Genotoxic characterization of emerging mycotoxins *in vitro*

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Among the many contaminants affecting human and animal health, mycotoxins (MTX) are of special concern as they naturally contaminate food and feed. MTX cause toxic effects, being of particular interest their potential genotoxicity and/or carcinogenicity due to continuous, lifelong intake, even at low doses. To mitigate these risks, maximum concentration levels for certain MTX in specific matrices have been established. However, most identified MTX remain uncharacterized. A bottleneck in MTX mutagenicity testing is the limited commercial availability and high cost of some of them. Moreover, a considerable amount of high purity is required to carry out standardized mutagenicity assays like the Ames test (OECD Test 471).

The SOS/umu test is a medium-throughput assay requiring a small amount of substance while keeping high concordance with the Ames test results. It determines genetic damage in *Salmonella typhimurium* through a colorimetric reaction. The assay is done in the presence or absence of external metabolic activation, and up to six substances can be tested simultaneously without extending the experimental time—unlike the Ames test, where testing multiple substances significantly increases the workload. Therefore, the SOS/umu test serves as a screening tool and even as a first step in genotoxicity testing.

In this work, 20 under-evaluated, not regulated MTX were tested in the SOS/umu test. Nine MTX had published data on the Ames test, and their results in the SOS/umu test were in line with the available bibliography. Genotoxicity testing on bacteria has been performed for the first time for 11 MTX. Two MTX, aflatoxicol and kojic acid, were positive in presence of metabolic activation; while one, o-methylsterigmatocystin, was a weak positive with presence of metabolic activation. The remaining MTX gave negative results in all conditions: 3-nitropropionic acid, andrastin A, apicidin, asperglaucide, asperphenamate, aurofusarin, averantin, averufin, bikaverin, butanolide, cyclo-(L-Pro-L-Tyr), cyclo-(L-Pro-L-Val), cyclopiazonic acid, fusaric acid, mycophenolic acid, skyrin and tryptophol.

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