

ASSESSMENT OF CHILDREN'S EXPOSURE TO CURRENTLY USED PESTICIDES IN WALLONIA, BELGIUM

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Background:

This study assessed the exposure to currently used pesticides (CUPs) of children living in 5 locations spread over Wallonia (Belgium) characterized by different agricultural practices and pesticide uses. The aims were to provide first data on the urinary levels of CUPs in Walloon children, to assess the contribution of inhalation as exposure pathway, and to identify some predictors of exposure.

Methods:

In spring 2016, 258 children aged from 9 to 12 years old provided first morning urine voids, while simultaneously ambient air were sampled close to the children's schools. 46 CUPs were measured in air and 32 parent pesticides, 3 specific metabolites (THPI, terbuthylazine desethyl, and TCPY), 4 non-specific metabolites of pyrethroids (3-PBA, 4F-3-PBA, cis and trans DCCA) and 5 dialkylphosphates were analyzed in the urine samples using 3 different extractions and further determination by LC-MS/MS or GC-MS/MS.

Results:

Metribuzin was the only parent pesticide measured in 10% of the samples with concentrations ranging from <0.2 to 1.68 µg/l. The metabolites THPI and TCPY were positively detected in respectively 23.5% and 100% of the urine samples with levels ranging from <0.2 to 4.13 µg/l for THPI and 0.36 to 38.96 µg/l for TCPY. The median concentrations of individual DAP ranged between <0.5 and 1.8 µg/l while 3-PBA was the most abundant pyrethroid metabolites detected (median of 0.98 µg/l), followed by t-DCCA (median of 0.66 µg/l).

Short discussion/conclusions:

This study showed that urinary parent CUPs seemed to be inadequate biomarkers to monitor the children's exposure vs metabolites, and that the air inhalation would be a minor route of exposure for the selected CUPs. The main predictors of exposure were biting nails, drinking of bottled water, the consumption of grey bread and fruit juices, the presence of carpets at home and the indoor use of pesticides, depending on the pesticides considered.