In human health risk assessment, ingestion of food is considered a major route of exposure to many contaminants, namely mycotoxins, a wide group of fungal secondary metabolites that cause toxic and carcinogenic outcomes in humans exposed to them. Infants have a more restricted diet and they generally consume more food on a body weight basis than adults thus they are a particularly vulnerable population group to food contaminants. This study aims to characterize the risk associated with the consumption of breakfast cereals (BC) concerning the exposure of Portuguese children to mycotoxins, namely aflatoxin B₁ (AFB₁) and ochratoxin A (OTA).

METHODS

- **Breakfast cereal samples**
  14 breakfast cereals were purchased from supermarkets in Lisbon Region.

- **AFB₁ and OTA occurrence - HPLC-FLD analysis**
  Column: ODS3, 150x4.6 mm, 5 µm, Phenomenex®
  Flow rate: 1 mL/min
  Mobile phase: KBr/ACN/MeOH/C₂H₅O₂
  Injection volume: 800 µL
  Run time: 59 min
  Derivatization: post-column with Kobra cell with KBr
  Equipment: Waters® 2695 with detector 2475

- **Breakfast cereals consumption data**
  Three days food diary from children (n=103) with less than 3 years old from a Primary Health Care Unit near Lisbon.

- **Mycotoxin daily exposure**
  Deterministic and probabilistic (@Risk, Palisade) approaches.
  Different exposure scenarios (H1 to H4) for the mycotoxin dietary exposure assessment in relation to the data treatment of the non-detects (cLOD, limit of detection). For the risk characterization, the outputs of exposure, namely the daily intake values, were compared with the reference dose values.

RESULTS

- **AFB₁ & OTA occurrence**
  • Approximately 71% and 86% of BC samples were contaminated with AFB₁ and OTA, respectively.
  • There are no maximum admissible levels in EU legislation for AFB₁ and OTA in breakfast cereals.

- **BC CONSUMPTION DATA**
  • Approximately 23% of the studied children consumed BC at least one time in these 3 days.

HIGHLIGHTS

- This study concerns the first risk assessment of Portuguese children to single mycotoxins in Breakfast cereals.
- AFB₁ and OTA occurred in a significant number of breakfast cereal samples.
- No EU legislation for AFB₁ and OTA in breakfast cereals is available.
- Deterministic and probabilistic approaches showed that children exposure to single mycotoxins present in breakfast cereals were well below the dose reference values.

Risk associated with the exposure to AFB₁ and OTA by breakfast cereals consumption was considered to be out of concern for the population considered.

REFERENCES:


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