

14th
INTERNATIONAL
SYMPOSIUM

MODERN
TRENDS
IN LIVESTOCK
PRODUCTION



BOOK OF ABSTRACTS

4 - 6 October 2023, Belgrade, Serbia

Institute for Animal Husbandry
Belgrade - Zemun, SERBIA

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AFLATOXIN AND FUMONISIN CONTAMINATION OF MAIZE GRAINS HARVESTED DURING 2018–2022 IN SERBIA

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Abstract: Maize is a staple food worldwide, used in human nutrition and as the main component of livestock feed. It contains nutrients such as carbohydrates (sugars and starch), proteins, fibres, minerals and vitamins and has the highest polysaccharide starch content (more than 70%). Maize grains are a suitable substrate for fungal infection and are frequently contaminated by the species from the *Aspergillus* and *Fusarium* genera. These fungi produce toxic secondary metabolites named mycotoxins. Aflatoxins (AFs) and type-B fumonisins (FBs) are the most detected mycotoxins in maize grains. Maize intoxication with AFs and FBs can lead to human and animal health disorders, causing acute and chronic mycotoxicosis. Aflatoxins produced by *Aspergillus* spp. have immunosuppressive, carcinogenic, and hepatotoxic properties and induce growth impairments. Fumonisins produced primarily by *Fusarium* spp. have neurotoxic, nephrotoxic, and hepatotoxic effects in animals and are classified as potentially carcinogenic in humans. The co-occurrence of AFs and FBs in maize has synergistic toxicological effects and poses a greater risk to human and animal health. The natural occurrence of AFs and FBs in 65 maize grain samples collected during harvest in 2018 (13 samples), 2019 (11 samples), 2020 (9 samples), 2021 (14 samples) and 2022 (18 samples) was evaluated using the enzyme-linked immune sorbent assay (ELISA). The average levels of AFs and FBs in mycotoxin-positive samples were 3.02 and 2910 $\mu\text{g kg}^{-1}$ (2018), 5.28 and 2710 $\mu\text{g kg}^{-1}$ (2019), 2.35 and 10980 $\mu\text{g kg}^{-1}$ (2020), 6.81 and 4950 $\mu\text{g kg}^{-1}$ (2021) and 5.32 and 20310 $\mu\text{g kg}^{-1}$ (2022), respectively. The co-occurrence of AFs and FBs was detected in 23.08% (2018), 18.18% (2019), 22.22% (2020), 64.29% (2021) and 22.22% (2022) of maize samples. The maximum limits of 10 $\mu\text{g kg}^{-1}$ for AFs in maize and 4000 $\mu\text{g kg}^{-1}$ for FBs in unprocessed maize, prescribed by regulations of the European Union and Serbia, were exceeded for AFs in 14.29% (2021) and 5.56% (2022) of tested maize samples and for FBs in 7.69% (2018), 66.67% (2020), 28.57% (2021) and 41.67% (2022) tested maize samples. These results indicate the need for continuous monitoring of the health status of harvested maize grains and risk assessment of the potential presence of mycotoxins in the food chain to avoid adverse effects on human and animal health.

Key words: maize, aflatoxins, fumonisins

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