（第３号様式）(Form No. 3)

学 位 論 文 要 旨
Dissertation Abstract

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学位論文題目：
Title of Dissertation　Study on the remediation of Thai food safety with respect to food hypersensitivities
（タイの食品への過敏症に対する安全性の改善策に関する研究）

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The aims of these researches are; to investigate the undeclared food allergens in commercial Thai food product; to survey Thai commercial food products that have been reported to contain no wheat, rye, barley or gluten according to their labels; to investigate the understanding and implementation of food allergen management among Thai food manufacturers; to establish reliable enzyme-linked Immunosorbent assay for the determination of coconut milk proteins in processed foods.

The presence of undeclared allergens – namely milk, egg, wheat and peanut – in 142 commercial processed Thai food products were investigated by quantitative ELISA method. Fifty- five positive cases found to contain undeclared allergens > 10 ppm, wherein undeclared milk was the most frequently (38.2%) followed by egg and wheat with similar frequency (31% each). Undeclared peanut was rare. A significant number of cases containing undeclared food allergen greater than 1% were indicated to be wheat (5 cases), egg (3 cases) and milk (3 cases). Confirmation test for the presence of egg (ovalbumin) and milk (casein) were also performed by Western blot test.

Moreover, one hundred and twenty nine commercial Thai food products those have been reported to contain no wheat, rye, barley or gluten according to their labels, with respects to gluten free status, were surveyed if they were suitable for CD individuals by examining the absence of gluten or below 20 ppm.

The gluten content in those products was analyzed using ELISA kit (LOQ 0.255 ppm gluten). The results presented that most of the examined Thai food products (92.2%) contained less than 20 ppm gluten, which is the recognized safe gluten level for the Celiac disease (CD) individuals. However, 10 products found to contain >20 ppm gluten, among these 8 samples showed significant gluten presence exceeding 1,000 ppm. These 10 products showed clearly positive bands for wheat specific DNA by PCR analysis. The presence of undeclared gluten in examined products might be due to the use of undeclared wheat/gluten ingredients or cross-contact wheat/gluten. Our survey suggests that most of the examined Thai food products can be consumed by CD individuals, showed the potential of these Thai products as new diets to expand their

limited food choices from different food culture, and ultimately raise the quality of life of all CD individuals globally.

Obviously, the two studies results revealed that appropriate allergen management strategies need to be implemented by Thai food manufacturer in order to ensure accurate labeling and to protect the allergic consumers.

In the following study, we aim to learn about the understanding and implementation of food allergen management among Thai food manufacturers. Seventy two of HACCP-certified food companies were conducted by questionnaires and direct interviews with company's QC managers, at period with no legal requirement on food allergen labelling. 55% (40/72) of respondents answered to implement a food allergen control program as part of existing product quality control and safety management. The awareness and understanding of food allergen management depended on the company's dominance in the market place as well as experience in food quality control and safety management. High awareness of food allergy as well as the management and labeling of food allergens was found most in food manufacturers who sell their products oversea. The respondents expected that food allergen labeling legislation will soon be adopted in Thailand. The results of this survey indicated the substantial effectiveness of the present allergen control programs of Thai food manufacturers, and also their potential capability of food allergen management for domestic products at a level equal to that for export products.

Additionally, a novel reliable Enzyme-Linked Immunosorbent Assay (ELISA) for detection and quantification of coconut milk proteins in processed foods designed and developed. The result demonstrated that developed sandwich ELISA was able to detect coconut milk proteins from various coconut milk products, and did not show any cross-reactivity with 41 of 42 kinds of popularly used food ingredients, thus reflecting great specificity for coconut milk proteins. Moreover, the established ELISA is highly sensitive and allowed the detection of 0.31μg/g of coconut milk protein in complex food matrices. This proposed assay could serve as a useful tool for detection of the presence of hidden coconut milk proteins in processed foods.