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Pesticide residues control in foods imported into Japan; HACCP-oriented approach to ensure regulatory compliance

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Introduction

In this study, we used Hazard Analysis and Critical Control Point (HACCP) procedures in the food importing business to comply with the Food Sanitation Law in Japan. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-product testing and it can be applied throughout the food chain from primary production to final consumption [1]. However, generally it is not considered to apply to food importation procedures.

To minimize food safety violations of imported foods into Japan, we employed a HACCP-oriented approach during the importing process of agricultural products especially cocoa beans, as an example.

Materials and methods

To identify major causes of Food Sanitation Law violations, we investigated MHLW's quarantine statistics of 3,018 cases of imported food between 2012 and 2015 [2] and identified items which have more cases of violations than other items. During the period, the category of "Agricultural chemical residues" was one of the most frequent issues. In previous research, disharmonized pesticide standards have been shown to act as a technical barrier to trade [3]. Therefore, we compared the Maximum Residue Limit (MRL) of the items between the major destination of the items (typically the EU) and Japan.

We interviewed a food importer which has experiences of violations, regarding importing processes, including control measures, monitoring methods and corrective actions. To conduct the hazard analysis, we used a general HACCP worksheet and filled it out based on the interview results. For primary production, we set operation procedures related to agricultural production, harvesting, fermentation, drying, storage and transportation based on Good Agricultural Practice (GAP) [4]. For subsequent importing processes, we applied operation procedures related to region/exporter selection, contract review, export and import in line with the guidelines for hygiene management of import processed foods issued by MHLW. According to the descriptions of Codex HACCP principle, control measures are only applied to CCPs. The criteria for identifying CCPs were "importer's direct responsibilities for respective process management" and "Further steps to mitigate violation risk of pesticide residues".

Results

As a result of the violation case analysis, the category of "Agricultural chemical residues" had one of the most frequent violations (736 cases in total). In the category, the item with the largest number of violations had been shrimp, however the violations decreased after the MRL amendment for ethoxyquin in 2014 [5]. Taking into consideration the situation above, we identified food items which showed the 2nd to 6th largest number of violations. The items were cocoa beans (105 cases), sesame seeds (35 cases), pepper (35 cases), tea leaf (26 cases) and onion (24 cases).

Since the EU is the major destination for the agricultural products mentioned above [6], we compared MRLs for these items between the EU and Japan respectively. The results showed that 71% of cases for cocoa bean, 72% for sesame seed, 50% for pepper and 31% for tea leaf arose from the difference between the EU and Japanese MRLs (Fig. 1).

From this research, we came to a hypothesis that producers make efforts to control their products in compliance with the EU regulations and not with those stipulated under Japanese law.

Based on this hypothesis, we tried to apply HACCP procedures to the importing process of cocoa beans, as an example. Eight (8) steps were identified and two CCPs were determined; "Contract arrangement to ensure the product compliance with Japanese regulations" and "pre-shipment confirmation of test

results to meet Japanese MRLs" (Table 1).

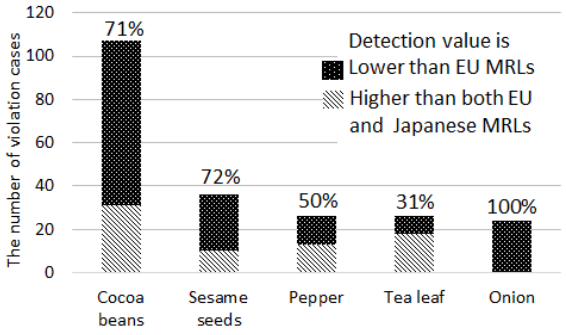

Fig. 1. The 2nd to 6th highest number items of pesticide MRL violations in Japan and the rate of violations in the detected value lower than the EU MRLs.

Discussion

The HACCP-oriented approach which consists of "the importing process identification", "Hazard analysis" and "Critical Control Points identification" was applied to the cocoa bean importing process. The hazard analysis results indicate the necessary control program in each step of the food importing process, therefore importers can use the method to assess the step. For the significance of CCP in the process, CCP1 (step 2) was to assure the compliance with Japanese pesticide regulations through the importer and exporter communication about the MRLs of Japan. This enables to establish the pesticide control between the production step and transportation step. Regarding the CCP2 (step 7), the control measure of confirming the test results is the same way of control with the receiving process of the raw material in a food processing process [7]. Importers are therefore able to confirm that the importing food was controlled in an appropriate manner during the prior steps.

References

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Table 1. HACCP worksheet

Step No.	Step		Organization in charge	Potential Hazards	Need to be addressed in the HACCP plan	WHY; Justification for decision made in previous column	General Control Measures	CCP
1	Selection		Importers	Business with high risk areas/ countries	No	Select the site based on business experience of recording violations and gathering information		No
2	Setting control limits		Exporters/ Importers	Set the control limits in relation to compliance with Japan MRLs	YES	Inadequate communication of Japan's pesticide MRLs is a major cause of violations	Contract of agricultural products comply with Japan's pesticides regulations	**CCP1**
3	Evaluate conditions	Production	Producers	Non-conformity usage of pesticides Wind-driven drift	No	Inspect the site and gather information; - Control pesticides in an appropriate manner -Prohibit usage of the non-designated pesticides -Prevent wind-driven drift from surroundings		No
4		Harvesting, fermentation and drying	Producers	Contamination through non-conformity usage of utensils and equipment Wind-driven drift	No	Inspect the site and gather information; - Equipment for harvesting is stored and used in an appropriate manner -Facility of dry processing is constructed in order to prevent contamination -Preventive measures are implemented		No
5		Storage	Warehouses	Contamination from the other agricultural products and storage place/area	No	Inspect the site and gather information; - Segregated from the other agricultural products -Containers and storage area/place is controlled hygenically		No
6		Transportation	Transporter	Contamination from transportation equipment	No	Inspect the site and gather information; Control containers, equipment, tracks in hygienic manner		No
7	Exportation		Exporters/ Importers	Export non-conformity products	Yes	Pesticide violations occurred if the previous steps are not managed appropriately	Decision making for exportation through confirming test results	**CCP2**
8	Importation		Importer	Import non-conformity products	No	Act of importation does not introduce any pesticide contamination		No