

TITLE: INVESTIGATION OF MYCOTOXINS OCCURRENCE IN BREWING BARLEY FROM BRAZIL

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ABSTRACT:

Barley (*Hordeum vulgare* L.) is one of the most important cereals in the world, together with maize, wheat and rice. This cereal is cultivated as a winter crop in tropical areas for malt production and has a significant economic importance. In this sense, the damage caused by fungi is widely responsible for losses of this harvested grain. Tropical conditions, such as those found in Brazil, may contribute to fungal dissemination and, consequently, mycotoxin production. For these reasons, the aim of the present research was to evaluate the occurrence and co-occurrence of mycotoxins (deoxynivalenol/DON and zearalenone/ZEA) in 76 brewing barley samples from different crop regions in Brazil. To accomplish mycotoxin analyses, detection and quantification were performed with an LC-MS/MS system composed by a triple quadrupole mass spectrometer. The method was validated for brewing barley and Commission Regulation 401/2006/EC was used as a guideline for this purpose. Linearity was confirmed using the calibration curve in a range of 0.025 to 0.50 µg/ml for both toxins, with a coefficient correlation of $r^2 = 0.997$ for DON and 0.999 for ZEA. The limit of quantification for both toxins was 25 µg/kg and the recovery mean of the extraction method was 98.6 % and 98 % for DON and ZEA, respectively. The results showed a contamination of 94% of the analyzed samples with high levels for DON, ranging from 1694.97 to 7814.65 µg/kg and 73.6% for ZEA, with levels ranging from 42.25 to 1181.35 µg/kg. Furthermore, it is important to highlight the co-occurrence of DON-ZEA in the majority of samples (73,7%). The data was compared to the maximum levels established by the Brazilian regulation where 66 samples (83%) were above the established values for DON and for ZEA, a total of 54 samples (68%) were superior to the fixed levels. The high mycotoxin levels may be associated with favorable environmental conditions of the crop regions and possibly due to the susceptibility of barley to fungal infection.

Keywords: LC/MS-MS, deoxynivalenol, zearalenone, grains, contamination

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