

Aflatoxin Monitoring in Rice and Barley

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Objectives

To ensure safety of agricultural produce, it is essential to monitor produce contaminants and establish appropriate measures in place to prevent them. In this study, for piling basic produce safety data, aflatoxins were monitored in rice and barley.

Materials and Methods

○ Materials

- Brown rice: 126 brown rice samples were collected from 30 different paddy fields being proportional to rice cultivating area in 2004. Rice were gathered from 10 sites in one paddy field to make one sample unit of more than 1kg. The samples were dried in the shade preventing a cross-contamination and hulls were removed, and then the hulled grains were ground for an analysis.
- Polished rice: 80 rice products comprising 10 products from each province and available from markets were purchased in 2005 and samples were collected from the each product. In each product, 2kg of polished rice were taken and ground, and then 25g of them were analysed.
- Barley: 55 barley products available from markets were purchased in 2005 and prepared for an analysis as done in the polished rice sample analysis.

○ Methods

- The prepared sample was screened using ELISA devices and the result from the ELISA screening was confirmed using HPLC method. The HPLC system was set up with immunoaffinity column, post column derivatisation device (Kobra Cell[®]) and fluorescence detector.

Results and Discussion

- LOQ of aflatoxin in rice and barley samples was 0.5ppb and 0.2ppb, and recovery rate was 73 ~ 109% and 72 ~ 87% in ELISA and HPLC test, respectively
- Base on the result of HPLC confirmation, the 7 samples being positive in ELISA screening was due to a false positive effect. So it could be concluded that aflatoxins in brown rice, polished rice and barley were assessed to be lower than the limits of quantitation.
- It is discussed that more researches on produce safety should be done even with produce from environmental-friendly cultivation.

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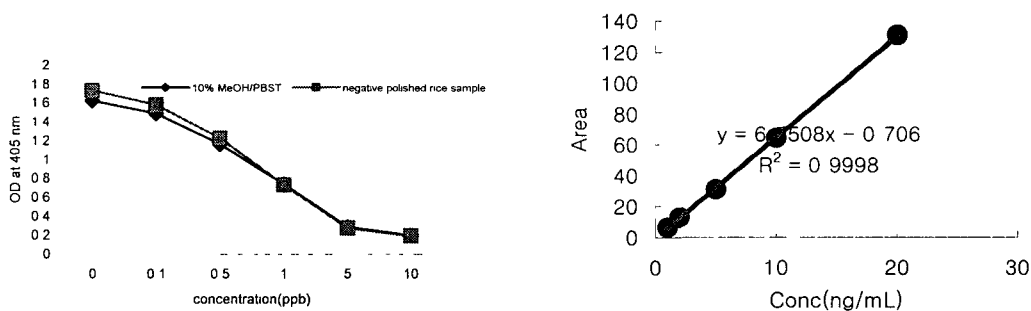


Fig 1. Aflatoxin B1 standard curve of rice sample in ELISA (left) and HPLC (right).

Table 1. The recovery rates and the limits of detection and quantitation of the analysis

	Recovery rate(%)			LOD(ng/g) ¹	LOQ(ng/G) ²
	Brown rice	Polished rice	Barley		
ELISA	73 ~ 109	-	-	0.5	1
HPLC	72 ~ 87	82	80	0.2	0.3

¹LOD: Limit of Detection, ²LOQ: Limit of Quantitation.

Table 2. The results of ELISA screening and HPLC confirmation

	Sample size	ELISA (Screening)	HPLC (Confirmation)
Brown rice	126	6	ND*
Polished rice	80	1	ND*
Barley	55	ND*	ND*

*Not Detected.