

## EFFECTS OF BAKING PROCESS ON MYCOTOXIN CONTENT IN WHOLE AND WHITE BREADS

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The wheat is the main source of nutrients to the world population and most of its production is converted into flour for human consumption. In Southern Brazil, where 90% of the national wheat is produced, *Fusarium* head blight (FHB), a fungal disease, is a major concern. Apart from yield loss and mycotoxin contamination, *Fusarium graminearum* may reduce wheat milling and baking performance. The objective of this work was to evaluate the effect of baking on the mycotoxin content on white and whole bread, made with artificially contaminated wheat flour, in order to obtain information about wheat by-products' safety. Wheat samples were artificially contaminated with addition of *Fusarium* damaged kernels and a gradient was obtained with four different levels of deoxynivalenol (DON), ranging from 5000  $\mu\text{g kg}^{-1}$ . The wheat was milled in a Laboratory Mill 3100 Perten, for producing whole bread. A pilot-scale mill Brabender Quadrumat Senior was used to obtain wheat flour for baking white bread. Bread loaves were baked on the straight-dough breadmaking, using a formulation without fat. After fermentation, the dough was baked in an electric oven for 35 min at 180 °C. After cooling, the bread loaves were weighed and the specific volume (SV) of each loaf was measured. *Fusarium*'s toxin levels (DON and zearalenone - ZON) were determined by chromatography (UHPLC-MS/MS). The statistical analysis used paired t-test, and the data from four contamination levels were individually considered. After the breadmaking process, a reduction in DON levels was observed, in both whole (55%) and white (65%) breads, when compared with milled wheat and wheat flour. DON levels in whole bread were lower than in milled wheat, from the second level (500  $\mu\text{g kg}^{-1}$ ) to the higher level of contamination. Similarly, in white bread, DON content decreased significantly in the two higher levels of contamination, from 2000 to 5000  $\mu\text{g kg}^{-1}$ . ZON levels presented slight increase in final breads when compared with initial levels in flour, but it was not statistically significant. ZON was detected only in the two higher levels in the whole wheat flour (mean 33.1  $\mu\text{g kg}^{-1}$ ) and in the two derived whole breads (mean 42.4  $\mu\text{g kg}^{-1}$ ). The mycotoxin content affected the specific volume (SV) of bread, increasing in the gradient 2000-5000  $\mu\text{g kg}^{-1}$ , although decreasing in the higher level (>5000  $\mu\text{g kg}^{-1}$ ). Both trends were statistically significant. DON levels decreased during the bread processing. So, baking process can be a complementary strategy to reduce the mycotoxin content in wheat by-products, especially for wheat lots with high DON levels (>2000  $\mu\text{g kg}^{-1}$ ).

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