Risk assessment of multiple mycotoxins in infant food consumed by Portuguese children – the contribute of the MYCOMIX project

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There is a growing concern within public health about mycotoxin involvement in human diseases, namely those related to children and scarce data are available on this issue. To fill this gap, the MycoMix Project (2013-15) “Exploring the toxic effects of mixtures of mycotoxins in infant food and potential health impact” aims to study the occurrence of multiple mycotoxins in infant foods and cereals consumed by the Portuguese children and its toxicity interactions. This project aims to answer three questions:

1) Are children exposed daily to one or several mycotoxins through food?
2) Can this co-exposure affect children’s health?
3) Are there interaction effect between mycotoxins?

The occurrence data of 12 mycotoxins (aflatoxins, ochratoxin A, fumonisins and trichothecenes) were quantified in 26 Breakfast Cereals (BC), marketed in 2014 in Lisbon (PT), using HPLC-FLD, GC-MS and LC-MS/MS.1

- 92% (24/26) of the analyzed BC revealed the presence of two to six mycotoxins, simultaneously, in the same sample.1
- 19% of samples (4/26) were contaminated with six mycotoxins simultaneously.1
- The mycotoxins mixture with highest incidence (3/26) was AFB1, AFB2, OTA and DON.1
- Results were all below the maximum legislated limits.1

Infant foods consumption data were obtained in a pilot study including 103 child (0-3 years old) from the Primary Health Care Unit of Cidadela, Cascais. A 3 day food diary was applied and data introduced in a web-based platform - OPEN PORTUGAL.3 For Breakfast Cereals consumption, a subsample of 75 children aged between 1 to 3 y old was used.

- 56% of children aged 1-3 years old consumed breakfast cereals at least one time in 3 days as reported in the food diary.2
- 40% of children aged 1-3 years old presented a mean weight of 13.39 kg and a mean consumption of breakfast cereals of 5.62 g day1.3

Two mathematical approaches: deterministic and probabilistic (Monte Carlo simulation) will be used for the computation of the exposure assessment for mycotoxins.

Different exposure scenarios for the mycotoxin dietary exposure assessment in relation to the data treatment of the non-detects (< LOD, limit of detection) will be included.

Daily exposure of children to ochratoxin A, fumonisins and trichothecenes showed no health risks to the children population considering individual mycotoxins (hazard quotients below 1).2

Cumulative risk assessment suggest an urgent need to establish legal limits for multiple mycotoxins in breakfast cereals.


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