Farm-to-Table Five-point Food Safety

Effective food safety management will have a positive effect on citizens' health. To ensure the healthfulness and safety of products from production using raw materials to sale, TFDA has adopted a "farm-to-table" total food life cycle management model, and is vigorously implementing a "five-point food safety policy". TFDA is also working to improve food management laws, strengthen oversight of food marketing chains, tighten management of exported and imported foods, assist domestic enterprises in expanding their overseas markets, and promote second tier quality control certification in order to guard food safety. At the same time, TFDA is further applying artificial intelligence to master potential food safety risks, and reinforcing testing technologies for emerging and potentially hazardous substances in food, in an effort to create an effective food safety protection net allowing people to enjoy their food with greater confidence.

02

Consolidating Food Safety Management

02

Consolidating Food Safety Management

In order to strengthen food safety from farm to table, TFDA continues to implement relevant management tasks, including refining comprehensive regulations of food management, strengthening the supervision of the food production and marketing chain, reinforcing import and export management, assisting domestic businesses in exploring export opportunities, promoting second tier quality control certification, and applying artificial intelligence to assist in risk assessment and decision-making. TFDA is working hard to develop and apply testing technologies for emerging and potentially hazardous substances in foods, and thereby establish an effective food safety protection net.

Section 1
Putting Food Management Regulations on a Sound Footing

Introduction

To improve regulations governing foods, and to boost businesses' autonomous management capabilities, TFDA revised 29 provisions in 2023, which strengthens food management regulations in our country.

Implementation Strategies

1. Drafting of food hygiene and safety standards

Based on risk assessment principles and international standards, scientific evidence, toxicological experiments, and dietary intake data for citizens, etc., TFDA has drafted relevant standards reflecting the foregoing data, and has striven to maintain agreement with international management standards.

2. Updating health care effects assessment methods

Revised the "Efficacy Assessment Method of Health Food for Dental Care" to ensure that standards for experimental methods and experiment implementation are clear and thoroughgoing.

3. Revision of food and related product inspection, registration, and permit document management regulations

Adoption of the "Directions on Registration of Food Additive," and addition of inspection and registration provisions for infant and follow-up infant formula and formula for certain disease.

4. Promulgation of Standards for Good Manufacturing Practices of Health Food

In order to improve the production management of health food manufacturers, MOHW has promulgated the "Standards for Good Manufacturing Practices of Health Food," which is based on "Regulations on Good Hygiene Practice for Food" in Taiwan and international good manufacturing practice operating standards, and content concerning management of quality, R&D, food safety controls, stability, flow tracking, audit systems, and documents and records.

5. Expanding autonomous inspection items

TFDA announced the revised Article 18 of "Food Businesses that shall Enact the Food Safety Monitoring Plan and Food Inspection, Minimum Testing Cycle, and Other Related Matters," which adds inspection items and minimum inspection period for frozen fruit by general merchandise retailers which not include department stores.

6. Enhancing labeling management

TFDA initiated two new labeling measures in 2023, namely "Regulation for the Labeling of Freshly Made Beverages in Chain Drink Stores, Convenience Stores, and Fast Food Restaurants" and "Regulations Governing the Labeling of Prepackaged Honey and Its Syrup Products."

7. Strengthening autonomous management among businesses

Food manufacturers have been progressively adopting food hygiene and safety management measures. To strengthen management implementation and ensure that food businesses realize their autonomous management responsibilities, TFDA abolished the requirement that "Vacuum-Packed Soybean Ready-To-Eat Food Shall Be Registered

with The Central Competent Authority," and drafted the "Guidelines for Manufacturers of Vacuum-Packed Soybean Ready-To-Eat Food to comply with the Regulations on Good Hygiene Practice for Food.

Achievements and Benefits

1. Harmonization with international regulations

TFDA determined a cumulative total of 7,771 pesticide residue limits, pesticide residue limits for 458 animal products, 1,551 veterinary drug residue limits, 17 sanitation standards, 44 food ingredient restrictions, and 797 food additives on the positive list during 2023, and defined scope of use, limits, and specifications/standards for each.

2. Refinement of health food assessment methods

The "Efficacy Assessment Method of Health Food for Dental Care" was revised in 2023 with greater emphasis on ethical treatment of experimental animals and the 3Rs principle (Replace, Reduce, Refine). At the same time, the criteria for subjects, rules for judging research data and results, and health care effect description were revised. At present, health foods in seven cases with this health care effect have been approved and registered. Assessment of these foods was conducted via human consumption study, and no animal experiments were conducted.

3. Refinement of the registration management system

By ensuring that the registration of food additives, infant and follow-up infant formula and formula for certain disease was updated and better met practical needs, TFDA made the food registration management system more effective and thoroughgoing.

4. Improvement of the health food manufacturing management system

To ensure that the production management systems of health food manufacturers comply with international norms and boost the overall international competitiveness of Taiwan's health foods, the enforcement date of the "Standards for Good Manufacturing Practices of Health Food" is January 1, 2025.

5. Strengthening autonomous management of food safety by businesses

Starting from July 1, 2024, new hygiene management items for frozen fruits that that general merchandise retailers that are not department stores must comply with when inspecting their finished products for microbes and other hygiene and safety risks was added to the existing hygiene management items that general merchandise retailers that are not department stores must comply with when inspecting their finished products for microbes and other hygiene and safety risks.

6. Protecting consumers' right-to-know

(1) To improve disclosure of labeling information for freshly made beverages on the market, starting in 2023, TFDA expanded the scope of products requiring the labeling of total caffeine content. In accordance with regulations, all freshly made beverages containing caffeine must have markings stating caffeine content. To provide a range of labeling options, TFDA also began allowing labeling via QR code or other electronic methods.

(2) To improve product name and labeling management regulations for products containing prepackaged honey and its syrup products, starting on July 1, 2023 (based on the products manufacturing date), products containing prepackaged honey and its syrup products must be labeled with names based on the amount of honey content. If products containing prepackaged honey and its syrup contain honey from different places of production,

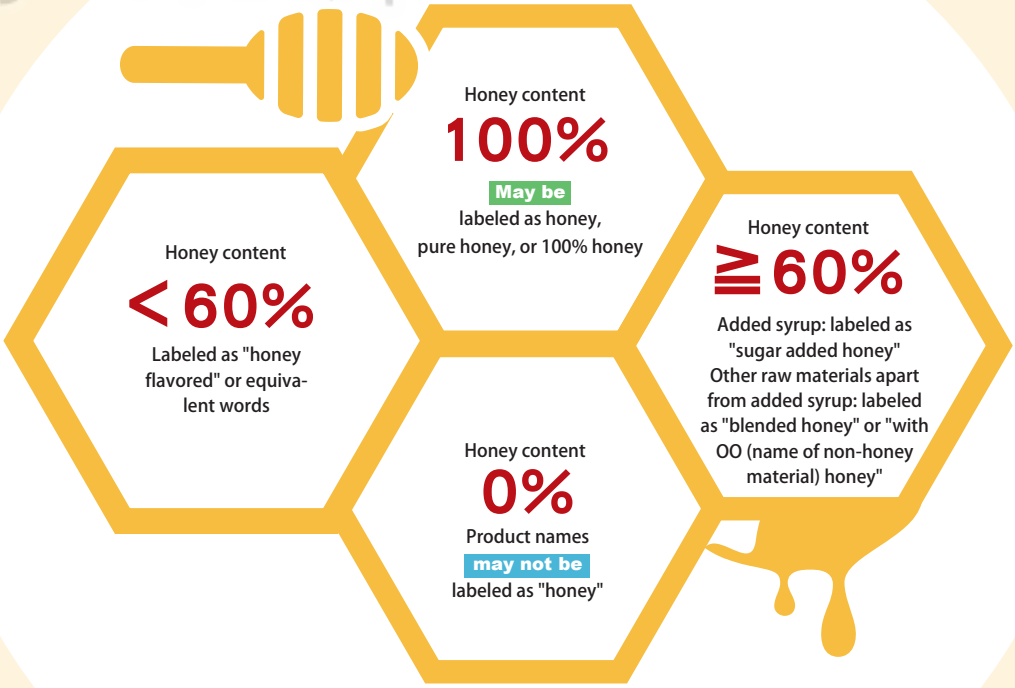


Figure 2-1 Regulations Governing the Labeling of Prepackaged Honey and Its Syrup Products

the places of raw honey production shall be labeled on the basis of the amount of honey content.

7. Accelerating food time-to-market

By exempting vacuum-packed soybean ready-to-eat foods from pre-market inspection and registration procedures, TFDA shortened time-to-market for accelerating vacuum-packed soybean ready-to-eat foods by at least 60 days.

Section 2

Reinforced Supervision of Food Production and Distribution Chains

Introduction

Food hygiene and safety is a vital matter closely connected with people's everyday lives. By monitoring production, manufacturing, distribution, and sale processes, TFDA has enabled potential risks to be discovered, allowing warning and control measures to be taken, which will enhance consumer trust and confidence.

Implementation Strategies

1. Border inspection of food and related products

TFDA reviewed and adjusted inspection methods and items on a rolling basis in reference to inspection records, product characteristics, and foreign and domestic information. Nonconforming products found in order inspections are returned or destroyed as required, and relevant information is announced. At the same time, the product random inspection rate has been increased. When imported products are found to be nonconforming during the product circulating in the domestic market (referred to as the post-market), relevant information is provided to the border authority for reinforced control, which

has strengthened hygiene and safety supervision mechanisms for imported foods.

2. Supervision of domestic manufacturing, processing, and distribution

In conjunction with the Five-points Food Safety policy and in consideration of citizens' diverse dietary habits, TFDA's supervision of food production and distribution chains has included the planning and organization of intensified audit and random inspection cases targeting items prone to violations, of high concern, or at high risk.

3. Border and post-marketing phosphine inspections and audits

To better monitor residual phosphine pesticide in at-risk foods, TFDA has included phosphine among border inspection items, and has also included the use and management of phosphine among the focal items of post-marketing audits. TFDA further monitors whether domestic manufacturers use phosphine in violation of regulations, and performs random inspections for phosphine residues.

4. Collaborative cross-department joint inspection

Cross-departmental joint inspections were conducted on the origin labeling of tea products and imported oysters available on the market, imported egg product businesses, and packaged and containerized drinking water manufacturing plants in 2023. These audits protected consumers' rights by tightening the regulatory compliance of the relevant products.

5. Cooperative police investigations with prosecutors and police

TFDA has relied on cooperation mechanisms involving the police and public health units to integrate various agencies' expertise and resources for the purpose of improving audit capabilities. TFDA has established a liaison platform for the investigation of suspected criminal cases involving foods and drugs, and a food and drug crime investigation team serves as a liaison and coordination center. By planning, directing, and coordinating investigation efforts by various agencies, this system has enhanced the effectiveness of investigation and handling.

Achievements and Benefits

1. Border inspection of food and related products

A total of 735,752 batches of food and related products were inspected at the border in 2023, of which 61,515 batches were sampled and tested with a pass rate of 98.8%.

2. Supervision of domestic manufacturing, processing, and distribution

TFDA completed 44 food inspection cases in 2023. A total of 139,599 inspections of domestic businesses were conducted, and the GHP compliance rate was 99.9%. A total of 520,000 inspections of foods and related products were conducted, and the compliance rate was 99.6%.

3. Border and post-marketing phosphine inspections and audits

(1) Border

A total of 234 batches of possible phosphine-containing products were inspected at the border in 2023, of which 12 batches were found to contain nonconforming products, which were returned or destroyed in accordance with regulations.

(2) Post-market

There were seven sampling inspection projects for high-risk products with phosphine residues in 2023. In these projects, 258 businesses were inspected and 101 products were sampled to detect phosphine residues, and the results were all qualified.

4. Collaborative cross-department joint inspection

(1)"Cross-departmental joint inspections of the origin labeling of tea product on market" in 2023: Inspected 411 tea products, of which 42 were suspected of containing foreign tea. These suspected cases were referred for investigation and prosecution by the District Prosecutors Office.

(2)"On-sale oyster place of origin labeling joint audit project" in 2023: Conducted 38 inspections on businesses and sampled 36 oyster products. There is one domestic bulk oyster product that does not indicate the origin information in accordance with regulations. The above-mentioned non-compliances have been corrected and all others are in compliance with the regulations.

(3) "Imported egg product business joint audit project" in 2023: Inspected labeling of 28 products at 22 businesses, and all products were in compliance.

(4)"Packaged and containerized drinking water manufacturing plant joint audit project" in 2023: GHP deficiencies were found in inspections of 37 businesses. All were in compliance at the time of follow-up inspections. Of the 41 product labels inspected, five noncompliant product labels have been fully corrected, and 33 cases in sampling inspection were in compliance.

5. Cooperative police investigations with prosecutors and police

In 2023, TFDA collaborated with prosecutors and police investigation units to handle 16 suspected violations of food regulations, all of which were dealt with in accordance the law.

Section 3

Improvement of Imported and Exported Food Management

Introduction

To ensure effective source management of imported foods, TFDA conducts systematic inspections of meat products, dairy products, egg products, fishery products, animal oil products, and products of cervidae origin. Products of these types from countries that implement systematic inspection may apply to TFDA for import inspection. In addition, TFDA has been adding or revising import regulations for different food categories. TFDA is committed to maintaining the hygiene and safety of imported foods and related products.

Furthermore, TFDA also compiles food safety assessment questionnaires and/or lists of prospective exporting firms on the basis of exporting country regulations and its division of labor with the responsible agencies in Taiwan; these questionnaires and lists are provided to the exporting countries for use in review, which assists domestic food businesses in obtaining imported food sale qualifications.

Implementation Strategies

1. Continued implement of a systematic inspection system

The governments of exporting countries (territories) must perform systematic food inspections. After these governments have submitted written applications to TFDA, TFDA shall perform examination and review to assess whether the exporting country's food hygiene and safety management system and government agency supervisory measures are equivalent to those of the ROC.

2. Continued revision and addition of border inspection items

TFDA and the Customs Administration, Ministry of Finance have established a customs clearance reporting mechanism for "imported goods without applicable food import regulations that are declared

as having food uses." After gathering and analyzing quarterly data and the results of audits by TFDA's regional administrations and local public health bureaus, TFDA reviewed and announced revisions to the classification codes of products for which import inspection applications must be made to TFDA.

3. Streamlining business consulting channels and providing legal information

(1) TFDA established the "Food Manufacturer Legal Knowledge Customer Service System," and has continued to update the system's Q&A section. This system helps businesses to enhance their autonomous management ability and better understand regulations concerning the export sale of foods.

(2) To enhance the competitiveness of Taiwan's food exports, TFDA has continued to update the information on its integrated export food hygiene and safety management platform, including the relevant laws of the importing country, import/export application procedures, and online learning videos.

4. Boosting the efficiency and quality of application for exported processed food sanitary verification

To facilitate the successful export of domestic processed foods, TFDA conducts explanatory meetings for businesses, which ensure that businesses understand key application points and reduces the chance that applications will be rejected or more documents needed. To improve case handling performance, quality, and consistency, TFDA also holds internal education and training classes and compiles case review principles.

Achievements and Benefits

1. Strict control over the hygiene and safety of imported foods

TFDA completed systematic inspection procedures in seven cases in 2023, including Indonesian fishery products, Japanese pork, Lithuanian beef, British lamb, Australian dairy products, Canadian all-age beef, and Vietnamese fishery products. All of the foregoing products complied with the specified import criteria, were produced at the source using approved production facilities, and verifying documents were issued so that businesses can apply to TFDA for import inspection.

2. Addition and revision of import inspection codes, enhancing management effectiveness

TFDA completed revision and enlargement of 47 product classification codes in food import regulations. Imported food products under a total of 2,765 codes require undergoing TFDA border inspection before they may enter the country.

3. Assisting businesses to expand their overseas markets

(1) Helping businesses to submit export application documents

In 2023, TFDA continued to actively assist businesses in exporting their products to China, Singapore, Malaysia, and Saudi Arabia, and also helped businesses export submit application documents in accordance with the specified products and the application procedures of the countries they plan to export to.

(2) Monitoring the hygiene standards of prospective export products

TFDA continued to submit egg product residue monitoring plans and implementation results for the export of egg products to the EU, as well as verification and guarantee information concerning composite foods containing processed dairy products, and these materials all passed review by the European

Commission. TFDA also continued to submit to Korea residue monitoring plans for the raw ingredients of egg and dairy products for export to Korea.

(3) Inter-agency assistance for overseas market expansion

TFDA relies on lateral inter-agency cooperation to actively promote domestic businesses' applications for the export of processed (cooked) meat products, and provides Taiwan's food hygiene and safety management and government supervisory measures in accordance with the planned country to which the products are to be exported.

4. Continued assistance to businesses needed English export verification

TFDA helped provide businesses applying to exported processed foods (additives) with 2,371 export sanitary relevant documents of processed foods in 2023, and held three explanatory meetings for businesses attended by 222 persons. The average satisfaction rate of these participants with the assistance provided by TFDA exceeds 90%.

Section 4

Implementation of Second Tier Quality Control Certification for Foods

Introduction

In accordance with the *Act Governing Food Safety and Sanitation*, TFDA has established a three-tier food hygiene and safety quality control system. In this system, second-tier QC consists of "third-party qualification of the hygiene and safety management systems," which seeks to provide consumers hygienic and safe food, while assisting food businesses in upgrading product quality and meeting international standards.

Implementation Strategies

1. Announcement of industries subject to compulsory regulation

TFDA has announced that second tier quality control certification must be performed by manufacturers in 10 industry areas, including firms with registered factories in 10 producing canned foods, food additives, special nutrients, and processed dairy products, as well as manufacturers of sugar, salt, starch, flour, soy sauce, and edible oil with capital in excess of NT$30 million. In addition, food manufacturers not on the announced list may voluntarily apply for certification.

2. Putting the accreditation and certification system on a sound footing

TFDA performs accreditation and certification tasks in accordance with the *Food Hygiene and Safety Management System Accreditation and Certification Management Regulations* and *Food Hygiene and Safety Management System Certification Operating Procedures*, and has established a food hygiene and safety management accreditation and certification information system (https://facs.fda.gov.tw) to boost management effectiveness. Food businesses that have been certified are subject to regular and occasional follow-up inspections, and must be re-certified again every two years.

3. Continued strengthening of certification quality

TFDA has completed certifying body accreditations in accordance with regulations to ensure that all certifying bodies retain ISO/TS 22003 accreditation qualifications, have professional auditors, and that applicable regulations governing avoidance of conflict of interest are upheld. In an effort to boost the certification quality and effectiveness of third party certifying bodies, TFDA performs on-site assessment

of certifying bodies and auditors, witness assessment, and audit consensus education and training classes on an annual basis.

Achievements and Benefits

1. Implementation of second tier quality control certification, protecting citizens' food safety

Certifying bodies accredited by TFDA include the Food Industry Development Research Institute, China Grain Products Research & Development Institute, National Animal Industry Foundation, and Taiwan External Agricultural Products Development Association. Among the 631 food businesses subject to certification in 2023, 91.4% have been certified, and TFDA is continuing to track the certification applications or certification of those businesses yet to be certified (Table 2-1). TFDA is relying on the second tier quality control certification system to help businesses discover and promptly resolve problems, and realize food hygiene and safety.

2. Linking of second tier quality control certification information, streamlining food export applications

Businesses that have received certification can waive on-site audits by the sanitation competent authority via possession of a certification certificate during the application period for hygiene verification, which has streamlined the food export application process.

Section 5

Apply Artificial Intelligence to Assist in Food Safety Risk Decisions

Introduction

In light of the diversification and continuous growth of imported foods, and the prevalent online consumption in the post-Covid era, in order to improve food safety management, TFDA has been using big data analysis and other smart technologies to assist with risk management and safeguard public health. In addition, in response to the incident where hepatitis A virus was detected in berries from Costco, TFDA immediately formed an emergency response task force to properly handle various emergency measures.

Implementation Strategies

1. Apply artificial intelligence technology

TFDA's Border Prediction Intelligent (BPI) relies on big data in conjunction with AI and machine learning technology, to enhance the

Table 2-1 Second Tier Quality Control Certification Results in 2023

Explanation	Number of businesses
Businesses subject to second tier quality control certification	631
Businesses that have received second tier quality control certification	577
Businesses that have not yet received second tier quality control certification	53*

*Have already applied for certification.

system by expanding new factors, adjusting model hyperparameters, refining the criteria for selecting the best models, strengthening feature learning for declarations that were not effectively captured, and establishing a model decaying monitoring mechanism; this system can immediately grasp risk information as a reference for decision-making, and has strengthened management of border food inspections.

2. Integrating from food cloud information to detect food safety risks

TFDA's automated post-marketing monitoring system, which was established on the basis of a cloud food database, assists the post-marketing tracking of abnormal chemicals transactions involving food cloud businesses and chemical cloud businesses. This system relies on big data analysis of historical audit records and data mining technology to assist post-marketing audit projects on high-risk businesses, and thereby address potential food safety risks.

3. Inspiring innovative thinking to enhance risk management capabilities

To accelerate the incorporation of smart technology in food and drug safety risk management, TFDA held the "Food and Drug Big Data Competition: In-depth Analysis, Precise Decision-making, Innovative Transformation, and Cutting-edge Excellence" in 2023. This event stimulated innovative thinking and breakthrough insights on the part of central and local government colleagues, and enhanced risk management and emergency response strategy drafting capabilities.

4. Holding emergency response meetings to address urgent incidents

TFDA continuously monitors international alerts, has been keeping track of the US FDA's recall alerts for frozen organic strawberries. TFDA expanded border and post-marketing inspections. After the hepatitis A virus was detected in berries form Costco, TFDA immediately activated third tier response mechanisms in response to the changing situation.

Achievements and Benefits

1. Advancement of applications of AI machine learning algorithm technology

Through the BPI system, 12 categories of food products were refined. The detection rate of violation for declarations using AI has increased by 1.19 times compared to those not using AI, effectively enhancing the efficiency of border food safety management.

2. Improving the automated post-marketing monitoring system to grasp potential food safety risks

TFDA gathered a total of 1,394 records from the food safety rapid reporting system, international food consumers red and green lights, and RASFF, etc. concerning public sentiment about food additives and chemicals. This allowed TFDA to add 44 types of food additives and chemicals that are prone to misuse, and determine their food risk combinations. After extrapolating based on food characteristics or additive uses, a total of 306 combinations were derived. This assist competent authority in planning more precise post-marketing food audits, and thereby preventing the occurrence of food safety incidents.

3. Holding a food and drug big data competition

The food and drug big data competition held by TFDA in 2023 attracted participants consisting of 170 government personnel, experts, and scholars on 11 teams. The assembly of participating teams from central and local government units facilitated interchange and cooperation, and boosted the ability to

Figure 2-2 The 2023 Food and Drug Big Data Competition

use data and draft strategies for responding to various events (Fig. 2-2).

4. Activation an emergency response meeting for the "Costco berries" incident

Responding to the detection of the hepatitis A virus in berries from Costco, TFDA immediately formed an emergency response task force, and established business processing, administrative support, inspection technology, staff operations, and distribution audit teams and a spokesperson. Nine response conferences were held and 24 work reports were compiled during the alert period, and all emergency response measures were conducted satisfactorily.

Section 6
Development of New Food Testing Technologies

Introduction

In order to fulfill hygiene criteria such as allowed limits set forth in food-related laws and regulations and to identify in real-time unknown or illegitimate additives and pollutants that may be generated to impact health during the process, it is required to define testing methods that are environmentally friendly, fast, and precise. TFDA continues to advance its laboratory testing and analysis capabilities, establish novel testing technologies for foods, and also organize related technical exchange and training events in response to the inspection of sudden food events for enhancing domestic food safety testing capacity.

Implementation Strategies

1. Promotion of domestic food testing technology interchange

TFDA has held testing technology interchange events allowing domestic and foreign experts and scholars to share testing technology advances and experience. These events are intended to achieve the goals of promoting interchange in testing technology,

boosting the technological level and quality of domestic testing laboratories, and training technical personnel.

2. Application of advanced analytical technology for high-risk foods, protecting the public's food safety

Targeting food items that are high risk and of high concern, TFDA has developed highly credible, rapid testing methods that can protect the public's food safety by quickly clarifying the details of emerging food incidents. Due to the extremely broad and complex range of food matrices, matrix interference effects must be overcome during testing. TFDA has advanced testing technologies to develop rapid and high precision testing methods for strengthening border inspections, monitoring of products on the market, and autonomous management by businesses.

Achievements and Benefits

1. Holding the 2023 APEC Communication Platform for Analytical Techniques - Food from Biotechnology-Derived Crops Workshop

The "2023 APEC Communication Platform for Analytical Techniques - Food from Biotechnology-Derived Crops Workshop" held by TFDA in 2023 combined an on-site symposium with an online videoconference. Six experts and scholars from Japan, Korea, Malaysia, Vietnam, Academia Sinica and TFDA were invited to share their knowledge on testing techniques, monitoring, and experiences related to innovative biotechnology foods, including genetically modified foods, in their respective countries. A total of 148 experts participated in the event, representing official organizations from Indonesia, Japan, Korea, Malaysia, Mexico, Peru, the Philippines, Singapore, Vietnam, and Taiwan, as well as the Ministry of Agriculture (Taiwan), TFDA, and local health bureaus. The workshop fostered the exchange of international experiences to enhance domestic testing standards, align with global practices, and promote cooperation opportunities between Taiwan and other APEC member economies in the Asia-Pacific region (Fig. 2-3、2-4).

2. Development of testing methods for high-risk and high-concerned food related items

(1) Rapid establishment of testing methods in response to public opinion and reliance on inter-agency cooperation to publish testing methods

1. Responding to the establishment of Reference Point for Action (RPA) for malachite green (MG) by EU and the dispute concerning the detection of malachite green and crystal violet in grouper exported from Taiwan to China, TFDA amended the "Method of Test for Veterinary Drug Residues in Foods - Malachite Green, Crystal Violet, and their Metabolites".
2. Responding to the need of exporting aquatic products to the EU, TFDA published the "Method of Test for Veterinary Drug Residues in Aquatic Products - Multiresidue Analysis of Nitroimidazoles and their Metabolites" which can be applied in product quality control before export, and will reduce trade barriers.
3. TFDA advanced the "Method of Test for Pesticide Residues in Foods - Test of Phosphine" to added applicable matrices, and has been used to successfully block the import of noncompliant mung bean and black sesame products at the border.
4. TFDA optimized the "Method of Test for Ethylene Oxide and its Reaction Product, 2-Chloroethanol, in Foods" for testing the carcinogenic substance ethylene oxide in cheese.

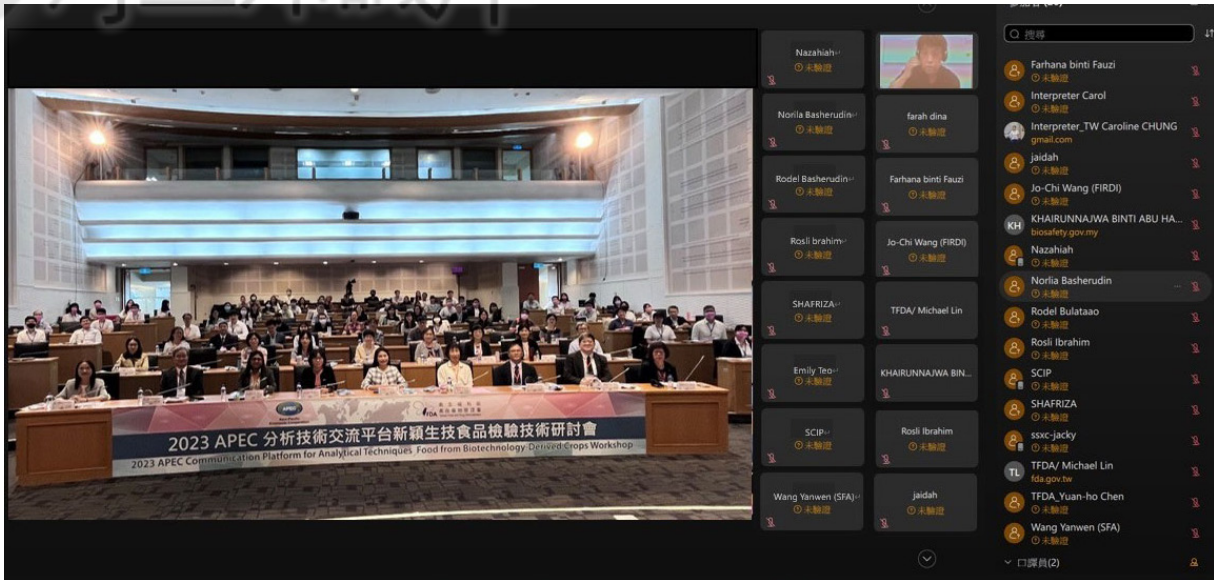


Figure 2-3　2023 APEC Communication Platform for Analytical Techniques - Food from Biotechnology-Derived Crops Workshop (online meeting)

Figure 2-4　2023 APEC Communication Platform for Analytical Techniques - Food from Biotechnology-Derived Crops Workshop

5. Responding to the discharge of radioactive water by Japan, through inter-agency cooperation, TFDA assisted the National Atomic Research Institute in publishing the "Method of Test Tritium in Foods" which will help the need of testing for the radioactive substance tritium in foods.

6. To prevent the sale of imported oysters mixed with domestic oysters, which would impact the income of local oyster dealers and oyster raisers, the Fisheries Research Institute, Ministry of Agriculture submitted the oyster place of origin identification technologies—the "Method of Test for Multielement

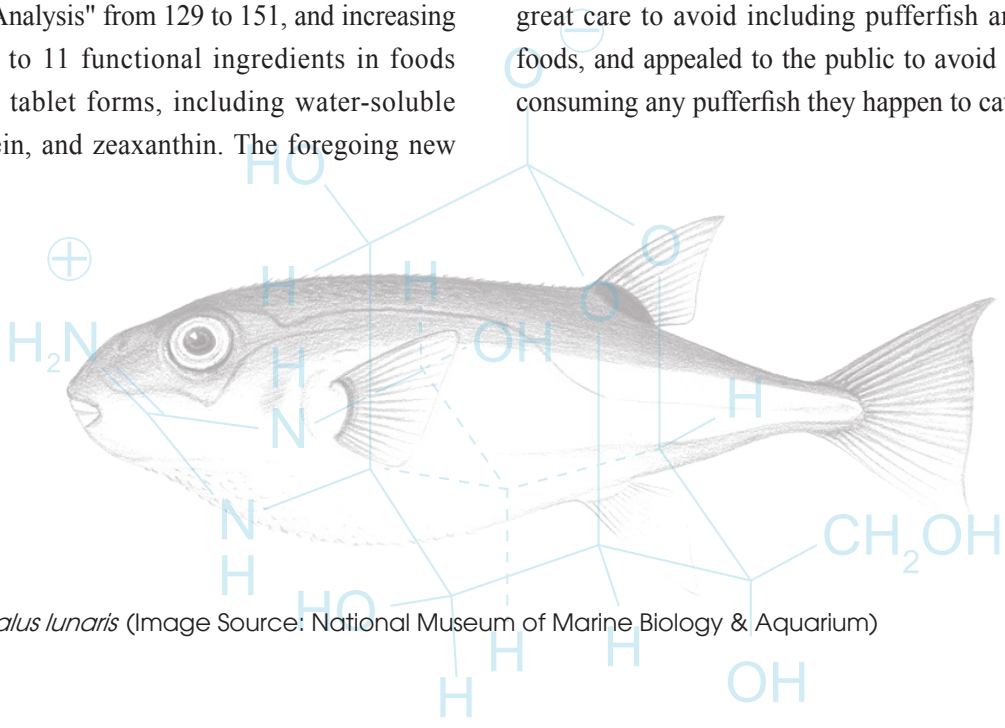
in Oyster" and the "Method of Test for Oyster Species Identification"—to TFDA's testing methods review committee for review. These methods were approved and released as recommended testing methods to provide the industry with a scientific basis for testing, and to protect consumers' right to know and the rights of Taiwan's oyster raisers by determining whether imported oysters have been mixed with domestic oysters.

(2) Advancement of testing methods

In 2023, in order to meet the need of testing requirement under food-related sanitation standards, TFDA promulgated or amended 8 testing methods for pesticides, veterinary drugs, heavy metals in food and food utensils, containers and packages including, promulgate two testing methods for alloy food utensils, containers and packages. TFDA also published 21 recommended testing methods, which included updating the "Method of Test for Pesticide Residues in Foods for Expansion of Multiresidue Analysis Methods (5)", increasing the number of analytes in "Method of Test for Pesticide Residues in Foods - Multiresidue Analysis (6)" from 20 to 31, increasing the number of analytes in "Method of Test for Pesticide Residues in Livestock and Poultry Products - Multiresidue Analysis" from 129 to 151, and increasing testing items to 11 functional ingredients in foods in capsule or tablet forms, including water-soluble vitamins, lutein, and zeaxanthin. The foregoing new test methods and analytes will effectively boost testing performance. In addition, TFDA also added or revised five testing methods for identification of microbes and biological organisms in foods. Responding to the need for testing in connection with food additive usage scope, permissible limits, specifications, and standards, TFDA developed the "Method of Test for Extracts of Rosemary in Foods," which has been provided for general use.

(3) Identification of fish species and toxin analysis responsible for pufferfish poisoning to protect public food safety

Responding to a food emergency incident of pufferfish poisoning cases occurring after people consumed pufferfish sashimi or pufferfish soup that they cooked by themselves, TFDA applied DNA molecular biotechnology to identify pufferfish species and liquid chromatography/tandem mass spectrometry to analyze tetrodotoxin. Using these technologies can clarify the cause of poisoning cases. The results of DNA species identification confirmed that the foregoing cases were caused by the lunartail puffer (Lagocephalus lunaris), and tetrodotoxin was detected through mass spectrometry. Furthermore, TFDA held a press conference to remind restaurants to take great care to avoid including pufferfish among their foods, and appealed to the public to avoid risk by not consuming any pufferfish they happen to catch.



• *Lagocephalus lunaris* (Image Source: National Museum of Marine Biology & Aquarium)