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Cambodia Needs Food Irradiation Facilities for Economic Growth and Sustainable Development

SOTH Sereyboth and *HEAB Kim Ey* [a]

What Is Food Irradiation?

According to the US Food and Drug Administration, food irradiation is the technique of ionising radiation, such as gamma rays, x-rays, or electron beams, applied to food and food packaging. Food irradiation lengthens product shelf life and improves food safety (preservation) without detrimental effects on the sensorial and nutritional values. It prevents sprouting or ripening and controls insects and invasive pests, thus making it the potential tool to solve phytosanitary issues.

Moreover, this technology may serve as a quarantine treatment for agricultural and animal-based products, thus facilitating the international trade of food. Around 51 food irradiation facilities have been approved in 41 countries, including the US, Denmark, Sweden, the UK, Canada, and the Netherlands. The food irradiation market is expected to rise at an annual growth rate of 3.90 per cent, reaching US$276.7 million by 2026.

ASEAN Member States have also started adopting irradiation. Indonesia used a food irradiation facility to treat 6,923 tons of cocoa, frozen seafood, spices, and other commodities. Malaysia sterilised 785 tons of spices, herbs, and other commodities. The Philippines treated 445 tons of spices and dried vegetables. Thailand treated 1,484 tons of fruits, and Vietnam treated 66,000 tons of frozen seafood, fruits, and other commodities.

According to the International Atomic Energy Agency (IAEA), after having a food irradiation facility, Vietnam gained US$20 million in 2020 by exporting mango, longan, lychee, dragon fruit, rambutan, and star apples to the US. The country is planning to expand the market using the facility. As Cambodia is an agriculture-based country, food irradiation facilities can expand the exporting market for Cambodian business and agriculture commodities.

Why Is Food Irradiation Important?

Irradiated food provides the same benefits as heating, refrigerating, freezing, or chemically treating it, but without changing temperature or leaving residues. Regarding free trade, the food irradiation technique is the most effective measure to fulfil the phytosanitary requirements of a particular country. For example, mango exports to New Zealand and the USA must follow a treatment process that includes food irradiation.

[a] **SOTH Sereyboth** and **HEAB Kim Ey** are government officials at the Department of Science, Technology and Innovation Training of the National Institute of Science, Technology and Innovation.

Food irradiation may enable exporters to increase their exporting volume, which is beneficial for farmers as they have a stable market. As a result, it will create more job opportunities, increase exportation volume, enhance local product quality, and increase economic growth.

Additionally, consumers' concerns about unsafe food will be cleared as it has been proven safe. Thus, consumers will be confident in buying food with irradiated labels. It is important to note that no scientific evidence suggests that consuming irradiated food will cause long-term health consequences such as cancer and other diseases or lower fertility for men and women. A study published in PubMed Central in 2004 looked at the long-term effects of irradiated food and found that there was no significant difference in health outcomes between those who consumed irradiated food and those who did not.

Food Irradiation Is Key to Facilitating International Trade

Irradiation has gained widespread acceptance as a reliable and successful post-harvest treatment for reducing microbe contamination, delaying spoiling, and preserving food quality. It serves as a phytosanitary treatment for many agricultural products, including fruits and vegetables, sprouts, spices, herbs, poultry, beef, pork, fish, seafood and rice.

The IAEA, the Food and Agriculture Organization (FAO), and the IPPC developed guidelines for the use of irradiation as a phytosanitary measure and the phytosanitary treatments for regulated pests, which include 15 irradiation treatments for 13 insect pests, including all fruit flies and three types of mealybugs. These guidelines followed the foundation of trade agreements, and they assisted traders in meeting the increasingly strict quarantine standards against exotic pests, thus creating new market opportunities.

Several varieties of irradiated fruits and vegetables are traded internationally between the Americas and the Asia-Pacific region, passing through food irradiation facilities. However, significant gaps exist, and "generic therapies" for broad-pest categories must be created to provide new alternatives for protecting agricultural produce and expanding trade. Trends toward more specific food safety and control systems, particularly machine-generated irradiation technologies, must be addressed to provide effective means of ensuring food quality, resolving customer concerns about the use of ionising radiation, and decreasing losses and waste without relying on radionuclide sources.

Rice is considered Cambodian white gold, of which the Cambodian government set a goal to export one million tons of milled rice by 2025. However, there are some challenges, including low yield, processing, logistics, marketing, and international standard compliance. As a result, Cambodian rice loses its opportunities to some international markets due to a lack of phytosanitary facilities, which brings about 35%–40% in price reduction.

Another important commodity for Cambodia is mango. Cambodia has exported some 945,274 tonnes of fresh mangoes to foreign markets, with an estimated total value of some $473,207,700. Fresh mango exports are primarily to Vietnam, which are then transported to the Chinese market with the product of Vietnam label after irradiation. Cambodia's fresh mangoes are also exported to Thailand, South Korea, and some EU countries. Only 107,680 tons have been exported under the sanitary and phytosanitary (SPS) verified licenses.

Chinese agricultural experts carried out their initial check on mango plantations in Cambodia and recommended importation to China. However, the lack of phytosanitary treatment facilities

limits this exportation opportunity. For instance, a mango treatment facility by hot water treatment in Cambodia can only treat 25–30 tons a day, very small compared to the volume of mango production. Therefore, investing in food irradiation facilities will increase the volume of Cambodian commodity exportation.

Food Irradiation in Cambodia: Challenges and Opportunities

Investing in a food irradiation facility is not an easy task as it may have some constraints such as a lack of technicians, expensiveness of the facility, and complicated procedures for standard compliance, and it requires many trials and errors. As this paper aims to initiate discussion, we do not have technicians who can operate the facility. As operating a food irradiation facility requires precision and flexibility, technicians must be equipped with nuclear, agricultural, and international standards and health and safety skills, which may require years of learning.

A food irradiation facility can cost more than US$1 million. Besides, the Codex Stan 106-1983 developed by WHO and FAO is relatively complicated to understand and demanding to comply with. For instance, different countries require different procedures or doses to treat a particular commodity, which requires knowledgeable technicians to handle. As the facility is new, many trials and errors are required to build confidence among all stakeholders. Therefore, these challenges may delay the establishment of a food irradiation facility in Cambodia.

Nevertheless, Cambodia joined the World Trade Organization (WTO) on 13 October 2004, allowing it to freely export and import products, including agricultural commodities, subject to tariff quotas. As a result, if the food irradiation facility is established, the obstacles to free trade agreement can be overcome. Many countries have widely accepted food irradiation facilities. If Cambodia has one, it will open more export opportunities for Cambodian products to international markets, particularly Europe, where food safety standards are relatively high. Therefore, SMEs exporting agricultural commodities overseas will increase their volume as they have more destinations. Additionally, more Cambodians will turn to farming when they have a stable market and price.

Moreover, by exporting irradiated food products, such as spices and fruits, Cambodia can differentiate itself in the international market and create a competitive advantage. This, in turn, will lead to increased revenue and economic growth for the country.

Food irradiation can also benefit the local economy by increasing food security while reducing food waste. With a longer shelf life, irradiated food products can be stored for longer periods, reducing the need for frequent transportation and storage costs. Thus, it can help stabilise food prices and reduce the risk of food shortages during times of low supply. Finally, the food irradiation facility will be a potential tool for sustainable agricultural development in Cambodia.

Prospects

The Cambodian government should consider establishing a food irradiation facility to increase the volume of exportation, more than that, to ensure consumers' safety by preserving important nutrition. To comply with international or key exported partners' standards, building human capital for operating the food irradiation facility is necessary.

Establishing a food irradiation facility will expand the market for Cambodian farmers and businessmen when more countries accept Cambodian products. Besides, providing public services with food sterilisation using an irradiation facility will create more jobs for Cambodian exporters, importers, logistic officers, and other stakeholders. Consumers will also benefit from healthy food, reducing medical expenses. Hence, food irradiation may be a key tool for economic growth and sustainable development in Cambodia's agriculture sector.

The views expressed are the author's own and do not reflect the views of the Asian Vision Institute.