

Evaluation of the Contamination of Consumed Wheat and Its Derivatives by Ochratoxinogenic Fungi

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Abstract : Ochratoxin A (OTA) is a mycotoxin produced by certain species of the genera *Aspergillus* and *Penicillium*, primarily found in cereals, coffee, and grapevine products. Its accumulation in the body can lead to nephrotoxic, teratogenic, immunosuppressive, and carcinogenic effects. The objective of this study is to investigate the contamination of consumed wheat and its derivatives by toxic fungi in Algeria. For this purpose, an analysis of 200 samples was conducted, including 90 samples of durum wheat and common wheat and 110 samples of wheat derivatives collected from mills (semolina and flour manufacturers). The results revealed an average fungal contamination rate ranging from 60% to 100%. The identified fungal isolates primarily belonged to the genera *Aspergillus* (70%), *Penicillium* (27.5%), *Alternaria* (40%), and *Mucor* (19.4%). The density of the fungal flora was higher in products intended for animal consumption, such as durum wheat flour (2525 CFU/g), wheat scraps (3175 CFU/g), and wheat bran (2950 CFU/g). Conversely, low fungal density was observed in fine semolina (900 CFU/g) and flour (800 CFU/g) intended for human consumption. The genus *Penicillium* was isolated in 46% of the analyzed samples of durum wheat derivatives and in 62.7% of the analyzed samples of common wheat derivatives. The *Aspergillus* genus dominated the majority of the analyzed samples. Molecular identification of *Aspergillus* and *Penicillium* isolates by sequencing ITS1-5.8S-ITS2 regions of DNAr and a part of the calmodulin (CaM) gene indicated that the species involved in the production of OTA in wheat and its derivatives were mainly *Aspergillus ochraceus*, *A. westerdijkia*, *A. alliaceus*, *A. carbonarius*, and *Penicillium islandicus*. The amounts of OTA produced by these species were determined by HPLC-FLD and ranged between 0,8.9 and 3033 μ g/g. Given that food safety and quality are major concerns today, understanding the microbial biodiversity of wheat is crucial because it is a staple food in Algeria.

Keywords : wheat derivatives, *Aspergillus*, microbial biodiversity, OTA

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