

## Abstract

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Title of Diploma Thesis: Determination of mycotoxin citrinin using on-line SPE HPLC on molecularly imprinted polymers

The aim of this work was to develop a fast method for mycotoxin citrinin (CIT) determination using high performance liquid chromatography (HPLC) and column switching technique in combination with on-line solid phase extraction (SPE) based on citrinin-selective molecularly imprinted polymer (MIP). The most suitable sorbent for selective extraction was chosen from six newly synthesized MIP after evaluation of their binding capacity and selectivity. Selectivity was tested by comparing molecularly imprinted and non-imprinted polymers and the ability of the MIP polymer to selectively separate citrinin from interferences of the test sample. The best MIP (functional monomer of metacrylamide with porogen acetonitrile) was filled into pre-column (20 × 3 mm) and connected to HPLC column-switching system. Three different matrices were injected to chromatographic system. 50 µl of the sample was injected onto MIP extraction column and washed out of interferences with methanol / 0.5% water solution of acetic acid in a ratio of 25:75 (v/v) at a flow rate of 1 ml min<sup>-1</sup> for 1 minute. After the valve switched, analyte was eluted from the MIP column to a Kinetex® Biphenyl (100 × 4.6 mm, 5 µm particle) chromatographic column by mobile phase consisting of acetonitrile / 0.5% acetic acid, which flowed through the column at a flow rate of 1 ml min<sup>-1</sup> for separation by gradient elution. Fluorimetric detection was set at wavelengths Ex 335 nm, Em 500 nm. Total sample analysis time including on-line extraction was 9.5 min. The method limit of quantification was 5 µg kg<sup>-1</sup> for cereal matrix and 25 µg kg<sup>-1</sup> for red yeast rice and food supplements based on red yeast rice. CIT was analyzed in 9 samples of which 6 samples were food

supplements available on the Czech market. The measured amounts of CIT in food supplements were low. In most cases even below the detection or quantification limit. Therefore, all samples met the maximum limits for CIT in food supplements.

Keywords: HPLC, MIP, on-line MIP, citrinin, red yeast rice