THE DYNAMICS OF POTENTIAL MYCOTOXIN PRODUCING FUNGI IN CORN SAMPLES DURING STORAGE

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Mycotoxins are toxic compounds which are naturally produced by certain types of fungi, and are capable of causing diseases and death in humans and livestock. Regulations for mycotoxin concentration in food and feed exist in most countries. Methods most commonly used for detection of mycotoxin contamination in food and feed are conventional analytical methods, including High-Performance Liquid Chromatography (HPLC) and Gas Chromatography (GC) and rapid immunological methods, including enzyme linked immunosorbent assay (ELISA). An alternative method for detection of mycotoxins themselves would be detecting the fungi, capable of producing mycotoxins, in food samples. In this work, we show the results of the real-time PCR analysis of four corn samples with primers, specific to the genes involved in mycotoxin synthesis and thus capable of recognizing potentially mycotoxigenic fungi.

In this work, four corn kernel samples of two lines (CP148 and CP 137) harvested in 2008 and 2018, were studied. The real-time PCR analysis was done using primers specific to the genes involved in mycotoxin synthesis (fumonisin, aflatoxin, DON, T2) and Sybr Green I as a dye.

As a result, genes involved in the synthesis of aflatoxins, fumonisin, DON and T2 were found in those samples. The set of the pathogens capable of synthesizing mycotoxins depended both on the year of harvest and on the corn genotype (on the resistance of certain genotype to mycotoxin producing agents). The samples were stored at the controlled conditions at +4 degrees Centigrade. As a result, we did not detect the increase of the number of pathogenic agents in the older samples. Moreover, the amount of the gene involved in mycotoxin synthesis in the samples of 2018 harvest was higher than in the same genotype harvested in 2008. This indicates that the storage in the controlled conditions does not result in the increase of the amount of potential mycotoxin producers.

Our study shows that real-time PCR analysis using primers to the genes involved in mycotoxin synthesis can help to track the dynamics of potential mycotoxin producers in corn samples during storage.

Keywords: corn, filamentous fungi, mycotoxins, real-time PCR,

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