Transformation of phthalates in dust

Within the MiSSE project (http://www.aces.su.se/misse/) household dust has been analyzed to demonstrate what are the chemicals that we can be exposed to in our indoor environment. One of the most pronounced chemical group found were the plasticizers phthalates, where levels up to 800 µg/g dust was measured. Chemicals bound to dust are exposed to transforming reactions such as hydrolysis and photolysis. Phthalates are expected to be degraded from di-alkyl phthalates to mono-alkyl phthalates via hydrolysis. It has been shown that these transformation products can for example disrupt the endocrine system or cause obesity. Very little is known today about the formation and toxicity of transformation products formed in our household dust and there is an urgent need to get a better understanding in the topic.

This project aims to demonstrate and measure the transformation rate of selected relevant phthalates found in the household dust measured within MiSSE project. Established methods measuring rate constants at different temperatures and pH will be used. Progress of the reactions will be followed by HPLC-UV and the reaction products will be identified with LC-MS. Activation energies will be estimated from reaction rates at different temperature using the Arrhenius plot and second order rate constants will be calculated from rate constants at different pH.

Based on gained information we can estimate the contribution to the toxicity found in dust that is coming from the transformation products and gain a deeper understanding of the processes occurring in dust that is affecting the chemical profile that we are exposed to.

Project credits: 30

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