

Title: TOXIGENIC FUNGI AND FUMONISINS B₁ AND B₂ IN DIFFERENT CORN (*Zea mays*) MILLING FRACTIONS

Authors: Savi, G.D.¹, Piacentini, K.C.¹, Marchi, D.¹, Valmorbidia, R.¹, Kreibich, H.H.¹, Scussel, V.M.¹

Institution: ¹ Laboratory of Mycotoxicology and Food Contaminants, Food Science and Technology Department, Center of Agricultural Sciences, Federal University of Santa Catarina, P.O Box 476, 88034-001 (Rodovia Admar Gonzaga, 1346, Itacorubi), Florianopolis, Santa Catarina, Brazil.

Abstract:

Fumonisin (FBs) are produced mainly by *Fusarium* species, such as *F. verticillioides* and *F. proliferatum*. FB₁ and FB₂ are the most abundant among all the FBs and are associated with several mycotoxicoses. They have been reported in many foods worldwide, especially in corn. The aim of this study was to evaluate the mycoflora and the FBs natural contamination in corn milling fractions. Grain samples from different cultivars from Southern Brazil were utilized. Samples were finely ground and separated into different fractions (grits, meal and flour) by a laboratory test sieve (12, 16 and 60 mesh), totaling 60 samples. Fungi total load was evaluated only in corn grains samples in colony forming units per gram (CFU/g) with genera and species identified further. The determination of FB levels was carried out by high performance liquid chromatography (fluorescence detection). For corn grains, the fungi colony counts ranged from 1x10¹ to 1.6x10³ CFU/g and humidity parameters had adequate moisture content of 13.5% (9.94-20.05%) and water activity of 0.68 (0.58-0.89). There was a dominance of *Fusarium* species (57.14%), such as *F. oxysporum*, *F. graminearum*, followed by *F. verticillioides*. These species, especially *F. verticillioides* can be responsible for FBs production detected in the current study. Among the *Aspergillus* species (28.57%), *A. parasiticus* and *A. candidus* were the most isolated. *Penicillium* was the third most isolated genera (14.28%). Regarding FBs, FB₁ and FB₂ were detected in 71.6% and 50.5% of corn samples, respectively. Among corn fractions samples, corn meal had the highest mean concentration of FB₁ and FB₂ (1305.40 and 607.63 µg/kg), followed by corn grits, corn grains and corn flour. About half of the corn meal samples (47%) won't be compliant with the future Brazilian regulation (2016) for FBs. The high contamination found in corn meal may be attributed to the fact that it is obtained by the fine particles created mainly during the milling of the external layers of the kernels, often utilized as feed ingredients. Moreover, the significantly lower levels observed in corn flour often utilized for human consumption, may be attributable to the potential of the external layer to behave as a physical barrier preventing the mycelia from penetrating further into the kernel structure. The knowledge of the mycoflora and FBs levels in the corn fractions may contribute to reduce the risk of contamination by these toxins.

Keywords: corn-based products, corn fractions, corn grains, fumonisin, toxigenic fungi

Funding agencies: CNPq