

UNIVERSITY "Ss. CYRIL AND METHODIUS" IN SKOPJE
FACULTY OF VETERINARY MEDICINE - SKOPJE

PROCEEDINGS

DAYS OF
VETERINARY MEDICINE 2013



The 4th International Scientific Meeting

06-08 September 2013
Struga, Republic of Macedonia

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**P19 PRESENCE OF TOTAL AFLATOXINS IN CORN
FLOUR AND POLENTA**

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ABSTRACT

Introduction

Aflatoxins are a group of naturally occurring, extremely toxic chemicals, mainly produced by two moulds, *Aspergillus flavus* and *Aspergillus parasiticus*. Under favorable conditions of temperature and humidity, these fungi grow on certain foods and feeds (corn and corn products, tree nuts, cottonseed, spices and milk). The major aflatoxins of concern are designated AFB₁, AFB₂, AFG₁ and AFG₂; however, aflatoxin AFB₁ is usually predominant and is the most toxic one. International Agency for Research on Cancer made classification of AFB₁ as carcinogenic to humans (Group 1). Total aflatoxin content in food is regulated by legislation worldwide. The maximum residual level (MRL) for total aflatoxins content is set on 4,0 µg/kg for cereals and their products. The HPLC-FLD method with immunoaffinity column clean-up is the most used method for determination of aflatoxins due to its efficiency, specificity, accuracy and sensitivity.

Materials and Methods

Total of 35 corn flour and 17 polenta samples were bring to our laboratory by border health inspectors or from the food operators itself. The extraction and purification of samples for aflatoxins analysis was done according to AOAC Official method 991.31. HPLC-FLD procedure was performed according to ISO 16050:2003. For clean-up IAC Aflaprep from R-Biopharm Rhône were used. The validation procedure was performed according to Decision 2002/657/EC and Regulation 401/2006/EC.

Results

The validation procedure provides satisfactory values for all performing criteria for the method. Calibration curves were linear in the proposed concentration range for all four aflatoxins with satisfactory coefficient of correlation (R²) in the range of 0,9993-0,9999. Limit of detection (LOD) and limit of quantification (LOQ) ranged 0,003-0,005 µg/kg and 0,009-0,023 µg/kg, respectively, were acceptable. Method accuracy estimated by recovery has been

tested and the mean recovery for total aflatoxins was 88,21%. The results for the repeatability of the method (RSD_r) are in the range 0,171 – 2,626%. RSD_R values (within laboratory reproducibility), show good correlation between two days (4,93-11,87%). 13 corn flour samples (37,14%) show total aflatoxins content below the LOD and 6 samples (17,14%) are over the MRL and contain aflatoxins in the range of 5,71-92,77 $\mu\text{g}/\text{kg}$. 4 polenta samples (23,52%) are with aflatoxins content less than LOD and only one sample was positive with total aflatoxins content of 7,46 $\mu\text{g}/\text{kg}$.

Conclusions

It was confirmed, through the validation procedure that employed HPLC-FLD method is suitable for total aflatoxins analysis in corn flour and polenta samples and it can be implemented for routine analysis in the laboratories.

Key words: total aflatoxins, HPLC-FLD, validation, corn flour, polenta