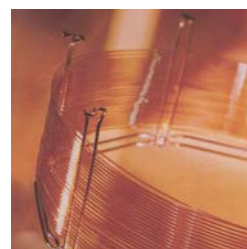


BOOK OF ABSTRACTS

4th International Symposium on
**RECENT ADVANCES IN
FOOD ANALYSIS**

November 4–6, 2009
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**OCHRATOXIN A CONTAMINATION OF BREAD—PORTUGAL
NATIONWIDE SURVEY DURING THE WINTER 2007/2008**

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Ochratoxin A (OTA) remains one of the most important mycotoxins known, due to its ubiquitous occurrence, wide range of susceptible food commodities and observed toxic effects, in both animals and humans. The reported toxic effects include carcinogenic, nephrotoxic, teratogenic, neurotoxic and immunotoxic.

Humans can be exposed to OTA directly through consumption of contaminated plant food or indirectly through consumption of tissues of animals exposed to contaminated materials. Nevertheless, the most important exposure way remains the direct one, through the consumption of mainly cereals and their derivatives. Of these, bread arises as one of the most important since it is greatly consumed by all social classes. From the many types of bread commercialized, wheat and maize bread are the most important that can contain other cereals (e.g. oat, rye), ingredients (e.g. nuts, raisins) and be prepared with the whole or the inner grain.

The purpose of this work was to undertake a nationwide survey in order to assess the contamination of bread by OTA and thus estimate the exposure risk of the Portuguese population through this staple foodstuff.

The procedure adopted was developed by Juan *et al.* (2007), and re-validated before the analysis of 274 maize and wheat bread samples. The samples were collected from random bakeries and supermarkets from north to south of the continental territory, during the winter of 2007/2008. Briefly the procedure involved the extraction of the mycotoxin with a PBS:methanol solution and a clean-up step through immunoaffinity columns. After evaporation of the eluted methanol, the sample extract was reconstituted in mobile phase and injected in a HPLC-FD equipment.

The results showed a broad contamination of maize and wheat bread, with the former presenting the highest frequency (83.3% *versus* 76.9%) and average contamination (0.40 *versus* 0.13 ng/g) values, in agreement with national and international previous studies. Furthermore, one sample of maize bread surpassed the European maximum legal limit set at 3 ng/g.

However, because maize bread is 4 times less consumed than wheat bread, its contribution to OTA human exposure is less significant than wheat bread (0.14 *versus* 0.24 ng/kg bw/day).

In sum, the bread consumed by the Portuguese population is widely contaminated with OTA, suggesting a need for additional attention to OTA contamination of this staple food and the implementation of surveillance and inspection programs to limit the exposure.

Keywords: ochratoxin A, bread, Portugal

This study was supported by the FCT and FEDER/POCI through the Project PTDC/AGR-ALI/65528/2006 and the grant SFRH/BD/37409/2007.

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OCHRATOXIN A CONTENT IN URINE SAMPLES FROM BRAGANÇA AND ALENTEJO: A COMPARATIVE ANALYSIS (WINTER 2007)**J. Bento^{1*}, S. Duarte², A. Pena³, C.M. Lino⁴, J.A. Pereira⁵**

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Ochratoxin A (OTA) is a mycotoxin which possesses a variety of toxic effects, including enzyme inhibition, immunosuppression, teratogenicity, nephrotoxicity, and carcinogenicity. It is produced by fungi for which foodstuffs such as beans, cereals, fruits, and seeds constitute an ideal growing media. It has proven itself at least partly resistant to food processing methods, meaning it is also present in derived products and thus finds its way into the human organism. Recent studies have suggested that, though OTA can be found in both plasma and urine – through which it is eliminated, though with great difficulty – the latter provides a better indication of OTA ingestion. Its collection procedure is also less invasive, and developments in analytical methodology allow an equally precise analysis.

In an effort to assess the Portuguese regional differences of exposure to this mycotoxin of the populations of Bragança and Alentejo, samples of urine from inhabitants of Bragança – eleven men and nineteen women – and Alentejo – eighteen men and twenty-two women – were tested for OTA through extraction with IACs and quantification by LC-FD.

Both regions featured similar contamination frequencies (96.7% for Bragança and 97.5% for Alentejo), with all negative samples being female. Mean values were also similar (0.022 ng/mL for Bragança vs. 0.021 ng/mL for Alentejo), as were maximum values (0.069 for Bragança, 0.064 ng/mL for Alentejo). In both regions, the highest contamination value was found in a female sample.

In Alentejo, mean value was found to be higher in males (0.025 vs. 0.018 ng/mL in females), while in Bragança the reverse was true, though the difference between genders was small (0.020 ng/mL for males, 0.023 ng/mL for females).

Females in both regions presented similar values for incidence, and mean and maximum contamination levels, while men from Alentejo featured a much higher maximum level (0.044 ng/mL vs. 0.027 ng/mL for men from Bragança).

Keywords: Ochratoxin A, urine, regional, Portugal

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