

Title: *FUSARIUM* SPECIES AND DEOXYNIVALENOL IN DIFFERENT FRACTIONS OF MILLED WHEAT (*Triticum aestivum* L.) GRAINS AND WHEAT-BASED PRODUCTS

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Abstract:

The toxigenic *Fusarium graminearum* is related to trichotecenes formation, including deoxynivalenol (DON), which is one of the most important type B trichothecene, often found in wheat grains worldwide. We evaluated the mycoflora, especially the *Fusarium* species, and occurrence of DON in wheat grains and their products. Wheat samples were collected in Southern Brazil during the 2014 crop and milled to obtain the finished flour and bran (n=60). The wheat-based products (bread, pasta and cracker) were collected from market (n=60). The fungi total load was evaluated only in wheat grains samples as colony forming units per gram (CFU/g) with genera and species identified further. The determination of DON levels was carried out by high performance liquid chromatography (ultraviolet detection). Regarding grains samples fungi colony counts, they were low and ranged from 10 to $8,2 \times 10^2$ CFU/g. Those findings, may be due to the fact that the wheat grains had adequate water activity and moisture content values (mean: $a_w: 0,6$ / mc: 11,4%). Despite of the low fungi count, the major concern are the toxigenic potentially species presence that may be considered as toxin-indicators. Among the *Fusarium* species, the most found were *F.verticillioides* and *F.graminearum*. These species, especially the *F.graminearum*, can be responsible for DON production detected in the current study. DON was detected in 38% of the wheat fractions samples analyzed, with levels from 48 to 2746, 2580 to 2881 and 821 to 2340 $\mu\text{g}/\text{kg}$ in grains, bran and finished flour, respectively. Dry milling of wheat led to a heterogeneous distribution of DON in the different parts of the grains, with increased levels in fractions processed from outer layers (wheat bran) and decreased in fractions processed from inner portions (wheat flour). However, the milling process may not reduce the level of DON of the fractions. Considering the Brazilian regulation DON set for 2017 onwards, 20, 15 and 5% of bran, finished flour and grains samples of the current study would be out of it. On the other hand, the contaminated wheat-based products, only 5% of each wheat product (bread and cracker) would not be of compliance. It is important to emphasize that the occurrence of DON, even at low concentrations, requires constant monitoring to avoid consumers chronic exposition. The knowledge about the mycoflora and DON levels, may contribute for the adoption of preventive and/or control measures and also to set grain monitoring programs.

Keywords: deoxynivalenol, *Fusarium*, wheat-based products, wheat fractions, wheat grains

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