

Rearing kids on chlordecone contaminated soils: Activated carbon, a promising media to limit the transfer from soil to animal tissues

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Résumé

Chlordecone (Kepone) (CLD) is a highly persistent pesticide in soil which was intensively used in French West Indies to fight the banana black weevil. Because of its toxicity and considerable levels in soil, it became a major threat to address. Soil or sediments are considered as reservoir for this contaminant and soil ingestion is the main exposure route for free range animals. In order to ensure the production of safe animal foodstuffs, it is necessary to reduce the transfer from soil to animal tissues. The present study intends to test whether two different activated carbons (ACs) could limit the CLD transfer from soil to animal. Three artificial soils (ASs) were prepared according to OECD guideline 207. One standard soil (SS), devoid of organic matter (OM), and two amended versions of this SS with coconut-based activated carbon (AC₁) or lignite-based one (AC₂) were prepared to obtain a 2% organic carbon content (dry matter basis). This study involved 15 kids as a typical on-farm consumption animal. Animals were randomly distributed into 3 groups (n=5 replicates). During 21 days, the kids were fed AS spiked with 10 µg of CLD per g of dry matter to achieve an exposure dose of 10 µg CLD per kg of body weight per day. After 21 days of oral exposure, CLD in peri-renal adipose tissue and liver were analysed by GC-MS, after extraction and purification. Concentrations in tissues were significantly affected by the treatment (p<0.01). In liver, CLD concentration was 2110, 450 and 24 ng.g⁻¹ DM for SS, AC₁ and AC₂ respectively. This decrease corresponds to a relative bioavailability of 21 and 1.2% for AC₁ and AC₂ respectively. In adipose tissue, a similar decrease has been observed. This study leads to conclude that 1/ AC could dramatically reduce the bioavailability of CLD 2/ extent of this limitation depends of the nature of AC. This result obtained with artificial soils is considered as a first major step prior to on-field experiments.