



**COST EFFECTIVE METHOD FOR THE SIMULTANEOUS DETERMINATION OF AFLATOXIN B1, B2, G1, G2 , ZEARALENONE AND OCHRATOXIN A IN MAIZE, RICE AND FEED BY THIN LAYER CHROMATOGRAPHY.**

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**ABSTRACT**

The impact on health of mycotoxin contamination is recognized all over the world. While there are methods available, these require considerable capital investments in equipment. The objective of this work is to present a cost effective method for quantification of individual aflatoxin, zearalenone and ochratoxin A based on method 970.45 AOAC 2005: chapter49. Trained personnel in visual detection is fundamental. Recoveries were determined at different concentrations 0,7 – 300 µg/kg, depending on the toxin and the matrix, obtaining as average, values greater than 70%. Acceptable results were obtained for accuracy using FAPAS material and for precision according to Horwitz equation. Detection and quantification limit (µg/kg) were of 0,7 for each aflatoxin( AFB1, AFB2, AFG1, AFG2), 60 for zearalenone (ZEA) and 2 for ochratoxin A (OTA). The effectiveness as a quantitative method was demonstrated and the accreditation by UKAS following the ISO 17025 obtained since 1998. This method is possible to be implemented in developing countries because equipment is really economically feasible. Results obtained should be the beginning for the establishment of national regulatory guidelines. Keywords: aflatoxin, zearalenone, ochratoxin A, thin layer chromatography, AOAC, FAPAS, detection limit, quantification limit, accreditation, UKAS, ISO 17025.

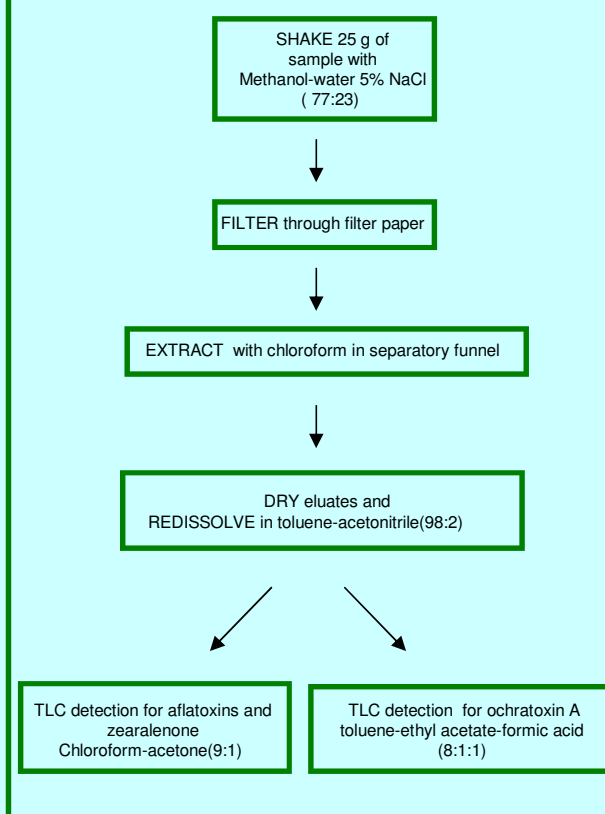
**INTRODUCTION**

Mycotoxin contamination of food, feed and agricultural crops continues to be a cause of serious concern to government and to relevant international and national organizations because of their negative impact on food safety, food trade and consumer's health. In most of the developing countries official monitoring of mycotoxin is uncommon. In order to assess the extent of consumer exposure to mycotoxins, routine analysis using cost-effective methods is useful. The need of low cost procedures is required for laboratories which can't afford the buy of sofisticate equipment.

**OBJECTIVE**

The objective of this work is to present a multi toxin method, validated and accredited relatively cheap based on thin layer chromatography (TLC) that can be used as quantitative method .

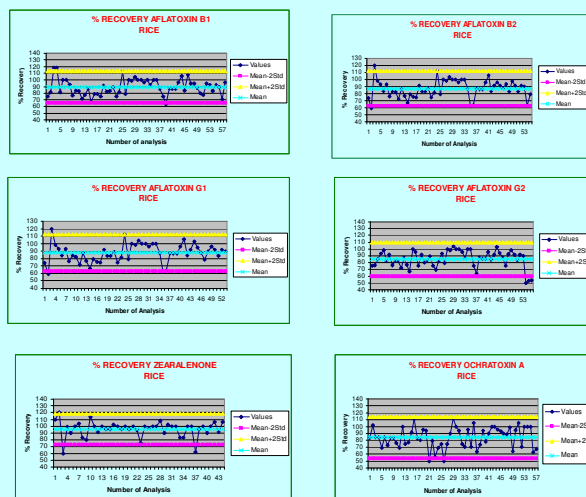
**EXPERIMENTAL**



**RESULTS**

Calibration Curve rice maize feed	Aflatoxin B1, B2, G1 and G2: 0,5 to 10 µg/kg for each one Zearalenone: 60 to 500 µg/kg Ochratoxin A: 1,3 to 25 µg/kg						
Detection limit and Quantitation limit rice maize feed	Aflatoxins: 0,7 µg/kg for each aflatoxin Zearalenone: 60 µg/kg Ochratoxin A: 2 µg/kg						
Recovery percentage  N= Number of samples R= Mean of % recovery	Matrix	AFB1	AFB2	AFG1	AFG2	ZEA	OTA
	Rice	N=118 R=89	N=113 R=88	N=111 R=90	N=115 R=85	N=88 R=96	N=98 R=84
	Maize	N=31 R=73	N=25 R=71	N=29 R=70	N=28 R=69	N=39 R=83	N=10 R=63
	Feed	N=22 R=76	N=19 R=74	N=18 R=74	N=16 R=73	N=14 R=78	N=13 R=63
Repeatability	RSD exp<RSD Horwitz						
Accuracy	Z score <12l						

**CONTROL CHARTS OF RECOVERY PERCENTAGE IN RICE**



Aflatoxins: Range of concentration: 1,7 to 5 µg/kg  
Zearalenone: Range of concentration: 55 to 230 µg/kg  
Ochratoxin A: Range of concentration: 3 to 10 µg/kg

**CONCLUSIONS**

This analytical method has demonstrated to be a low-cost, robust, easy to perform method that needs trained personnel in visual detection. The effectiveness as a quantitative method was demonstrated and the accreditation by UKAS following the ISO 17025 obtained since 1998. This method is possible to be implemented in developing countries because equipment is really economically feasible. Analytical results obtained should be the beginning for the establishment of national regulatory guidelines.