DISTRIBUTION OF *Fusarium* MYCOTOXINS IN WHEAT MILLING PROCESS

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Fusarium head blight (FHB) is a fungal disease that affects cereals and is capable of producing mycotoxins of increasing health concerns. In Southern Brazil, FHB of wheat is caused by *Fusarium graminearum* species complex, which produces mainly deoxynivalenol (DON) and zearalenone (ZON) mycotoxins. There is a need for research-based information on how different contamination levels affect these mycotoxins' distribution in the milling process. The objective of this study was to analyze the Fusarium mycotoxin distribution within each milled fraction, extracted from wheat lots artificially contaminated with a crescent gradient of deoxynivalenol (3000 µg kg^{-1}). Wheat samples produced in 2013 season in Southern Brazil region were obtained from plots of Embrapa breeding program. The wheat samples were artificially contaminated with residues of cleaning and pre-cleaning process, including light and shriveled grains. Pilot-scale milled wheat fractions were collected, comprising finished flour and bran. The Fusarium mycotoxin content was determined by chromatography (UHPLC-MS/MS). Ergosterol, a fungal marker was analyzed, to elucidate the relationship between toxin accumulation and fungal dispersion in wheat layers. The distribution of ergosterol in the wheat milled fractions was similar to DON, it presents higher concentration in bran than in finished flour. The mycotoxin concentration in the inner grain layers may be associated with fungal growth within the grain rather than the toxin diffusion. The results obtained show that *DON* increased exponentially relative to the initial levels of mycotoxin in wheat milled fractions (finished flour and bran). DON concentration was significantly higher in bran, when compared with milled wheat and finished flour, with DON levels lower than 1,000 µg kg^{-1}. Therefore, the milling process cannot be solely used as an effective tool for DON reduction in the finished flour, especially in high-contaminated wheat lots.

Keywords: deoxynivalenol; ergosterol; wheat; milling process