

# Aflatoxins detection in Corn Meal by Electronic Nose



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## Introduction

- ✓ Control of mycotoxins in feed and food are items of great interest
- ✓ Due to the heterogeneous distribution of mycotoxins in commodities, reliability of measured levels of these metabolites is greatly affected by the collection of representative samples
- ✓ The use/develop of screening methods that can detect mycotoxin in large number of individual samples without sample pretreatment can represent an important benefit for food and feed commodities safety assurance

## Aim

The aim of this study was to investigate the use of an electronic nose (EN) as screening method for aflatoxins detection in corn meal

## Materials and Methods

- ✓ Thirty corn meal samples were analysed by ELISA for determination of total aflatoxins content
- ✓ In the second stage of experiment 3g of each sample were placed in 12ml glass vials hermetically sealed, and submitted to a enricher/desorber unit EDU2 (Airsense Analytics GmbH, Schwerin, Germany), and then were submitted to the 10 MOS (Metal Oxide Semiconductor) sensors of the PEN2 EN (Airsense Analytics GmbH, Schwerin, Germany). Each sample was tested in triple
- ✓ Data were analyzed by Principal Component Analysis (PCA) as explorative approach. Cross-validated Linear Discriminant Analysis (LDA) was adopted as classification model to make distinction from mycotoxin containing samples and free ones. Analysis was performed by SAS software (SAS Institute, Version 8. Cary, NC, U.S.A; 2001)

## Results

ELISA test quantify aflatoxins concentration in 24 samples in a range of 6ppb -100ppb, while 6 samples resulted under kit detection limit (2 ppb)

PCA analysis applied to EN data showed that the first two components were able to explain 98.04% of total data variability and also that sensors W1W and W5S were the most important in distinguish between aflatoxins containing corn samples and negative ones (figure 1)

LDA demonstrated the ability of electronic nose in classification of positive samples from negative (table 1)

Figure 1

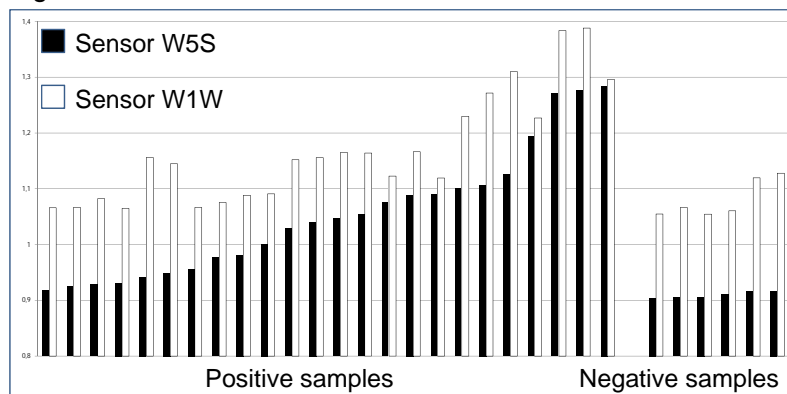


Table 1

	Group size	Cross-validation results	
		positive	negative
Positive samples	24	24	0
Negative samples	6	0	6

## Conclusions

The experiment demonstrated that EN sensor array can be able in grouping corn aflatoxins containing samples. Sample classification was in line with aflatoxins content measured by ELISA assay. With the aim to prove EN ability in a partial quantification of aflatoxins content further study will be designed in order to evaluate if sensors response signals are affected by mycotoxins per se or by mycotoxins associated volatiles from moulds metabolism.

Keywords: Aflatoxins, Corn, Electronic Nose

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