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PRESENCE OF TRICHOTHECENES IN MAIZE PRODUCED IN NORTHERN SERBIA

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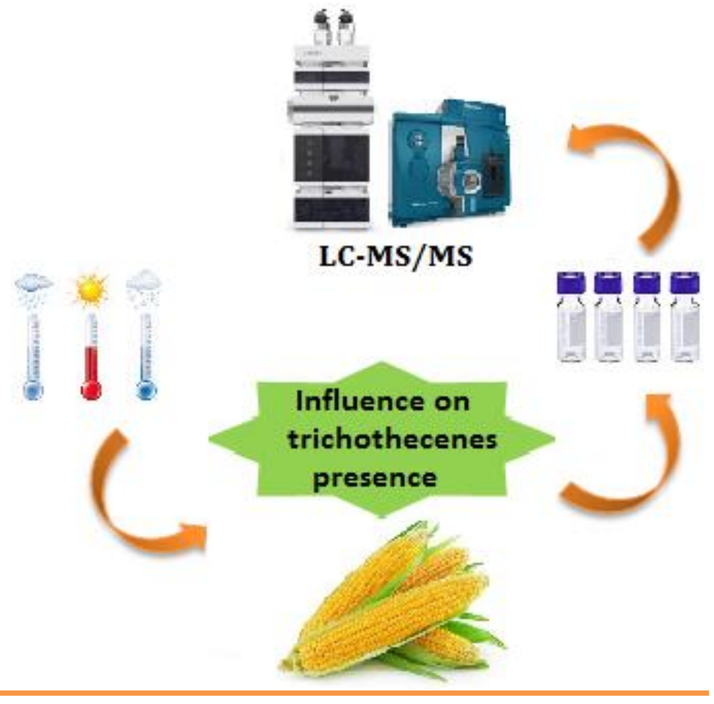
INTRODUCTION

Infection of crops and stored cereals with fungi can lead to the production of secondary toxic metabolites commonly known as mycotoxins, which can result in great economic losses and negative impacts on human and animal health. Trichothecenes are the largest group of mycotoxins produced by *Fusarium* species and frequently occur in cereals such as maize, wheat, barley, oats and rye.

OBJECTIVES

The main objective of the present study was to determine the presence of trichothecenes: deoxynivalenol (DON), nivalenol (NIV), 3-acetyldeoxynivalenol (3-ADON), 15-acetyldeoxynivalenol (15-ADON), T-2 toxin, HT-2 toxin, monoacetoxyscirpenol (MAS), diacetoxyscirpenol (DAS), neosolaniol, and conjugated forms of trichothecenes such as deoxynivalenol-3-glucoside (DON-3G) and HT-2-glucoside in maize samples collected in Northern Serbia during a period of six years. The second objective of this study was to examine the influence of weather conditions on the levels of detected mycotoxins.



METHOD

A liquid chromatography-tandem mass spectrometry (LC-MS/MS) method was used to determine the concentration of trichothecenes in maize samples (1).

RESULTS AND DISCUSSION

WEATHER CONDITIONS

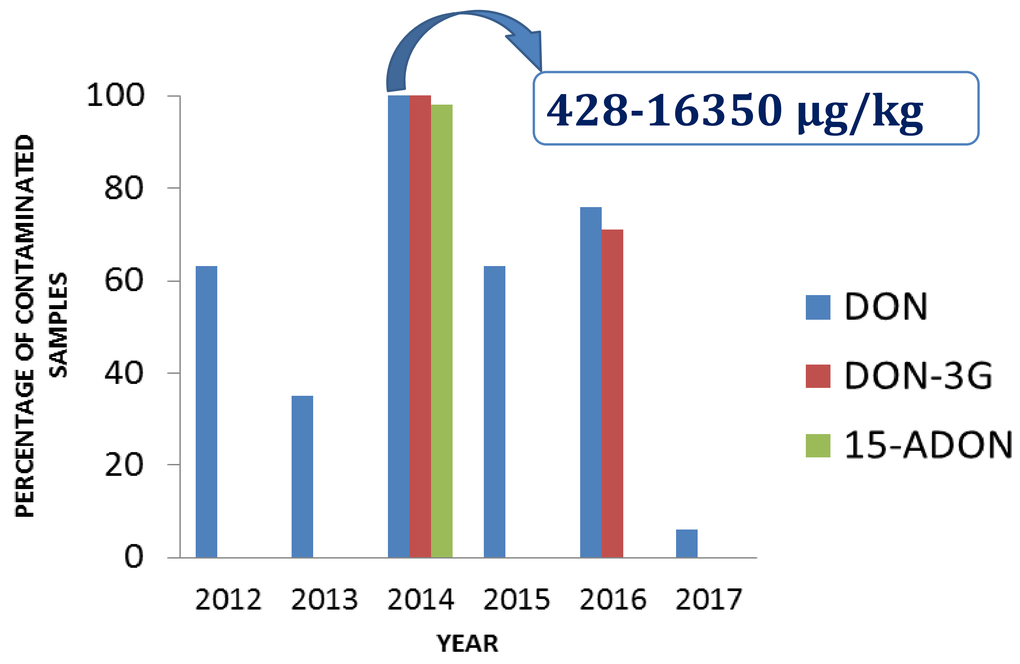
- 2012 • Extreme drought
- 2013 • Hot and dry
- 2014 • Extreme wet
- 2015 • Hot and dry
- 2016 • Moderate
- 2017 • Hot and dry

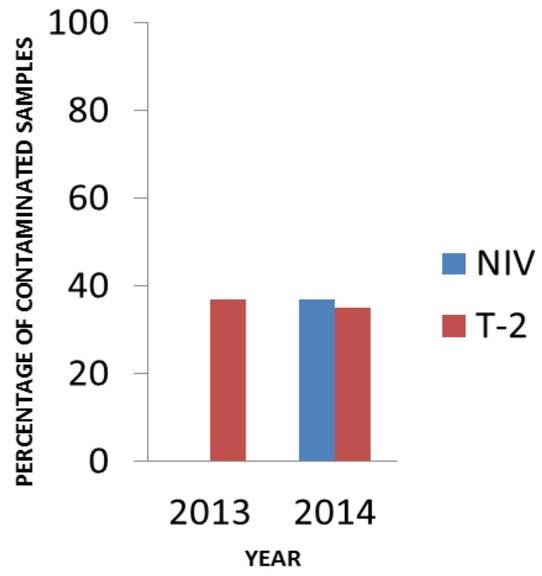
The highest frequencies and concentrations of examined mycotoxins were detected in maize samples harvested in 2014

YEAR	> ML[a] (1750 µg/kg)
2012	2%
2014	84%
YEAR	**> ML[b] (8000 µg/kg)**
2014	6%

The maximum level (ML) of DON for unprocessed maize intended for human[a] and animal[b] consumption, defined by European Union Regulation and Serbian Regulation.

PERCENTAGE OF CONTAMINATED MAIZE SAMPLES





The frequency of the other detected mycotoxins in maize samples from Serbia, in all six examined years, was low, while all samples were negative for 3-ADON.

CONSLUSIONS

- Based on all the above, it can be noticed that DON is a frequent contaminant of maize from Northern Serbia, but it should be noted that its concentration largely depends on the amount of precipitation during the maize growing season. Therefore, the contamination of maize samples with DON should be continuously monitored due to its potential negative effects on human and animal health.

REFERENCE

1. Sulyok, M., Stadler, D., Steiner, D., Krska, R. (2020). Validation of an LC-MS/MS-based dilute-and-shoot approach for the quantification of > 500 mycotoxins and other secondary metabolites in food crops: challenges and solutions. Analytical and Bioanalytical Chemistry, 412(11), 2607-2620.

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