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毒理学关注阈值方法的建立及其在食品接触材料评估中的应用

Establishment of the threshold of toxicological concern with decision tree approach and its application in food contact materials

DOI :

中文关键词: 邻苯二甲酸二(2-乙基己基)酯 增塑剂 毒理学关注阈值 风险评估 Cramer分类

Key Words:DEHP plasticizer TTC risk assessment Cramer classification

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中文摘要:

目的以邻苯二甲酸二(2-乙基己基)酯(DEHP)为模式化学物,建立可用于食品接触材料的毒理学关注阈值(TTC)风险评估方法。方法建立基于Cramer结构分类的TTC决策树方法;利用Cramer结构分类流程和Toxtree软件对DEHP进行Cramer结构分类;利用2002年中国居民营养与健康状况调查数据和部分食物中DEHP的监测数据,估计我国不同年龄组人群通过饮料、植物油、发酵乳、方便面、果冻、果酱的DEHP暴露量,并按照TTC决策树方法对DEHP进行风险评估;同时,采用传统的风险评估方法进行验证。结果 DEHP属于Cramer I类结构,其对应的TTC阈值为30μg/kg BW。我国居民的DEHP最大暴露量为4.06μg/kg BW,4个年龄组的最大暴露量为11.10μg/kg BW,分别占DEHP TTC阈值的13.5%和37.0%。按照DEHP的健康指导值———每日耐受摄入量(TDI)(50μg/kg BW)计算,全人群和4个年龄组的最大暴露量分别占TDI的8.1%和22.2%,两种方法的风险评估结果基本一致。结论 TTC决策树方法是一种有效的风险评估工具,可用于食品接触材料的优先筛选和初步评估。我国居民膳食DEHP的健康风险较低,不需要引起健康关注。

Abstract:

Objective To establish the threshold of toxicological concern(TTC) approach and to apply it in the risk assessment of bis(2-ethylhexyl) phthalate(DEHP) as a model chemical for food contact materials.Methods TTC decision tree approach was established and DEHP was classified into Cramer systems based on both Cramer schematic diagram and Toxtree software to classify DEHP into Cramer systems.DEHP exposure in general population as well as in four age population groups was estimated by using data from the Chinese National Nutrition and Health Survey and data from DEHP surveillance on beverage,vegetable oil,fermented milk,instant noodle,fruit,vegetable-based jelly and fruit jam in China.TTC decision tree approach was used for risk assessment and the exposure was compared with the corresponding TTC value.Tolerable daily intake(TDI)-based risk assessment was also carried out to verify the results from TTC approach.Results DEHP belongs to class I Cramer and its TTC value was 30 μg/kg BW.The maximum dietary exposures of general population and four age groups were 4.06 and 11.10 μg/kg BW,respectively.These exposure values accounted for 13.5% and 37.0% of TTC for DEHP and accounted for only 8.1% and 22.2% of TDI for DEHP.Similar results can be derived from both TTC approach and TDI-based approach.Conclusion TTC decision tree approach is a useful tool for prior screening and primary risk assessment of food contact materials.Dietary exposure of DEHP in Chinese population is low and no health concern is required.

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