

ABSTRACT

MYCOTOXINS IN FOODS AND FEEDS

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Optimization of analytical procedures for the determination of aflatoxins B₁, B₂, G₁ and G₂ in animal feeds, feed components and selected foods are described. Our novel four component HPLC mobile phase solvent, aided in obtaining lower detection limits for these aflatoxins in different sample types when compared to most of the published procedures. All samples analyzed contained below 0.2 ng/g, 0.5 ng/g, 0.02 ng/g and 0.03 ng/g aflatoxins B₁, G₁, B₂ and G₂, respectively. The effects of various parameters on the production of aflatoxins by a local isolate of Aspergillus flavus Link were investigated. Although the high humidities experienced locally do not result in large quantities of aflatoxins being produced, the high levels of calcium in the feeds and microbial interactions, significantly reduce the quantities of aflatoxins are produced by A. flavus.

An evaluation of the fungal flora of local poultry feeds and feed components was undertaken. Several genera of fungi were isolated including the mycotoxigenic A. flavus Link, A. tamaraii Kita and P. citrinum Thom. Chemotaxonomical studies

revealed the latter two species produce large quantities of kojic acid ($> 10,000$ ug/g) and citrinin (> 500 ug/g) respectively while the former is mainly a producer of cyclopiazonic acid (> 300 ug/g) with little aflatoxins (< 0.052 ug/g).

An improved visible spectrophotometric method for the determination of cyclopiazonic acid in poultry feeds and corn is described. It is based on the reaction of cyclopiazonic acid with Ehrlich reagent, plus detection at 580 nm. Conditions were optimized with respect to reagent concentrations and measurement time. The detection limit was 0.08 mg/kg for 50 g samples. Mouldy corn and poultry feeds analyzed contained between 1 and 4 mg/kg cyclopiazonic acid.

Preliminary investigation of the antifungal properties of a local plant are described. A compound isolated possesses outstanding antifungal activity against a wide range of fungi. On Czapek Dox agar plates, this compound is more potent in terms of its antifungal properties compared to two commercial mould inhibitors.

It appears that mycotoxins other than aflatoxins are produced in large quantities (> 300 ug/g substrate) by the indigenous, mycotoxigenic fungi. These mycotoxins namely citrinin, cyclopiazonic acid and kojic acid should be assayed for when assessing mycotoxin contamination in feeds, feed components and foods.