

Abstract

Research Title Non-destructive determination of mold and aflatoxin in pepper, corn and peanut using near infrared spectroscopy (NIRS)

Researcher Busarakorn Mahayothee¹, Pramote Khuwijitjaru¹

Office Department of Food Technology, Faculty of Engineering and Industrial technology, Silpakorn University

Research Grant Fisical Year 2015 Research and Development Institute, Silpakorn University

Year of completion 2016

Type of research Applied research

Subjects Agriculture and Biology, Sub-group: Agro-industry

The objective of this research was to study the rapid determination of moisture content, aflatoxin content and mold in pepper, corn and peanut using near infrared spectroscopy (NIRS) and studying the feasibility sample preparation of dry-extract system for infrared (DESIR) technique for determination low level of aflatoxin B₁.

In this study, samples were used for detection of moisture content and mold and aflatoxin B₁. The reference analysis of total mold content using dilution plating method and moisture content by oven-dry method and aflatoxin B₁ by HPLC were performed. Samples were prepared from two different methods for analysis NIR measurements, the first method was the kernel and the second one were the grond sample. Both types of samples were analyzed using reflectance mode of NIR measurements in wavelength regions 800-2500 nm. glass micro fibre (GF/A) samples were used for model building for determination of aflatoxin B₁. Model (GF/A) were dropped with 1 ml of extraction aflatoxin B₁ in sample ranging and dried in hood 1 hour. Model (GF/A) were analyzed using transfectance mode of measurements in wavelength regions 800-2500 nm. Then, the calibration model was built by using partial least squares regression analysis.

It was found that grinded sample was a proper sample preparation for NIR measurement to predict the moisture content mold and aflatoxin B₁ in pepper, corn and peanut. Maximum coefficient of determination (R^2) and less root mean square error of prediction (RMSEP) were respectively 0.98 and 0.521%, 0.30 and 3.89×10^3 cfu/g and 0.97 and 0.14 ppm for moisture content mold and aflatoxin B₁, respectively.

Keywords: contamination, food safety, mold, aflatoxin, microbial, food hazards, non-destructive, near infrared spectroscopy