

## **Does manufacturers' size affect the prevalence of mycobiota and occurrence of mycotoxins in spices and spice-based products?**

### **ABSTRACT**

The present work aimed to establish the prevalence of mycobiota and occurrence of mycotoxins (aflatoxins and ochratoxin A) in spices and spice-based products, and correlate these to their manufacturers' sizes. A total of 90 spice, sauce and paste samples were purchased; 3 manufacturer sizes (small, medium, large)  $\times$  3 types of samples (spices, sauces, pastes)  $\times$  5 brands  $\times$  2 replicates. The prevalence of mycobiota was assessed with dichloran rose bengal chloramphenicol (DRBC) and *Aspergillus flavus* and *Aspergillus parasiticus* (AFPA) medium, while the occurrence of mycotoxins was quantified with HPLC-FLD. Large-scale manufacturers were found to adopt a greater number of safety and quality certifications. Small-scale manufacturers significantly yielded the highest total fungal loads on DRBC (log 5.084 $\pm$ 0.417 cfu/g paste, log 6.253 $\pm$ 0.407 cfu/g sauce, log 6.662 $\pm$ 0.222 cfu/g spice) and AFPA (log 4.461 $\pm$ 0.451 cfu/g paste, log 5.661 $\pm$ 0.395 cfu/g sauce, and log 6.269 $\pm$ 0.432 cfu/g spice). Correlation analysis (Pearson's *r*) revealed that manufacturers' sizes positively influenced (DRBC *r*=0.781; AFPA *r*=0.702) the prevalence of mycobiota. Aflatoxin B1 was present in 6/30 (20%) paste samples, 1/30 sauce samples (3.33%) and 12/30 spice samples (40%). Aflatoxin B2 was only present in 2/30 sauce samples (6.67%). Aflatoxin G1 and G2 were absent from all samples. Ochratoxin A was present in 11/30 (36.67%) paste samples, 5/30 sauce samples (16.67%) and 21/30 spice samples (70%). It was found that, to a certain extent, the size of and certification adopted by manufacturers affected the prevalence of mycobiota and the occurrence of mycotoxins in spices and spice-based products analysed in the present work. Nevertheless, it is henceforth recommended that a surveillance study of this nature be extended and widened in terms of number of samples as well as type of spices, sauces and pastes to obtain a more thorough and significant profile of the products' food safety and quality level.

**Keyword:** Aflatoxins; Ochratoxin A; Chilli; Pepper; Pastes