

P.34 A study on alternative risk assessment scheme of flame retardants.

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Abstract: When a chemical is identified to impact on human health or poses ecological risk, it might be banned and replaced depending on availability of substitutes. With such a replacement policy, risk from the replaced chemical is naturally reduced, but risk from its substitute increases. This is called risk-trade-off between replaced chemical and its substitute. It is important to prove that the substitute chemical poses less risk than the one it replaced. In which case, how can we compare the risk of replaced chemical and its substitute? In this study, we focused on a flame retardant, Hexabromocyclododecane (HBCD) and assumed its substitutes as a case study of alternative risk assessment for chemicals in consumer products. This research has two objects: first, to predict exposure volume using mathematical models on alternative scenario. And second, to investigate variation in outcome when different risk assessment methods are used. To achieve the first objective, exposure assessment on alternative scenario was undertaken within a framework of uniform combustibility between HBCD and its substitutes. If emission rate from products of replaced chemical is known, it is possible to estimate that of the substitute. Exposure volume of the substitute could also be estimated based on information of performance of flame retardant and physico-chemical property. To achieve the second objective, we compared the results of deterministic risk assessment and probabilistic risk assessment. The method of deterministic risk assessment provided information regarding whether risk exists or not on average or worst scenario. On the other hand method of probabilistic risk assessment quantified in detail if probability of exposure volume exceed reference-dose (RfD). The findings suggested that each approach might lead to a different conclusion.