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Report Highlights:

This report provides the latest status of consumption, regulation, public perception, research, development, production, government policy, and use of agricultural biotechnology in Japan. In general, Japan uses a science-based process for evaluating and granting approval for import and production of genetically engineered products. Japan is a major importer and consumer of products derived from biotechnology, but domestic production remains extremely limited. Japanese regulators have established handling procedures for genome edited food and agricultural products. Seven genome edited products developed by Japanese and American companies have completed the necessary consultation and notification processes, four of which are being produced and distributed in the domestic market.

Executive Summary

Japan is a major importer of food and feed produced using modern biotechnologies. The United States is the top exporter of genetically engineered (GE) products, primarily grains and oilseeds, to Japan, but other major suppliers include Canada, Brazil, and Argentina. In Marketing Year (MY) 2022/2023, Japan imported 15 million metric tons of corn, 3.3 million tons of soybeans, and 2 million tons of canola. Japan also imports billions of dollars of processed foods that contain GE-derived oils, sugars, yeasts, enzymes, and additives. Conversely, Japanese farmers do not cultivate any genetically engineered food or feed products, despite broad regulatory approval by national authorities. As of October 2024, the Government of Japan (GOJ) has approved 205 products for environmental safety, including 157 approvals for domestic cultivation. As a basic rule, the GOJ requires domestic field trials for the approval of GE crops. As of September 2024, the GOJ has approved 334 products for food use.

The GOJ's regulatory approval of GE products is important for U.S. agriculture and global food production and distribution. As a significant importer of agricultural products, GE exports not approved by the GOJ could result in significant trade disruption. The GOJ's GE regulations are largely science-based and transparent, and regulators generally review and approve new events within time periods that align with industry expectations for market release. However, some challenges remain. The landscape of agricultural biotechnology has rapidly advanced as more small- and medium-sized biotech firms enter the market, and more biotech products are traded globally. In addition, the widespread availability of technology, such as CRISPR, has allowed developers to create more products in shorter time periods. Japan's regulatory agencies may face challenges as more time and resources will be required to successfully process more requests for regulatory clearance.

The GOJ completed the handling guidelines and product labeling policies for genome edited food in 2020. The Ministry of Agriculture, Forestry, and Fisheries (MAFF) is the competent authority for overseeing animal feed and biodiversity handling procedures and the Consumer Affairs Agency (CAA) oversees handling procedures for food products. As of October 2024, three companies have notified the GOJ about seven non-GE genome edited food products.

Useful Acronyms

AMC: Agricultural Material Committee
CAA: Consumer Affairs Agency
CAS9: CRISPR Associated Protein 9
CRISPR: Clustered Regularly Interspaced Short Palindromic Repeats
FAMIC: Food and Agricultural Materials Inspection Center
FSC: Food Safety Commission
GE: Genetically Engineered
GOJ: Government of Japan
IP: Identity Preservation, Identity Preserved
JETRO: Japan Export Trade Organization
JFY: Japan Fiscal Year
LMO: Living Modified Organisms
MAFF: Ministry of Agriculture, Forestry, and Fisheries
MEXT: Ministry of Education, Culture, Sports, Science and Technology
MHLW: Ministry of Health, Labour and Welfare
MOE: Ministry of Environment
NIAS: National Institute of Agro-biological Sciences
ST-3FT: Stage 3 Field Trial
TALEN: Transcription Activator-Like Effector Nuclease

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CHAPTER I: PLANT BIOTECHNOLOGY

PART A: Production and Trade

a) RESEARCH AND PRODUCT DEVELOPMENT

In Japan, agricultural biotechnology research is done predominantly by the public sector; government research institutes, and public universities. Research progresses at a slower pace than in the United States as there is limited demand for domestic application, despite there being a number of private seed companies. Furthermore, because most research takes place in public institutions, there is less urgency to recoup the financial investment in product development when compared to private sector companies or start-ups. In addition, Japanese farmers and food companies are generally reluctant to handle GE varieties as many GE food products come with mandatory labeling requirements and concerns persist over public perception. Annual GOJ polling shows public concern about GE products has fallen significantly over the last 10 years. However, without demand signals for commercial GE products, product developers have little reason to seek commercialization of GE varieties.

The GOJ's national project for science and technology innovation, the Cross-Ministerial Strategic Innovation Promotion Program (SIP), encouraged research of genome editing technology (JA6050). With financial support of SIP, in December 2020, agricultural biotechnology company, Sanatech Life Science (formerly Sanatech Seed), was the first organization to complete the GOJ's voluntary notification and consultation process for genome edited products. The product, a nutritionally enhanced tomato, is now commercially available in Japan. In August 2020, the USDA Animal Plant Health Inspection Service (APHIS) has also determined that the tomato product is not regulated under 7 CFR part 340. The Government of Philippines also made a similar decision in May 2024. In July 2023, Sanatech Life Science completed the GOJ's voluntary notification and consultation process for its second product, a second tomato variety (link to the CAA's list of notified products, in Japanese).

Public and private sector researchers, as well as joint public-private researchers, continue to develop genome edited research studies and products in Japan. Some of these products are currently in the early stages of the regulatory process and product development pipeline. Current research includes, but is not limited to, high yield rice with less fertilizer, environmental stress tolerant rice, wheat with reduced pre-harvest sprouting of grains on spikes, pollen-free Japanese cedar (to combat hay fever), and potato with reduced toxicity levels. However, as reluctance to handle GE products still prevails in Japanese industry and society in general, it is uncertain if/when these studies will translate into marketable commercial products.

Another potential roadblock for researchers can be the intended effect or outcome of the product's trait itself when it is a food product. For example, there have been efforts to develop products that mitigate pollen allergies, such as genome edited rice. However, since the trait mitigates an allergy, it falls into the category of medicine instead of food, adding to the regulatory complexity. While the National Institute of Agro-biological Sciences (NIAS) began its research on GE rice that mitigates pollen allergies in 2000, its progress has not reached the regulatory review stage for commercialization. However, there has been renewed interest in this research. In 2023, the GOJ held a Ministerial Meeting on Hay Fever and announced a clinical trial of pollen allergy mitigating rice. In addition, in 2024, MAFF held a discussion session titled "Public-Private Sectors Partnership for the Commercialization of Cedar Pollen (Allergy Mitigation) Rice." Proposed outcomes include cultivation in closed vertical farming systems,

and medicinal commercialization by extracting the active ingredient (link to NHK, in Japanese). See interim report from May 2024 meeting here (link to MAFF, in Japanese).

b) COMMERCIAL PRODUCTION

There is no commercial production of GE food or feed products in Japan, despite MAFF approval for the cultivation of 157 GE agricultural products. A lack of GE products developed for the Japan market combined with burdensome federal and local GE cultivation regulations make it almost impossible for Japanese farmers to cultivate GE agricultural products. At the same time, with the increasing availability of information-sharing via the internet and social media, there are some new Japanese farmers who are vocal advocates in support of biotechnology as a tool for sustainable agricultural production. See "PART C: Marketing, a) PUBLIC/PRIVATE OPINIONS" for more details.

There is limited domestic cultivation of GE crops for ornamental and pharmaceutical use, however, the government and private sector do not release information on the scale of production.

Sanatech Life Science began online sales of its nutritionally enhanced, genome edited fresh tomato after completing Japan's voluntary consultation and notification process in 2020. The tomato and tomato puree is currently available in some grocery stores in Tokyo, at select restaurants, and through online sales. Although some consumer groups vocalized resistance to genome edited products entering the marketplace, there is generally wide consumer acceptance.

As of September 2024, there have been three non-GE genome-edited crops notified to the GOJ, including a waxy corn product from Corteva Agriscience, which became the first product by a non-Japanese developer to clear the notification process in March 2023. In October 2024, a potato of high tuber set trait from J.R. Simplot completed the GOJ's notification process (link to the CAA's list of notified products, in Japanese).

c) EXPORTS

There are no GE agricultural products exported from Japan. In CY2023, Japan exported JPY 1.5 trillion, approximately $9.8 billion of food and agricultural products, including processed products ($3.4 billion). Exported processed products may contain GE ingredients (USD=148 JPY, Link to MAFF's home page, in Japanese). The top three export markets were China, Hong Kong, and the United States.

d) IMPORTS

Grains and Oilseeds

Japan imports almost 100 percent of its corn and over 95 percent of its oilseeds supply, much of which is GE soybean and canola. In MY2022/2023, Japan imported 15.5 million tons of corn, approximately a third of which was for food use. FAS/Tokyo estimates nearly half to two-thirds of corn for food use imported by Japan is non-segregated or GE, but there are no official statistics available. For more information on the import of grains and oilseeds see JA2024-0014 and JA2024-0017.

Fresh Produce

The "Rainbow Papaya," a GE papaya grown in Hawaii, appears to be the only fresh GE product exported from the United States to Japan (JA1048).

e) FOOD AID
In 2023, Japan provided approximately 6.2 billion JPY, approximately $42 million (1 USD = 148 JPY), food aid, mainly with Japanese Government reserve rice, to 21 countries and regions. For more, see Ministry of Foreign Affairs (in Japanese).

f) TRADE BARRIERS
Japan is one of the world's largest per-capita importers of GE products and has no significant trade barriers.

PART B: Policy

a) REGULATORY FRAMEWORK
Regulatory Process
The GOJ requires regulatory approval prior to the commercialization of GE plant products for use as food, feed and/or for environmental release depending on the nature and use of product. The following government organizations play a role in the regulatory framework.

- MAFF: Protection of biodiversity and feed safety
- MHLW: Monitoring of food safety, including unapproved GE products
- Ministry of Environment (MOE): Responsible for biosafety regulations on living modified organisms under the Act on the Conservation and Sustainable Use of Biological Diversity
- Ministry of Education, Culture, Sports, Science and Technology (MEXT): Responsible for environmental protection and regulating lab studies in research institutes and academia
- Food Safety Commission (FSC): Food safety risk assessment of biotechnology products
- CAA: Food safety risk management (since April 1, 2024) and labeling of biotechnology products

Ministries are also involved in environmental protection and regulating lab studies. The FSC, an independent risk-assessment body under the Cabinet Office, performs food safety risk assessments for CAA and feed-safety risk assessments (in terms of human consumption of livestock products grown with GE feed) for MAFF.

On April 1, 2024, the administration of food safety standards was transferred from MHLW to CAA. In the transition, all resources and staff transitioned from MHLW's Food Safety Standards and Evaluation Division, under the Pharmaceutical Safety and Environmental Health Bureau, to CAA's Food Safety Standards and Evaluation Division. CAA has stated that Japan's basic framework to develop safety standards based on scientific knowledge and risk analysis in accordance with the Food Safety Basic Law remains unchanged (CAA meeting minutes, in Japanese). The Subcommittee on Genetically Modified Food was also transferred under CAA's authority. CAA held the first meeting on October 9 (link to the CAA's site, in Japanese).

It is customary for regulators to first approve products for food, followed by feed, and then environment. The actual time needed for full approval varies significantly depending on each event and the familiarity of the product and trait. Approval is generally granted within eighteen months of formal acceptance of the dossier for food, feed, and/or environmental release if regulators characterize the product as having familiar traits. For a detailed diagram of the food, feed, and biodiversity approval process, see Figure 1.

Responsible ministries use external advisors to provide scientific review and risk assessment of GE products for which developers seek approval in Japan. The advisory committees and expert panels primarily consist of researchers, academics, and representatives from public research universities, and they report their findings and recommendations to the responsible ministries for final approval.

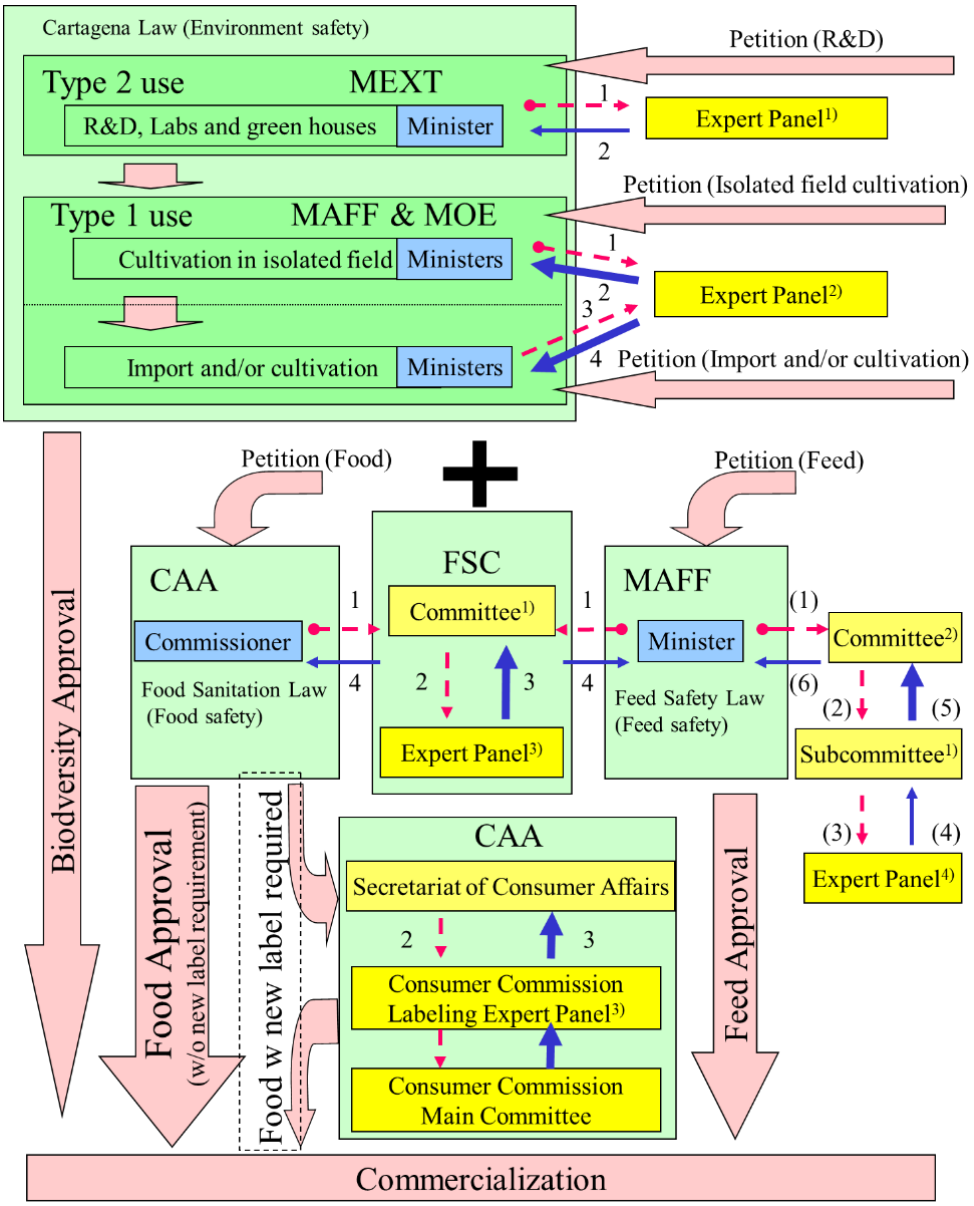
Table 1: GE Product Safety Review by Approval Type

Type of Approval	Examining body	Jurisdiction	Legal Basis	Main Points Considered
Food Safety	FSC*	Cabinet Office	Food Safety Basic Law	• Safety of host plants, genes used in the modification, and the vectors • Safety of proteins produced because of genetic modification, particularly their allergenicity • Potential for unexpected transformations as the result of genetic modification • Potential for significant changes in the nutrient content of food
Feed Safety	Agricultural Materials Council	MAFF Animal Product Safety Division	Law Concerning the Safety and Quality Improvement of Feed (the Feed Safety Law)	• Any significant changes in feed use compared with existing traditional crops • Potential to produce toxic substances (especially with regard to interactions between the transformation and the metabolic system of the animal)
Environment/ Impact on Biodiversity	Biodiversity Impact Assessment Group	MAFF Plant Product Safety Division	Law Concerning Securing of Biological Diversity (Regulation of the Use of Genetically Modified Organisms)	• Competitive superiority • Potential production of toxic substances • Cross-pollination

Note: CAA, MHLW and MEXT are not involved in conducting risk assessments; they are risk management bodies, provide monitoring of unapproved products, contact points for domestic research institutes and academia, and/or contact points for applications.

*The point of contact for the application is CAA.

Figure 1: Approval Process for GE Products



• Type 1 Use: The use of living modified organisms (LMOs, therefore not limited to plants) outside facilities, equipment, or other constructions without containment measures
• Type 2 Use: The use of living modified organisms (LMOs, therefore not limited in plants) with containment measures
• Expert Panel 1: Expert Panel on Recombinant DNA Technology, Bioethics and Biosafety Commission, Council for Science and Technology, MEXT
• Expert Panel 2: Experts with special knowledge and experience concerning adverse effect on biological diversity selected by MAFF/MOE Ministers
• Expert Panel 3: Genetically Modified Foods Expert Committee, FSC
• Expert Panel 4: Expert Panel on Recombinant DNA Organisms, Agricultural Materials Council, MAFF
• Committee 1: Food Safety Commission
• Committee 2: Feed Committee, Agricultural Materials Council, MAFF

• Subcommittee 1: Safety Subcommittee, Feed Committee, Agricultural Materials Council, MAFF
• Red (broken) arrow: Request for review or risk assessment
• Blue (solid) arrow: Recommendation or risk assessment results (thick arrows: with public comment periods)
• Numbers beside the arrows indicate the order of requests/recommendations within the respective ministries.

Food Safety

The CAA must approve GE plants intended for food use prior to commercialization in Japan. Upon receiving a petition for review from an applicant, CAA will undertake a preliminary check of the application then request that FSC complete a food-safety risk assessment. Within the FSC, there is a "Genetically Modified Foods Expert Committee" that consists of scientists from universities and public research institutes who conduct the scientific review. Upon completion, the FSC provides its conclusions to CAA for the official announcement of review completion. FCS publishes the risk assessment results of GE foods in English on its website. FSC set the standard processing time, from the receipt of dossier to the completion of review, at 12 months.

In June 2024, the FSC released the revised "Guideline for Food Health Effects Assessment of Genetically Modified Foods (Seed Plants)," "Technical Document on Food Health Effects Assessment of Genetically Modified Foods (Seed Plants)," and "Guideline for Food Health Effects Assessment of Additives Produced Using Genetically Modified Microorganisms" (as of October 2024, available only in Japanese). The updates include, but are not limited to, the use of analytical data for newer technologies, and the streamlining of review the process.

Feed Safety

Under the Feed Safety Act, MAFF must approve all GE products intended for feed use prior to commercialization. When MAFF receives a petition, MAFF asks the Expert Panel on Recombinant DNA Organisms, part of the MAFF-affiliated Agricultural Materials Committee (AMC), to review the GE crops for feed use. The Expert Panel evaluates feed safety for livestock animals and then the AMC reviews the evaluation. The MAFF Minister also asks the FSC's Genetically Modified Foods Expert Committee to review human health effects from consuming livestock products from animals fed the GE crop under review. Based on the AMC and FSC reviews, the MAFF Minister approves the feed safety of the GE events.

In March 2024, MAFF held a joint meeting for the AMC/Feed Sub-Committee and AMC/Feed Safety Division (link to MAFF, in Japanese). The agenda included discussion on the establishment of new safety assessment criteria for feed produced using genetically engineered microorganisms. Per the Safety Assessment Standards for Foods Produced Using Genetically Modified Microorganisms (links to FSC, original Japanese and provisional English translation), MAFF intends to establish new safety assessment standards that allow the examination of feed produced using genetically engineered microorganisms.

On September 25, MAFF discussed: 1.) That the draft of the newly established standard was prepared in line with the Safety Evaluation Standard for Genetically Engineered Foods (microorganisms) by the FSC; and 2.) This standard will be applied in the future when there is an application for safety

confirmation for feed produced using genetically modified microorganisms. FAS Tokyo expects the process will include a domestic and WTO public comment period before it will be formally adopted in Japan.

Impact on Biodiversity
In 2003, Japan ratified the Cartagena Protocol on Biosafety. In 2004, Japan adopted the "Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms," commonly referred to as the "Cartagena Law," to implement the Protocol. Under this law, MEXT requires Minister-level approval before performing early stage agricultural biotechnology studies in laboratories and greenhouses. MAFF and MOE require joint approvals for the use of GE plants in greenhouses or labs as part of their assessment on biodiversity.

MAFF requires product developers to perform isolated field trials in Japan to collect scientific data as part of the approval process for biodiversity. MAFF and MOE must give developers permission to begin field trials required for the environmental risk assessment for the event. A joint MAFF and MOE expert panel conducts the environmental safety evaluations. MAFF set the standard processing time, from the receipt of the dossier to approval to begin field trials, at six months. More information can be found on MAFF's website (link in Japanese). However, the "clock" for the standard processing time stops when the applicant revises the dossier, receives questions from MAFF, and prepares the response. The preliminary consultation, confined field trial, and administrative handling for an official notification is a prolonged process.

The GOJ does not charge fees for the review of GE products.

Table 2: Relevant Terminology

Legal Term (in local language)	Legal Term (in English)	Laws and Regulations where Term is Used	Legal Definition (in English)
遺伝子組換え技術 (Idenshi Kumikae)	Genetic engineering	Law Concerning Securing of Biological Diversity	Technology for processing nucleic acids outside the cell Technology to fuse cells of organisms belonging to different taxonomic families
組換えDNA技術 (Kumikae Di Enu Ei Gijyutsu)	Recombinant DNA technique	Standards for the Safety Assessment of Genetically Modified Foods	Technique that recombinant DNA molecules prepared by cleavage and recombination of DNA using enzymes or other methods are transferred to living cells for proliferation (the term refers to the techniques that overcome natural physiological

			reproductive or recombinant barriers and that are not techniques used in traditional breeding and selection)
遺伝子組換え生物 (Idenshi Kumikae Seibutsu)	Living Modified Organism (LMO)	Law Concerning Securing of Biological Diversity	Living organisms created by genetic engineering
第二種使用 (Dai Nishu Sihyou)	Type 2 Use	Law Concerning Securing of Biological Diversity	Use with the intention of preventing the spread of the LMO into the air, water, or soil outside of facilities, equipment, or other structures
第一種使用 (Dai Isshu Shiyou)	Type 1 Use	Law Concerning Securing of Biological Diversity	Use of LMO without measures in Type 2 use (e.g., open field cultivation)
宿主 (Shukushu)	Host	Standards for the Safety Assessment of Genetically Modified Foods	A living cell or individual organism into which DNA is transferred through recombinant DNA techniques
ベクター (Bekuta)	Vector	Standards for the Safety Assessment of Genetically Modified Foods	A carrier DNA that transfers the target genes or DNA fragment into the host for its proliferation or gene expression
ドナー (Donah)	Donor	Standards for the Safety Assessment of Genetically Modified Foods	A microbe, animal or plant that supplies the inserted DNA
ゲノム編集技術 (Genomu Henshuu Gijyutsu)	Genome Editing Technology	Food Hygiene Handling Procedures for Food and Additives Derived from Genome Editing Technology	A technology to modify a specific site of a specific base sequence on a chromosome using an enzyme recognizing the base sequence in order to provide specific functions

b) APPROVALS/AUTHORIZATIONS
As of October 2024, Japan has approved over 334 GE products for food, 201 for feed, and 205 for environmental safety; including 156 for environmental release, including cultivation. The 334 products approved for food does not include 36 stacked events, which are no longer subject to the safety review process. See the reference section at the end of this report for links to lists of approved products.

c) STACKED OR PYRAMIDED EVENT APPROVALS/AUTHORIZATIONS
The GOJ requires separate environmental approvals for stacked products. CAA, formerly MHLW, exempts from review GE stacked products that use previously approved single events if the crossing of single events does not affect the metabolic pathway of the host, for more details see the FSC website (in Japanese). As of August 2024, the number of exempted products remains the same as last year - 36 stacked products (5 soybean, 15 corn, 4 canola, and 12 cotton) are exempt from review, for more information see CAA's website. For details on the approved stacks, please see the links contained in the reference section at the end of this report. For additional details on previous improvements made in the handling of stacked product approvals, see JA7138.

d) FIELD TESTING
The GOJ requires domestic field trials for GE products, even those with no foreseeable opportunity for environmental release or commercial cultivation. In December 2014, MAFF excluded crops that do not have wild relatives in Japan (like corn), with traits of sufficient familiarity (i.e., herbicide tolerance, insect resistance) from mandatory field trail requirements. In March 2019, MAFF added cotton with traits of sufficient familiarity to the list of products excluded from domestic field trials.

On September 19, MAFF officially announced the exemption of domestic field trial requirements for GE soybean with familiarity[1] (JA2024-0051). This announcement followed MAFF's public comment period published in June 2024 (JA2024-0034). For more information on MAFF's policy on the requirement of domestic field trial and this change see MAFF's website (in Japanese) and JA6050.

e) INNOVATIVE TECHNOLOGIES
The GOJ has three separate handling procedures for genome edited food and agricultural products that cover food, feed, and biodiversity safety. After April 1, 2024, the food safety standard administration was transferred from MHLW to CAA which now oversees the procedures for food and food additives. While the transfer changed the point of contact for developers, the consultation and notification of food products from genome editing technology has generally remained the same. The consultation and notification process is shown in Figure 2.

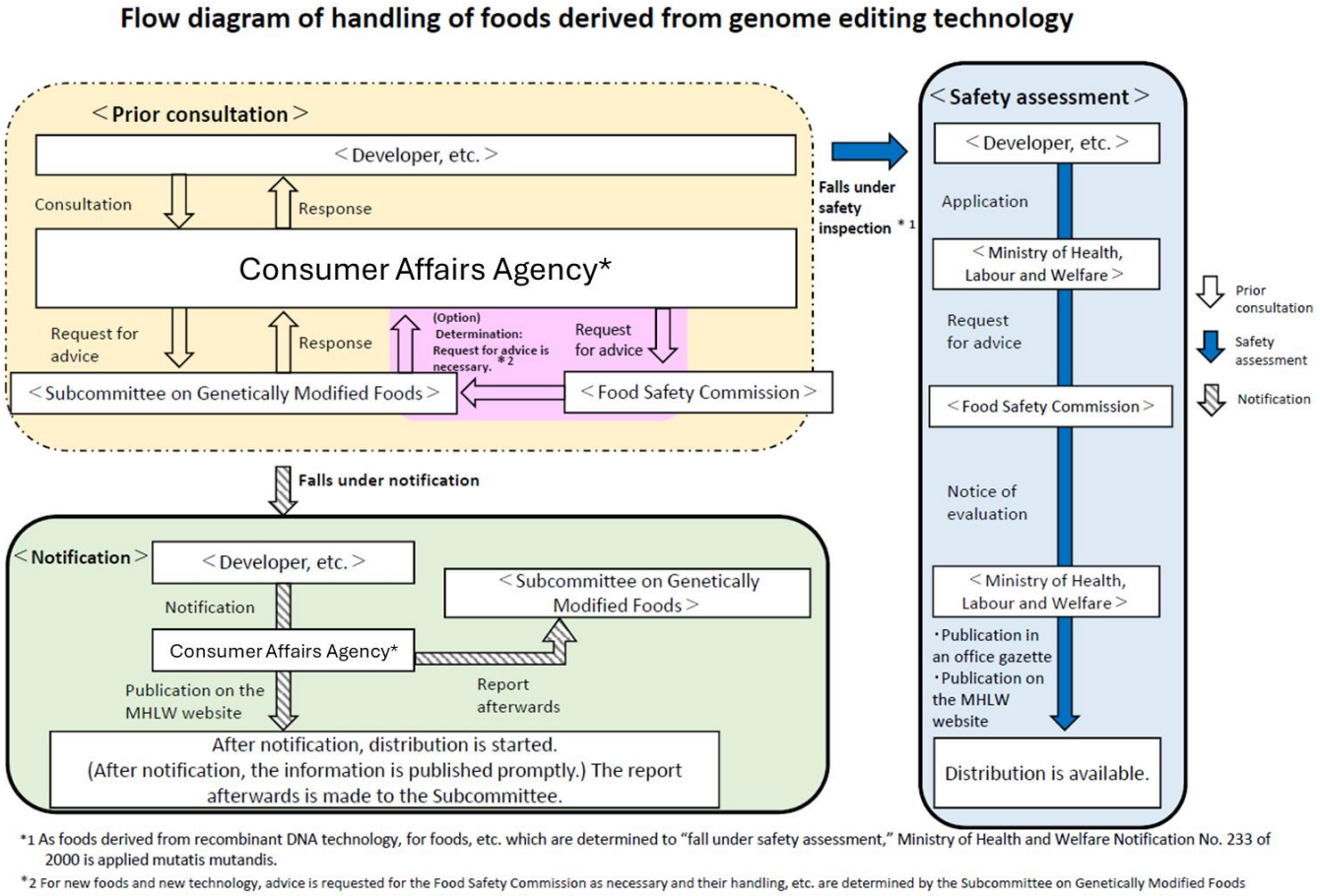
MAFF is responsible for both feed and feed additives as well as biodiversity safety for products under its authority. For more on genome editing handling procedures in Japan, see JA2021-0106. MHLW, formerly oversaw the procedure until March 2024, and MAFF amended procedures for pre-market

[1] When a GE organism meets both conditions below, MAFF considers it a familiar trait:
- Those recognized as having a clear mechanism of action based on publications of peer-reviewed journals and/or the consensus among multiple experts at relevant government's review committees; and,
- The extent of potential biodiversity impacts caused by the characteristics conferred by the introduced nucleic acids, or their replicas, is recognized as being equal to or less than the biodiversity impacts of genetically modified plants that have already received approval of environmental release, provided that they share the same host.

consultations and notifications for products derived from genome edited crossbred progeny in December 2020 and April 2021, see JA2020-0214 and JA2021-0073 for more information.

CAA determined that genome edited foods that do not contain foreign DNA are not subject to the Food Labeling Standard. However, CAA guidance recommends food manufacturers voluntarily label genome edited foods. Similarly, food manufacturers may also disclose that their products are not derived from genome edited ingredients, but CAA advises that manufacturers should be able to verify their product's authenticity of ingredients throughout supply chain. For more on CAA's labeling guidance, see JA2019-0174.

Figure 2: Flow diagram of handling of food derived from genome editing technology



*1 As foods derived from recombinant DNA technology, for foods, etc. which are determined to "fall under safety assessment," Ministry of Health and Welfare Notification No. 233 of 2000 is applied mutatis mutandis.

*2 For new foods and new technology, advice is requested for the Food Safety Commission as necessary and their handling, etc. are determined by the Subcommittee on Genetically Modified Foods

*Modified from the original diagram which indicates the "Ministry of Health, Labour and Welfare" as the contact point for developers instead of "Consumer Affairs Agency" which overtook the food safety standard administration from MHLW on April 1, 2024. (Source: CAA)

f) COEXISTENCE

A 2004 MAFF guideline requires that before product developers can begin a field trial, they publicly disclose detailed information about the field trial online and host meetings with nearby residents. MAFF also requires the establishment of buffer zones to prevent related plant species in the surrounding area from cross-pollinating, see Table 3. These requirements, restrictive local regulations, and perceived

public resistance has made the planting of GE crops difficult. For additional detail, please see the guidelines for cultivation of GE crops on the MAFF website (link in Japanese).

Table 3: Required Buffer Zone for GE Crops in Open Fields

Plant	Minimum Isolation Distance
Rice	30 meters
Soybeans	10 meters
Corn (applicable for food and feed safety approvals)	600 meters or 300 meters with the presence of a windbreak
Rapeseed (applicable for food and feed safety approvals)	600 meters or 400 meters if non-recombinant rapeseed is planted to flower at the same time of the field-tested rapeseed. A width of 1.5 meters surrounding field tested plants as a trap for pollens and pollinating insects

Local Government Regulations

There are 15 local governments with regulations for the planting of GE products for research and/or commercial purposes. Local governments established many of these rules between 2004 and 2009 with limited changes since. In addition, some local governments, for example Imabari City (link in Japanese), argue that foods containing GE ingredients should not be used in the school lunch program.

After the Hokkaido Prefectural Government made a minor amendment for the rule that requires prefectural approval before planting GE products, there seems to be no significant change. The rule was amended in 2022 and exempted pot-grown ornamental plants following MAFFs approval of a GE phalaenopsis orchid. See JA2023-0115 for the amendment in Hokkaido and JA2019-0219 for more information on other local regulations.

g) LABELING AND TRACEABILITY

Processed product manufacturers, importers, and/or retailers can make three types of GE claims on food labels in Japan: GE, non-segregated (i.e., without identity preservation), and non-GE. CAA requires GE and non-segregated product labeling. If a product is GE IP, CAA requires the food label contain a GE label. If a retailer distributes a non-IP product for which approved GE varieties exist (e.g., grains, oilseeds), CAA requires the food label to contain a non-segregated label (regardless of the percentage of GE or non-GE in the product).

CAA requires food labels to identify GE products and/or ingredients when the GE ingredient is among the top three ingredients and accounts for at least five percent of the product.

In March 2019, CAA revised labeling policy for GE foods, effective on April 1, 2023. Under the revised labeling regulation, the products need to be distributed under an IP system and have no detectable GE content; effectively establishing a zero tolerance for GE components. Although some consumer groups complained to CAA that manufacturers are effectively unable to use “non-GE” labeling, post has not observed any significant market impact. To highlight industry efforts to obtain non-GE ingredients at five percent or lower with IP handling, some manufacturers use description such as “identity preserved.”

For more information, please see CAA website (in Japanese). FAS/Tokyo has submitted multiple reports on the review process (see, e.g., JA7067, JA7093, JA7121, JA8014, and JA9055).

h) MONITORING AND TESTING

The GOJ monitors volunteer plants to assess the effect on biodiversity of environmental release of a GE crop. MAFF's most recent report on environmental release includes a survey conducted in the vicinity of ports where canola and soybeans were unloaded from vessels. MAFF found no significant impact on biodiversity. MAFF looked for indicators that GE plants are affecting biodiversity, such as by surviving through multiple generations, or crossbreeding of GE soy with *Glycine soja*, a Japanese domestic wild plant and the closest living relative of soybean. MAFF has been the competent authority responsible for monitoring since 2006 and has never reported a significant impact to biodiversity from the environmental release of a GE crop.

MAFF, acting as a state trading enterprise, conducts tests for GE wheat and rice shipments from some export markets, including the United States. MAFF conducts these tests to ensure compliance with food's low-level presence policy. MAFF publishes tests results annually on its website (in Japanese).

i) LOW-LEVEL PRESENCE (LLP) POLICY

Japan has a zero-tolerance policy for unapproved GE events in food and the environment, and it is explicitly illegal to import GE-derived foods that CAA has not approved, regardless of the amount, form, or their known safety outside of Japan. For this reason, LLP of unapproved GE crops has the potential to disrupt agricultural trade with Japan. For more on Japan's LLP policy, see JA6050.

As of September 2024, MHLW monitors imported foods for the following items:

- PRSV-YK, PRSV-SC, and PRSV-HN (papaya and its processed products if papaya can be isolated for analysis. Monitors 119 cases annually.)
- 63Bt, NNBt, and CpTI (rice and its processed product with rice as a main ingredient, such as rice flour, rice noodle, etc., when products are unheated or mildly heated. Monitors 299 cases annually.)
- RT73 *B. rapa* (canola and its processed products. Monitored 29 cases annually.)
- MON71100/MON71300, MON71700 and MON71800 (U.S. wheat. Monitors 59 cases annually. Also, regulatory authority, MHLW and/or port officials, may request inspection of specific shipments.)
- MON71200 (Canadian wheat. Monitors 59 cases annually. Also, regulatory authority, MHLW and/or port officials, may request inspection to specific shipments)
- F10 and J3 (potato and its processed products, of potato as a main ingredient, such as French fries, potato chips, etc. Monitors 299 cases annually)
- CZW3 and ZW20 (zucchini and its processed products, such as dried zucchini. 29 cases annually)
- AquAdvantage (salmon and its processed products, such as salmon flakes, from Canada, Panama, and the United States. Monitors 59 cases annually).

j) ADDITIONAL REGULATORY REQUIREMENT

Although GE products receive regulatory approval for commercial planting, GE products with herbicide resistance may need to have the relevant chemical registered in Japan.

k) INTELLECTUAL PROPERTY RIGHTS (IPR)
Japan provides strong IPR protection and enforcement. Japanese IPR covers genetic engineering of agricultural crops, including but not limited to, the gene, seeds, and name of varieties. Japan's Patent Office is responsible for IPR.

l) CARTAGENA PROTOCOL RATIFICATION
Japan ratified the Cartagena Protocol on Biosafety in November 2003 and implemented the "Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms." In December 2017, Japan ratified the "Nagoya-Kuala Lumpur Supplemental Protocol on Liability and Redress to the Cartagena Protocol on Biodiversity." This and other laws implementing the protocol may be found on the Japan Biosafety Clearing House (J-BCH) website.

m) INTERNATIONAL TREATIES AND FORUMS
The Japan Bioindustry Association (JBA) has prepared guidelines on Access and Benefit Sharing. Their target, however, appears to be the pharmaceutical and medical industries.

Japan is also involved in the harmonization of regulatory oversight in biotechnology at the Organization for Economic Co-operation and Development (OECD), as well as the Asia-Pacific Economic Cooperation (APEC) High Level Policy Dialogue on Agricultural Biotechnology (HLPDAB).

n) RELATED ISSUES
None.

PART C: Marketing

a) PUBLIC/PRIVATE OPINIONS

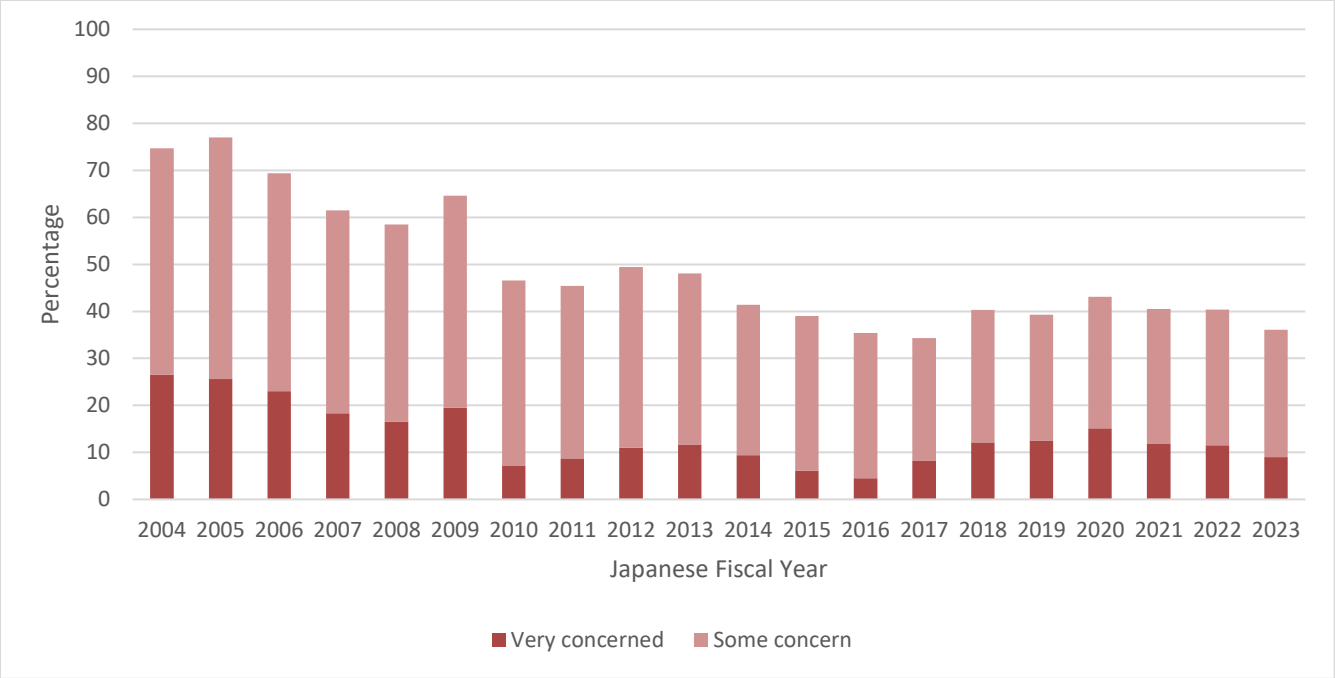
Although GOJ polling shows public concern about GE products has fallen significantly over the last 10 years, Japanese food companies and retailers are reluctant to handle GE varieties as many GE food products come with mandatory labeling requirements and concerns over public perception remain. Without assurance that GE crop will be purchased, farmers cannot take the risk of using GE crops. In addition, local government regulation adds another hurdle for local farmers to cultivate GE crops.

Recent movement toward forward-leaning engagement on agricultural biotechnology continues to spread through Japanese farmers. A group of like-minded local farmers has started to openly claim an urgent need for agricultural biotechnology by Japanese farmers. In April 2023, a group of like-minded farmers established the Japan Biotech Crop Network (JBCN, in Japanese and English). Their goal is to have biotechnology crops in the hand of Japanese farmers. In addition, JBCN claims these crops will reduce the burden on the environment caused by agriculture and support sustainable agriculture. Member farmers of JBCN attended the Pan-Asia Farmers Exchange Program in order to build contacts with biotech farmers around the world (Tour report, in Japanese).

b) MARKET ACCEPTANCE/STUDIES
Although there are still consumer groups actively campaigning against products derived from biotechnology, the public perception of GE-derived products has changed. Recent GOJ survey results

show that consumers concerned with GE food are now in the minority. In 2006, the FSC conducted a survey (in Japanese) and found that 75 percent of participants were "highly concerned" or "concerned" about GE foods. However, in the 2023 survey, only 36 percent of respondents were "highly concerned" or "concerned," marking a notable change in the public's concern about GE products. GE foods last appeared in the top seven food-safety concerns for survey respondents in 2009. For non-GE genome edited food products, 12 percent responded that they are "highly concerned," and 31 percent "concerned. For more information on the FSC's annual survey, see the Appendix in this report.

Figure 2: Japan Consumer Acceptance of GE Foods (2004-2023)



Source: FSC Food Safety Monitoring (in Japanese)

CHAPTER 2: ANIMAL BIOTECHNOLOGY

PART D: Production and Trade

a) RESEARCH AND PRODUCT DEVELOPMENT
In Japan, most molecular biology researchers focus on medical and pharmaceutical applications. As with plants, universities and public research institutions conduct much of the limited animal biotechnology research pertaining to food and agriculture.

In 2019, a largely academic research team behind a genome edited sea bream and pufferfish founded a startup company called Regional Fish, with private sector financial support from the GOJ. In December 2023, the company completed the first non-GE genome edited aquaculture product, fast-growing flounder.

Kyushu University and the Karatsu City Government are partnering to develop a genome edited chub mackerel with reduced aggression, which increases aquaculture productivity (Nature).

Researchers at Hiroshima University and Kewpie Corporation have been working on lowering allergens in chicken eggs. The team created a chicken lacking ovomucoid, the most predominant allergen protein, and performed a safety study (publication in Food and Chemical Toxicity). In February 2024, the team announced they will proceed to the next step, clinical research (Nikkei, in Japanese).

Japan's NIAS continues to develop GE silkworm varieties for value-added silk production; however, its commercial application remains limited. As of July 2023, although several GE silkworm are approved for experimental rearing, there are no new approvals of GE silkworm for commercial production (MAFF, in Japanese).

Interest in animal cloning appears to have waned in Japan and activity has been steadily decreasing since the late 1990's. There have been no new births since 2018 and there are no longer any living cattle from fertilized-egg clones or cattle from somatic cell cloning in Japan. For more details, see the MAFF website (link in Japanese).

b) COMMERCIAL PRODUCTION
Currently, there is no commercial production of GE animals for the purpose of agricultural production except for limited experimental production of value added silk from GE silkworms by NIAS and Gunma Prefecture Sericulture Technical Center (link, in Japanese).

As of October 2024, one company, Regional Fish, has notified GOJ of three types of animal food products from genome editing technology, a sea bream with increased edible skeletal muscle, fast-growing puffer fish and flounder. More details in CAA website (in Japanese).

c) EXPORTS
None.

d) IMPORTS
None.

e) TRADE BARRIERS
None.

PART E: Policy

a) REGULATORY FRAMEWORK
GOJ regulators apply the same regulation for GE plants to the commercialization of GE livestock animals and insects. For production or environmental release of GE animals, MAFF will apply its "Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms." The Food Sanitation Act, under CAA's supervision, covers the food safety aspect of GE animals.

In general, the technical terms used for animals are the same as for plants.

b) APPROVALS/AUTHORIZATIONS

There are no new approvals since the previous report. See last year's annual report here JA2023-0115.

c) INNOVATIVE BIOTECHNOLOGIES
The regulatory policies and guidelines developed by MHLW (note: the administration of food safety standard was transferred from MHLW to CAA on April 1, 2024) for food and MAFF for biodiversity explained in Chapter 1 apply to animals derived from genome editing technology with some exceptions.

MHLW decided that due to differences between fish raised for aquaculture versus crops and livestock (such as a shorter breeding history, greater genetic variation in species, and genetic mosaicism with CRISPR/Cas9), it would change its genome edited product consultation and notification process for fish. MHLW finalized a report titled "Note on the Handling of Fishes Obtained via Genome Editing Technology." For more detail, please see JA2021-0132.

d) LABELING AND TRACEABILITY
The labeling requirement for GE animals is the same as for plants. There is no mandatory labeling requirement for non-GE, genome edited products. For products derived from a cloned animal, CAA requires products to carry a cloned label. FAS/Tokyo is not aware of any commercial product with a "cloned" label.

e) ADDITIONAL REGULATORY REQUIREMENTS

f) INTELLECTUAL PROPERTY RIGHTS (IPR)
Same as for plants.

g) INTERNATIONAL TREATIES/FORA
Japan ratified the Cartagena Protocol on Biosafety in 2003.

h) RELATED ISSUES
In September 2017, the GOJ implemented monitoring for GE salmon and processed salmon products, such as salmon flakes. See i) LOW-LEVEL PRESENCE (LLP) POLICY for details.

For additional details, please see JA7112.

PART F: Marketing

a) PUBLIC/PRIVATE OPINIONS
At this moment, there is no commercial distribution of GE animals in Japan except for a few products, such as the silkworm used to make protein for medical diagnostic agent. It is not clear how much, if any, public interest there would be in consuming meat from GE or cloned animals.

b) MARKET ACCEPTANCE/STUDIES
There are no market acceptance studies specific to animal biotechnology.

CHAPTER 3: MICROBIAL BIOTECHNOLOGY

PART G: Production and Trade

a) COMMERCIAL PRODUCTION

Japan has several traditional foods that rely on fermentation, including soy sauce, *natto* (fermented soybeans), *miso* (soybean paste), and *sake* (rice wine). Other products common in the modern Japanese diet that use fermentation include yogurt, cheese, and bread. Despite widespread use, there is little public information on the scale of production for products derived from microbial biotechnology. The food industry in Japan is sensitive to consumer reaction to the use of biotechnology and labeling rules exempt the products in this category from required GE labeling, so there is little incentive to indicate if a product uses microbial biotechnology.

Industry values Japan's 2021 enzyme and yeast markets at approximately 49 billion yen (340 million USD) but there is no specific value available for enzyme and yeast derived from biotechnology.

Manufacturers of products that use microbial biotechnology (e.g., GE enzymes) are a mix of international and domestic companies. GOJ has given approval to a number of companies to use microbial biotechnology, including, Novozyme, Danisco U.S., Ezaki Glico and several other domestic companies. Lists of approved products and applicants can be found on CAA's website.

Japanese companies make up most applicants for self-cloning, natural occurrence, and highly purified products (e.g., L-glutamine). See CAA's website (link in Japanese) for a list of approved products and applicants.

Product developers have introduced a limited number of alternative meat products in the Japan market. Most alternative meat products available on the Japanese market are soy-based. In October 2020, MAFF held its first "Council for Public-Private Partnership in Food Technology" (link in Japanese) for the promotion of cross-sectorial collaboration, but the conference was not open to the general public. The Center for Rule-Making Strategies at Tama University established Japan Association for Cellular Agriculture in 2020 to promote activities and communication among stakeholders in industry, regulators, policy makers, and academia about the commercial application of cellular agriculture for medical/pharmaceutical, food, and materials industry, etc. The Japan Bioindustry Association also launched a working group for cultured meat and held its first workshop in July 2023. So far, meat analogue products from bacteria or single cell-based proteins are not in commercial distribution in Japan.

In addition to alternative meat products, some manufacturers have expanded their interests to include other high value products and ingredients. In February 2024, Japanese chocolate company, Meiji Holdings, in partnership with California Cultured, (link to press release, in Japanese) announced its plan to commercialize a chocolate in the U.S. produced with cell-cultured cacao. In the release, Meiji noted the need to use the latest technology to establish sustainable value chains that address social issues and resolve raw material supply concerns.

Ajinomoto Co., Inc. announced an alliance with Solar Foods, a company that developed microbial protein that feeds on carbon dioxide as a nutrient source, and acquired a license for its sales in

Singapore. Through this agreement, the two companies will develop products using the microbial protein and conduct market feasibility studies in Singapore beginning in 2024 (Ajinomoto press release).

b) EXPORTS

In CY2023, Japan exported 5,073 MT of enzymes (HS code 3507), valued at $279 million, which may include products derived from microbial biotechnology.

Table 5: Japan Enzyme Exports (HS3507, CY2023)

Country	Volume (Metric Ton)	Value (Million USD)
Denmark	1,234	15
United States	1,128	88
China	701	44
France	351	16
Netherlands	274	4
Others	1,385	112
Total	**5,073**	**279**

Source: Trade Data Monitor Inc.

c) IMPORTS

In CY2023, Japan imported 4,924 MT of enzymes (HS code 3507), valued at $107 million, which may contain products derived from microbial biotechnology.

Table 6: Japan Enzyme Imports (HS3507, CY2023)

Country	Volume (Metric Ton)	Value (Million USD)
China	2,106	27
Denmark	850	16
United States	705	15
Singapore	418	1
Germany	295	15
Others	550	33
Total	**4,924**	**107**

Source: Trade Data Monitor Inc.

d) TRADE BARRIERS

None.

PART H: Policy

a) REGULATORY FRAMEWORK

Japan's Food Sanitation Act defines food additives as (i) substances used in or on food in the process of

manufacturing food, or (ii) substances used for the purpose of processing or preserving food. The GOJ considers most microbial biotechnology products as food additives. More information can be found on CAA's website.

If product manufacturers only use the GE microorganism and its products in a contained environment for food production, the manufacturer must only seek food safety approval from CAA. The approval process is the same as the GE food safety review process for plant and animal products. After CAA completes a preliminary review it sends the application to FSC for the safety risk assessment. For more information on the process, please see CAPTER I. Plant Biotechnology, B: Policy, a) Regulatory Framework.

CAA exempts food additives from the safety review when they are highly purified and do not contain foreign GE material. CAA and FSC can exempt microorganisms from the safety review if they agree that they are self-cloning or natural occurrence. FSC has published their Safety Assessment Standards for microorganisms, food additives, and highly purified end-products. More information can be found on CAA's website (in Japanese).

The Newly Developed Food Survey Subcommittee in CAA held the first listening session for industry in March 2023 and the second in August to learn about the status of research and development of foods derived from cell culture technologies. The listening session was not open to the public. MHLW announced that they will continue such events with the industry. As of October 2024, the GOJ has not published any regulatory policy for the handling of food products derived from cell culture technologies. In August, CAA had its first meeting of the subcommittee since it has taken over as the food safety standard administration from MHLW in April 2024, however, cell culture technology was not on the agenda.

b) APPROVALS/AUTHORIZATIONS

As of March 2024, Japan has approved 83food additive ingredients derived from GE technologies. Approved products can be found on CAA's website and are listed below:

- Alpha amylase: 19 products
- Rennet: 5
- Pullulanase: 4
- Lipase: 7
- Riboflavin: 2
- Glucoamylase: 5
- Alpha-glucosyltransferase: 4
- CGTase: 2
- Asparaginase: 1
- Phospholipase: 8
- Beta-amylase: 1
- Exomalt tetraohydrolase: 2
- Acid phosphatase: 1
- Glucose oxidase: 3
- Protease: 5
- Hemicellulaze: 2
- Xylanase:5

- Beta-galactosidase: 1
- Psicose epimerase: 1
- Terpene hydrocarbons: 1
- Aminopeptidase: 1
- Alpha-Glucsosidase: 1
- Carboxypeptidase: 1
- Pectinase: 1

As of October 2024, CAA, and formerly MHLW, have approved 89 products as highly purified substances, products of natural occurrence, or self-cloning. CAA's website (link in Japanese) has the complete list of products.

c) LABELING and TRACEABILITY
CAA requires food labels to identify GE products and/or ingredients when the GE ingredient is among the top three ingredients and accounts for at least five percent of the product.

CAA does not require food labels to contain GE labeling for food additives. CAA does have other food additive labeling requirements, for more see JA2019-0216.

d) MONITORING AND TESTING
No specific testing for products from microbial biotechnology.

e) ADDITIONAL REGULATORY REQUIREMENTS
None.

f) INTELLECTUAL PROPERTY RIGHTS (IPR)
Same as for plants and animals.

g) RELATED ISSUES
None.

PART I: Marketing

a) PUBLIC/PRIVATE OPINIONS
Public awareness of microbial biotechnology use by the food industry is limited.

b) MARKET ACCEPTANCE/STUDIES
There are no significant market acceptance studies available.

Reference

Risk assessment standards of genetically engineered food

Food Safety Commission
http://www.fsc.go.jp/english/standardsforriskassessment/gm_kijun_english.pdf

Information related to GE food regulations

Consumer Affairs Agency
https://www.caa.go.jp/policies/policy/standards_evaluation/bio/genetically_modified_food (in Japanese)

Information on GE Food Labeling

Consumer Affairs Agency (the agency responsible for labeling regulations, including GE)
http://www.caa.go.jp/en/ (English)

Food Labeling Law, Government Ordinance, Ministerial Ordinance and Notifications (in Japanese only)
https://www.caa.go.jp/policies/policy/food_labeling/food_labeling_act/

The information on the Food Labeling Law is still not available in English. Please refer to JA7078 for additional details on the law.

Useful resources on agricultural biotechnology by Japan Biosafety Clearing House (Japan)
http://www.biodic.go.jp/bch/english/e_index.html

Approved events for commercial use

Approved events for food use (in English):
https://www.caa.go.jp/policies/policy/standards_evaluation/bio/genetically_modified_food/assets/genetically_modified_food_240917_01.xlsx

Approved stacked events for food use (exempted from review, in Japanese):
https://www.caa.go.jp/policies/policy/standards_evaluation/bio/genetically_modified_food/assets/genetically_modified_food_241010_01.xlsx

Approved events for feed use (in English):
http://www.famic.go.jp/ffis/feed/r_safety/r_feeds_safety33.html

Approved events for environmental release (in Japanese):
https://www.maff.go.jp/j/syouan/nouan/carta/torikumi/attach/pdf/index-49.pdf

Japan Biosafety Clearing House – List of approved living modified organisms under Cartagena Protocol domestic Law (in English):
http://www.biodic.go.jp/bch/english/e_index.html

Genome editing technology

CAA – Foods derived from genome editing technology (in Japanese)
https://www.caa.go.jp/policies/policy/standards_evaluation/bio/genome_edited_food

MAFF – Handling of living organisms derived from new breeding technique under Cartagena Law (in Japanese)
http://www.maff.go.jp/j/syouan/nouan/carta/tetuduki/nbt.html

MAFF – Safety of Feeds and Pet Foods (in English)
https://www.maff.go.jp/e/policies/ap_health/petfood/index.html

CAA – Information for the labeling of genome edited foods (in Japanese)
https://www.caa.go.jp/policies/policy/food_labeling/quality/genome/

Appendix

Table: Degree of Concern for Each Hazard Perceived in Terms of Food Safety (Top 7 responses, by percentage, answering "very anxious" and "somewhat anxious") (Provisional Translation)

	#1	#2	#3	#4	#5	#6	#7
2004	Contaminants (cadmium, methylmercury, arsenic, etc.) (91.7%)	Pesticide Residue (89.7%)	Antibiotics for livestock (83.5%)	Food poisoning from harmful microorganisms, viruses (80.9%)	Food Additives (76.4%)	Genetically Modified (74.7%)	BSE (74.5%)
2009	Food poisoning from harmful microorganisms, viruses (79.6%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (78.1%)	Pesticide Residue (73.1%)	Antibiotics for livestock (68.2%)	Elution of chemicals from utensils, containers and packaging (67.5%)	Genetically Modified (64.6%)	Food Additives (62.5%)
2014	Food poisoning from harmful microorganisms, viruses (78.5%)	Radioactive material (64.1%)	Health food claims (64.1%)	Pesticide Residue (58.8%)	Antibiotics for livestock (55.4%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (53.6%)	Food Additives (50.4%)
2016	Food poisoning from harmful microorganisms, viruses (82.8%)	Health food claims (61.7%)	Mycotoxin (61.5%)	Drug-resistant bacteria by antibiotics for livestock (59.1%)	Radioactive material (56.5%)	Foods containing allergenic substances (55.7%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (51.9%)
2017	Food poisoning from harmful microorganisms, viruses (83.4%)	Health food claims (63.6%)	Mycotoxin (62.0%)	Drug-resistant bacteria by antibiotics for livestock (59.1%)	Foods containing allergenic substances (57.5%)	Radioactive material (51.5%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (49.9%)
2018	Food poisoning from harmful microorganisms, viruses (86.7%)	Drug-resistant bacteria by antibiotics for livestock (66.9%)	Health food claims (64.9%)	Mycotoxin (64.6%)	Foods containing allergenic substances (61.8%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (60.9%)	Radioactive material (54.0%)
2019	Food poisoning from harmful microorganisms, viruses (85.1%)	Drug-resistant bacteria by antibiotics for livestock (66.1%)	Health food claims (62.6%)	Mycotoxin (61.9%)	Foods containing allergens (59.9%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (53.9%)	Elution of chemicals from utensils, containers and packaging (52.8%)
2020	Food poisoning from harmful microorganisms, viruses (83.2%)	Mycotoxin (72.5%)	Health food claims (60.5%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (59.4%)	Drug-resistant bacteria by antibiotics for livestock (57.4%)	Pesticide Residue (56.3%)	Elution of chemicals from utensils, containers and packaging (55.5%)
2021	Food poisoning from harmful microorganisms, viruses (80.5%)	Mycotoxin (64.1%)	Drug-resistant bacteria by antibiotics for livestock (63.9%)	Health food claims (62.9%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (61.4%)	Foods containing allergens (60.5%)	Radioactive material (54.9%)
2022	Food poisoning from harmful microorganisms, viruses (79.5%)	Health food claims (66.8%)	Mycotoxin (65.6%)	Contaminants (cadmium, methylmercury, arsenic, etc.) (62.1%)	Drug-resistant bacteria by antibiotics for livestock (59.4%)	Foods containing allergens (58.2%)	Radioactive material (51.3%)

2023	Food poisoning from harmful microorganisms, viruses (82.5%)	Mycotoxin (65.3%)	Health food claims (63.6%)	Drug-resistant bacteria by antibiotics for livestock (60.3%)	Contaminants (cadmium, methylmercury , arsenic, etc.) (59.6%)	Foods containing allergens (57.2%)	Radioactive material (49.0%)

Source: Food Safety Commission of Japan

Attachments:

No Attachments