes are subject to safety evaluation under food enzymes regulations introduced in 2008, with the ongoing registration of such enzymes on a Union List. Applications for registration require detailed data, including full genome information of the production strain and assessments of toxicity and allergens. A highly transparent electronic application system has been established, and discussions on simplifying evaluations are also underway. The Union List is scheduled to come into effect in 2028.

In the United States, enzymes recognized as safe are widely used under the GRAS system. While a fundamental review of the GRAS system is currently under consideration, the FDA is also examining the introduction of new toxicity assessment tools. Under these tools, enzymes are expected to be classified in the lowest toxicity category.

In Japan, many enzymes are treated as existing food additives. In 2025, a notification system for production strains was introduced, further enhancing transparency and safety.

In China, reviews are conducted based on national standards (GB standards). In Australia and New Zealand, FSANZ (Food Standards Australia New Zealand) conducts scientific evaluations, and the review process is made public through a public comment system.

Regulations governing enzymes vary by country and region. Beyond legal requirements, it is also important to understand the cultural and social values that shape these regulatory frameworks and to stay aligned with the latest developments. Enzymes play an important role in helping to address global challenges. Amano Enzyme will continue to adapt to evolving regulations to deliver safe and high-quality enzymes worldwide while safeguarding both food quality and safety.

Regulatory Systems by Country (as of 2025)

Country/Region	Regulatory System	Key Features and Recent Developments
EU	Food Enzymes Regulation (Reg. EC No.1332/2008)	Registration on the Union List after safety evaluation Union List scheduled to take effect in 2028 Electronic application system and discussions on simplified evaluation
United States (USA)	GRAS system	Wide use of enzymes recognized as safe Consideration of abolishing self-affirmed GRAS system Introduction of evaluation tools and response to synthetic biology
Japan	Existing additive system New approval system	Notification system for production strains to be effective in 2025 Enhanced information disclosure
China	National standards (GB standards)	More stringent analytical documentation requirements
Australia/ New Zealand	FSANZ review system	Scientific evaluation, transparency, and public comment system

Symposium

The 2nd North America-Japan Enzyme Technology Symposium

On September 22, 2025, the University of Minnesota and Amano Enzyme co-hosted the 2nd North America-Japan Enzyme Technology Symposium in Minneapolis, Minnesota, following the first symposium in 2023. The University of Minnesota has been strengthening its research collaboration with the University of Tokyo, through mutual visits. By holding our co-hosted symposium alongside the University of Tokyo visit at the University of Minnesota, we aimed to foster broader research connections.

The event welcomed approximately 70 onsite attendees and 45 online participants. In the invited lectures, eight invited speakers from Japan and the United States presented research findings covering topics such as advanced enzyme functionality and the development of plastic-degrading enzymes. These lectures highlighted the potential of enzymes in building a circular society, followed by an active discussion.

In addition, 13 graduate students and early-career researchers gave presentations during the poster session and flash talks. At the closing ceremony, Poster Awards were presented to two presenters, expressing expectations for the future achievements of young researchers.

We would like to express our sincere gratitude to all those who supported the organization of this symposium. We will continue to contribute to the advancement of enzyme research and support symposium activities in Japan, North America, and other regions worldwide.

Speaker	Affiliation
Kate Adamala	University of Minnesota
Hal Alper	The University of Texas at Austin
Saori Kosono	The University of Tokyo
Huimin Zhao	University of Illinois Urbana-Champaign
Michelle Chang	Princeton University
Shinya Fushinobu	The University of Tokyo
Romas Kazlauskas	University of Minnesota
Satoru Ishihara	Amano Enzyme Inc.

Symposium

Enzyme Technology: New Opportunities for AMANO-HUS Collaboration

On October 24, 2025, the workshop "Enzyme Technology: New Opportunities for AMANO-HUS Collaboration" was held in Hanoi, Vietnam, co-hosted by Vietnam National University Hanoi, University of Science (VNU-HUS) and Amano Enzyme. This workshop aimed to promote enzyme technology research in Vietnam, following the 2nd Asia-Pacific Enzyme Technology Symposium in 2024.

Approximately 60 faculty members and students participated in the event. Five researchers from Japan and Vietnam presented research findings covering topics on biosynthetic enzymes for natural compounds and microbial resources in Vietnam. There was also a lively Q&A session, providing researchers from both countries a valuable opportunity to connect and build relationships.

Amano Enzyme will continue to promote academic collaboration of this kind and contribute to the advancement of enzyme research and industry-academia collaboration in both Japan and Vietnam.

Symposium

The 8th Sino-Japan Joint Symposium on Enzyme Technology

On November 1, 2025, the 8th Sino-Japan Joint Symposium on Enzyme Technology was held in Jiaxing City, Zhejiang Province, China, jointly organized by Amano Enzyme, Jiangnan University, and the Jiaxing Future Food Research Institute. Having been held biannually since 2011, this symposium aims to contribute to the further development of enzyme applications in Asia by enabling direct interaction between Japanese and Chinese researchers in the field of enzymes and facilitating the sharing of knowledge and technologies.

This year's symposium was themed around "Health Food and Enzymes," reflecting factors such as China's aging population and increasing health awareness trend in recent years. A total of eight researchers and experts from Japan and China delivered presentations from multiple perspectives, covering topics such as safety assessment of enzymes in the health food sector, application examples in product development, the latest research findings and analytical technologies, as well as market trends. From Japan, Professor Norihisa Kato of Hiroshima University and Associate Professor Shigenobu Kishino of Kyoto University presented their latest research findings in their respective fields.

A total of 113 people from various companies, universities, and research institutes attended the symposium and took part in active question-and-answer sessions and discussions. Discussions also deepened on the possibilities of joint research and industry-academia collaboration, reaffirming the importance of building cross-border networks. Amano Enzyme will continue to value international exchange opportunities such as this symposium and aim to further advance enzyme technology and contribute to society through research collaboration between China and Japan and cooperation with industry.

Speaker	Affiliation
Yongxiang Fan	China National Center for Food Safety Risk Assessment
Norihisa Kato	Hiroshima University
Shigenobu Kishino	Kyoto University
Ding Gangqiang	Chinese Center for Disease Control and Prevention
Lijun You	South China University of Technology
Haoran Yu	Zhejiang University
Xiao Liu	Jiangnan University, Science Center for Future Foods
Yuki Ishigaki	Amano Enzyme Inc.

Symposium

Enzyme workshop at CPHI & PMEC India 2025

On November 25, 2025, we hosted a workshop in Delhi, India, on the theme of "Sustainable Manufacturing of Pharma API and Intermediates ." This workshop was held during our exhibition at CPHI & PMEC India 2025, one of the world's largest expos for active pharmaceutical ingredients, with the aim of further promoting the use of enzymes in pharmaceutical synthesis.

We were joined by Dr. Yasuhisa Asano, Professor Emeritus of Toyama Prefectural University (currently with AEnzam), from Japan, and Dr. Kumaraguru Thenkrishnan of the CSIR–Indian Institute of Chemical Technology, from India, who delivered insightful and highly specialized lectures on the features and practical applications of enzyme technologies. The event was attended by many participants, and active question-and-answer sessions and discussions followed the lectures.

India is one of the world's largest suppliers of active pharmaceutical ingredients, alongside China. Through the expansion of enzyme-based methods in this region, Amano Enzyme will continue to contribute to sustainable pharmaceutical manufacturing and to the advancement of green chemistry, including the reduction of environmental impact.

Information

Jokichi Takamine Study Group, NPO

Dr. Jokichi Takamine

Dr. Jokichi Takamine lived through the dramatic period of time from the end of the Tokugawa shogunate, Meiji era, and Taisho era. He left a great legacy as a scientist, entrepreneur, and an international goodwill ambassador. Dr. Takamine is called the father of modern biotechnology for his research and development of amylolytic enzymes derived from microorganisms, mainly Taka-Diastase.

Dr. Jokichi Takamine
(photo courtesy Great People of Kanazawa Memorial Museum)

Jokichi Takamine Study Group, NPO

The NPO, Dr. Jokichi Takamine Study Group, is engaged in educational activities, such as publishing journals and holding lectures, in order to make more people aware of Dr. Takamine, who made a great contribution to the development of science and technology in modern Japan, its commercialization, and goodwill between Japan and the United States.

Main Activities

In 2025, the group held activities in various areas to share Dr. Jokichi Takamine's willingness to take on challenges and pioneering spirit with younger generations. At museums in Tokyo, the group held lectures that highlighted Dr. Takamine's multifaceted endeavors while showing how scientific knowledge connects with society. At a junior high school in Tokyo, the group also took part in entrepreneurship education programs, speaking at places associated with Eiichi Shibusawa and sharing with students how Dr. Takamine and Shibusawa each helped shape their time through both science and business. In Dr. Takamine's birthplace of Takaoka City, and in Kanazawa City, where he spent his childhood, the group held 17th annual lectures, introducing junior high school and university students to Dr. Takamine's life as both a pioneer of biotechnology and an entrepreneur. It also expanded its outreach through a wide range of channels, including providing images for educational books and television programs and publishing research articles. In the coming year, we hope to continue to provide accurate information and educational outreach.

Lecture at Horifune Junior High School, Kita Ward, Tokyo, held as part of the group's entrepreneurship education activities at a site associated with Eiichi Shibusawa.

Lecture at Kanazawa Institute of Technology, including student-led outreach activities such as science classes and events for elementary, junior high, and high school students, conducted as part of the "You Are the Future Dr. Jokichi Takamine! Fermentation Industry Revitalization Project."

Topic Entrepreneurship Education and Jokichi Takamine

Dr. Jokichi Takamine was not only a scientist who helped pioneer biotechnology in Japan, but also an entrepreneur who launched multiple businesses. His commitment to bringing scientific discoveries to society was further strengthened through his relationship with Eiichi Shibusawa and played an important role in Japan's industrial development during the Meiji era. This year, we advanced initiatives at educational institutions across Japan, including lectures on entrepreneurship education in Tokyo's Kita Ward, presenting Dr. Takamine's thinkings as a foundation for building the future. By repeatedly taking on challenges and developing new fields, the life of Dr. Takamine offers young people living in an era of change a clear model for forging their own paths. His spirit of bridging science and business to shape the future continues to resonate strongly with modern entrepreneurship education.

Dr. Takamine has graves at Woodlawn Cemetery in New York and Aoyama Cemetery in Tokyo. Pictured is one of the graves with a furry visitor.

Scan the QR code ▶ to visit the Study Group's website.

Notification of the recruitment of new members

The Jokichi Takamine Study Group is accepting supporting members.

Supporting members will receive publications related to Dr. Takamine and regularly issued newsletters. They also receive information about lectures, events, and news.

If you would like to join us, please write your name (if you are a corporate body, company/organization name and department), postal code, address, phone number (no cell phone number accepted), occupation, age, and sex on a letter or a postcard and mail it to us. We will return a bank transfer form to pay the initiation fee and the annual membership fee.

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Toranomon, Minato-ku, Tokyo
105-0001 Japan

*For more details, please visit our website.
https://npo-takamine.org/membership/

Conference presentation

Amano Enzyme has decided academic presentations such as the following.

Conference/Meeting	Date	Title	Speaker
2025 AOCS Annual Meeting & Expo	Apr. 27th-30th, 2025 (Oregon, USA)	Functional Modification of Protein-glutaminase and its Industrial Application	Kazunori Yoshida
		Enzymatic Advancements in Plant-Based Milk: Enhancing Taste and Nutritional Value	Minghong Yang
4th Swiss-German-Japanese Workshop on Biocatalysis and Bioprocess Development	Jun. 26th, 2025 (Greifswald, Germany)	ENGINEERING OF INNOVATIVE PROTEIN-GLUTAMINASE FOR PLANT-BASED FOOD APPLICATION	Kazunori Yoshida
2025 IFT First Annual Event and Expo	Jul. 13th-16th, 2025 (Illinois, USA)	From Months to Minutes: The Future of Cheese Aging with Enzymes	Monica Henry
Microbe Week 2025 "Utilizing Microorganisms for Industrial Applications: Challenges from Corporate Research, Part 1"	Jul. 29th, 2025 (Tokyo, Japan)	The Profound Depths of Enzyme Production by Microorganisms (Liquid Fermentation, Koji Cultivation)	Koji Mito
Japan Society of Food Science and Technology 72nd Convention	Aug. 27th-29th, 2025 (Tokyo, Japan)	Umami and saltiness enhancements of textured pea proteins by combining protease- and glutaminase-catalyzed reactions	Kiyota Sakai
74th JSAG Annual Meeting	Sep. 3rd-5th, 2025 (Okayama, Japan)	Functional analysis of novel glucose 2-epimerases	Ryo Takaoka
The 77th Annual Meeting of the Society for Biotechnology, Japan	Sep. 11th, 2025 (Hiroshima, Japan)	Enzyme Production by Koji (Solid-State) Cultivation	Koji Mito
Japan Society for Meat Science and Technology, Fall Symposium	Sep. 15th, 2025 (Gifu, Japan)	Improved functional properties of plant-based meat analogs by industrial enzymes	Kiyota Sakai
The 2nd North America–Japan Enzyme Technology Symposium	Sep. 22nd, 2025 (Minnesota, USA)	Performance expansion of industrial specialty enzymes	Satoru Ishihara
2025 China High-Quality Development Conference for Protein Beverages, Functional Beverages, and Solid Beverages	Oct. 20th, 2025 (Hubei, China)	Enzyme-driven technological innovation in the beverage industry	Panhui Wang
Joint Symposium with Vietnam National University Hanoi University of Science and Amano Enzyme Inc	Oct. 24th, 2025 (Hanoi, Vietnam)	Advances in structure-based enzyme engineering and future prospects	Satoru Ishihara
The 8th Sino-Japan Joint Symposium on Enzyme Technology	Nov. 1st, 2025 (Zhejiang, China)	Enzyme Market as Digestive Aids and Nutritional Supplements in the World	Yuki Ishigaki
Fungal Molecular Biology Conference, Workshop	Nov. 16th, 2025 (Aichi, Japan)	Enzymes creating a sustainable food future: The cutting edge of plant-based food applications	Kazunori Yoshida
		Enzyme Production by Koji (Solid-State) Cultivation; Expanding Prospects from Filamentous Fungi Research to Industrial Applications	Koji Mito
5th Amano Enzyme Research Grant Presentation	Nov. 21st, 2025 (Aichi, Japan)	Functional analysis of novel glucose 2-epimerases	Ryo Takaoka
The Japanese Society for Food Science and Technology, Chubu Symposium 2025	Dec. 13th, 2025 (Gifu, Japan)	Enzyme applications for plant-based meat analogs	Kiyota Sakai
Japan Society for Bioscience, Biotechnology, and Agrochemistry annual meeting 2026	Mar. 9th, 2026 (Kyoto, Japan)	Functional analysis of a novel glucose-fructose oxidoreductase	Kakeru Nagaki

Journal/Book	Date	Title	Author
Trends in Food Science & Technology 2025, Vol.156, 104870	Jan. 2025	Valorization of animal by-product enzymes: Advancing sustainable food processing through innovative extraction, purification, and application strategies	Wei Luo, Jingnan Zhang, Mirja Kaizer Ahmmed, Kiyota Sakai, Fereidoon Shahidi, Zijian Zhi, Haizhou Wu
Food Science and Technology Research 2025, Vol.31, No.3, FSTR-D-24-00222	Jan. 2025	Glutamic acid production methods by protease and protein-glutaminase for plant-based meat analog patties	Kiyota Sakai, Masamichi Okada, Shotaro Yamaguchi
Food Research International 2025, Vol.202, 115721	Feb. 2025	Microbial protease supplementation improves gastric emptying and protein digestive fate of beef for the elderly under dynamic in vitro digestion	Zhitong Zhou, Yang Liu, Yuki Ishigaki, Shotaro Yamaguchi, Jian Chen, Xiao Liu
Journal of Agricultural and Food Chemistry 2025, Vol.73, No.8, 4829-4839	Feb. 2025	Computational design of Burkholderia cepacia lipase mutants that show enhanced stereoselectivity in the production of L-menthol	Jinzen Ikebe, Kazunori Yoshida, Satoru Ishihara, Yoichi Kurumida, Tomoshi Kameda
Current Research in Food Science 2025, Vol.10, 101022	Mar. 2025	Umami and saltiness enhancements of textured pea proteins by combining protease- and glutaminase-catalyzed reactions	Kiyota Sakai, Nickolas Broches, Keita Okuda, Masamichi Okada, Shotaro Yamaguchi
Seibutsu-kogaku Kaishi, Volume 103 Issue 5 Pages 180–186 (2025)	Mar. 2025	Study on Amazake production methods to increase Resistant Protein content	Tatsuki Kato, Yuki Ishigaki, Hiroki Fujioka, Kan Yamashiro, Hideyuki Yamashita, Kenji Ozeki
Food Chemical, 2025, Vol41 No8 (484)	Aug. 2025	Forty Years of Development in Speciality Enzymes for Food Processing	Shotaro Yamaguchi
Bulletin of Applied Glycoscience 2025, Vol15, No3	Nov. 2025	Characteristics and industrial applications of fungal β-1,4-mannanase	Ryutaro Nishigaki, Kiyota Sakai, Masashi Kato, Motoyuki Shimizu
Food Science and Technology Research 2025, Vol.31, No.6	Nov. 2025	Protein-glutaminase represses aggregate formation via electrostatic interactions between fish gelatin and carrageenan	Kiyota Sakai, Masamichi Okada, Shotaro Yamaguchi

2026 Exhibitions

Date	Exhibition	Location
January 29-31	Medical Fair India	New Delhi (India)
February 11	Food focus Thailand-Functional F&B Roadmap	Nonthaburi (Thailand)
February 16-17	Florida Section IFT	Orlando (US)
March 3	SCIFTS	Garden Grove (US)
March 12-14	NCA Convention	Tampa(US)
March 17-19	FIC 2026	Shanghai (China)
March 21-23	CACLP2026(In Vitro Diagnostic Expo)	Xiamen (China)
April 14-16	CheeseExpo	Milwaukee (US)
April 16	NY IFT	Edison (US)
April 21-22	Molkerei Kongress Munich	Munich (German)
April 27-29	PETFOOD FORUM 2026	Kansas City (US)
May 19-20	PLMA's 2026 World of Private Label	Amsterdam(Netherland)
May 20-21	PPIC Annual Research Spotlight Meeting	St Paul (US)
June 9-11	Bridge2Food Europe	Copenhagen(Denmark)
June 16-18	CPHI & PMEC China 2026	Shanghai (China)

Date	Exhibition	Location
July 12-15	IFT FIRST 2026	Chicago (US)
July 26-30	ADLM 2026	Anaheim (US)
September 10	Food focus Thailand-dairy and dairy alternatives Roadmap	Pathum Thani (Thailand)
September 16-18	Fi Asia 2026	Jakarta (Indonesia)
September 30 -October 1	The Food Tech Summit & Expo 2026	Mexico City (Mexico)
October 6-8	Alimentaria FoodTech 2026	Barcelona(Spain)
October 13-15	Bridge2Foods North America 2026	Minneapolis(US)
October 14-16	Hi Japan 2026	Tokyo (Japan)
October 28-30	SupplySide Global 2026	Las vegas(US)
TBA	Minnesota section IFT	Minneapolis(US)
November 4	Chicago Section IFT	Chicago (US)
November 17-19	Fi Europe 2026	Frankfurt (Germany)
November 23-25	CPHI India 2026	New Delhi(India)

For details and the latest information, please refer to our website or each exhibition website.

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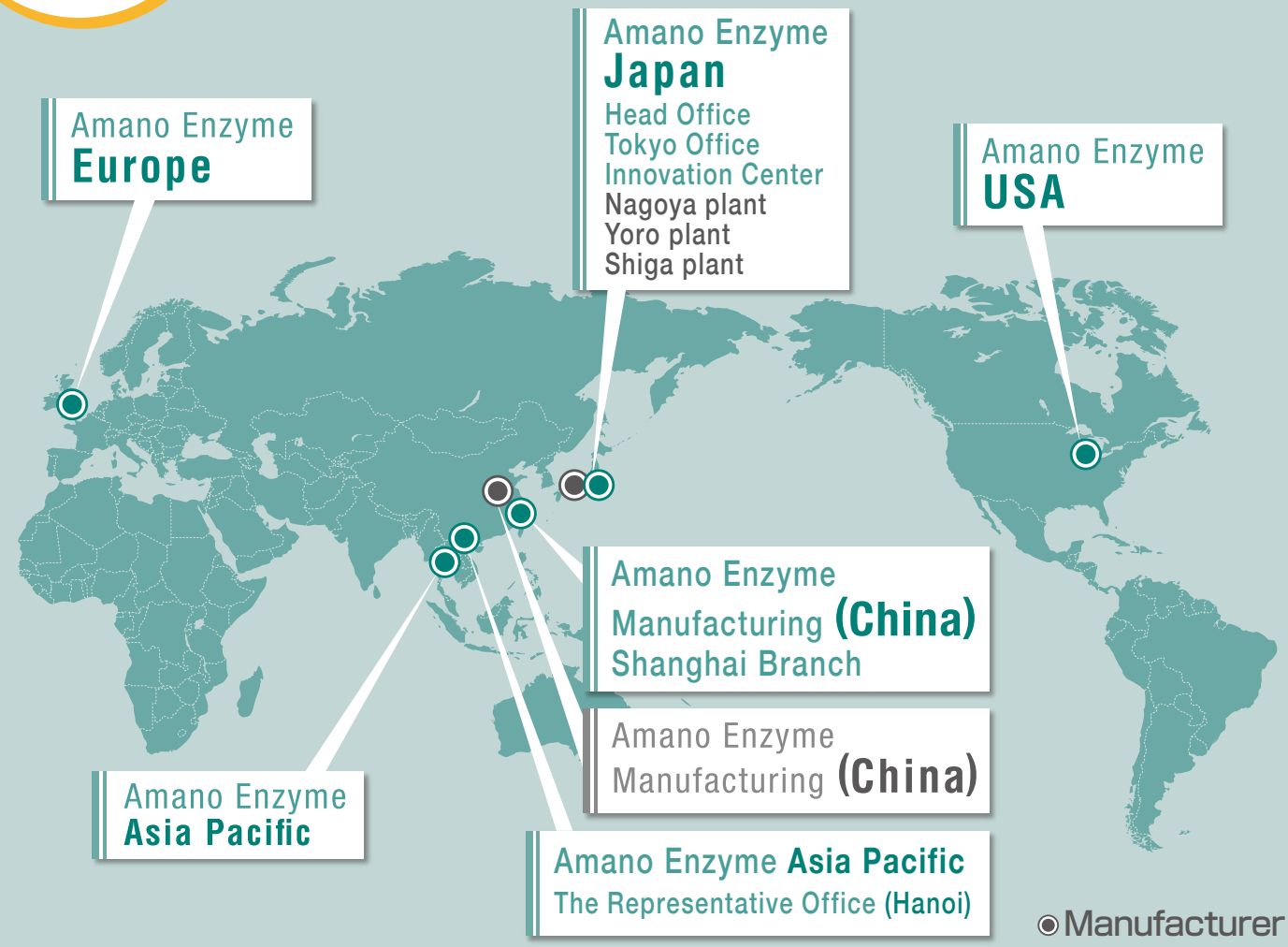

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