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Patulin Exposure among Tunisia Population

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Abstract

Patulin (PAT) is produced by a wide range of fungal species of the *Penicillium*, *Aspergillus*, *Byssochlamys*, *Eupenicillium*, and *Paecilomyces* genera of which *Penicillium expansum*, a common contaminant of damaged fruits, is the most important. PAT is the predominant mycotoxin in fruits and fruit-based products. PAT exerts genotoxic and cytotoxic effects in humans. Due to its toxicity and large occurrence, the assessment of populations' exposure to PAT is imperative. Recently, biomarker-driven research aroused as a successful method to assess the exposure in humans to a wide range of mycotoxins such as deoxynivalenol, aflatoxins and ochratoxin A. This was executed through the estimation of their metabolites in biological fluids such as urine and plasma. However, there is a lack of information on the PAT metabolism pathway. To date, PAT's biomarkers remain unknown, and an analytical method to evaluate the PAT exposure through biomarkers has not been developed. The aim of the presented study was to detect reliable PAT biomarkers in both human urine and plasma. An *in vitro* study through PAT incubation with liver cells was executed to detect PAT metabolites. Although PAT is a relatively stable compound, metabolites were detected via the use of state-of-the-art high resolution mass spectrometry, and were described and identified. Then, an *in vivo* study was performed where urine and plasma samples from volunteers ($n = 100$) were analysed to detect PAT metabolites, and were compared with the obtained *in vitro* results. The detected metabolites in the biological samples can be used as PAT biomarkers in future research. The identification of reliable PAT biomarkers is an important step towards mycotoxin assessment studies.

Keywords: Biomarker, exposure, patulin, Tunisia