

Quaternary ammonium compounds (QUAT) in house dust

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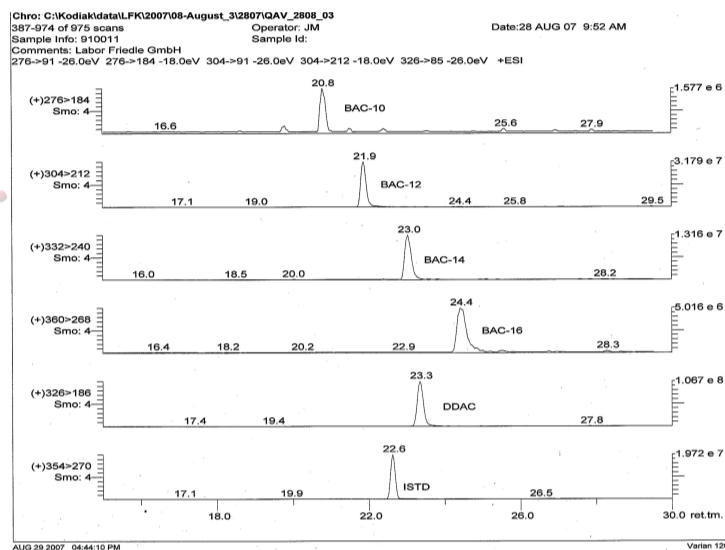
INTRODUCTION

Indoors surfactants are absorbed in house dust and are unlikely to be biologically degraded there, meaning that long-lasting contaminations are to be expected. The first part of the study was to determine the limits of determination, the linearity and the reproducibility of the measurements of the concentration van QUATs.

METHODS

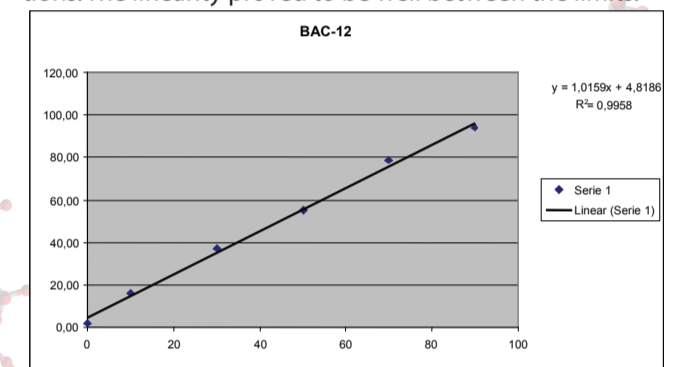
The samples were taken from the pool of house dust samples taken for the German Environmental Survey for Children 2003/06. The research collection consists of 50 filtered vacuum cleaner bag samples of < 63 µm fraction. The following substances were selected for analysis:

- BAC-10 (Benzalkonium chloride with R=C10)
- BAC-12 (Benzalkonium chloride with R=C12)
- BAC-14 (Benzalkonium chloride with R=C14)
- BAC-16 (Benzalkonium chloride with R=C16)
- DDAC (Didecyltrimethylammonium chloride)



Mass fragmentographs of an exemplary dust sample with concentration level between 0.7 mg/kg (BAC-10) and 46.8 mg/kg (DDAC)

Linearity: tested with 6 samples with different concentrations. The linearity proved to be well between the limits.



Linearity of the process with example BAC-12

Limits of determination: clearly below 0.1 mg/kg for each substance.

Repeatability: a selected dust sample was processed 5 times and measured. The standard deviation was 6.23 %.

Recovery: 2 samples with 10 mg/kg and 50 mg/kg of QUAT added, were processed. Except for BAC-16 the recovery rate for the low concentration was about 15 % lower than for the concentration of 50 mg/kg.

RESULTS

In the 50 samples of house dust, taken from German Environmental Survey for Children 2003/06, the average concentration of the sum of the QUATs was 35.2 mg/kg with a 95-percentile of 105.7 mg/kg.

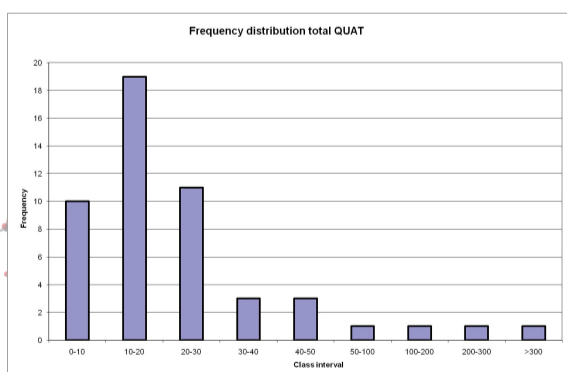


Fig 5: Frequency distribution of QUAT levels [mg/kg]

CONCLUSIONS

For the first time the results give an impression about the distribution of specific quaternary ammonium compounds (QUATs) in German house dust and the related toxicological data allows the exposure situation to be assessed.

ACKNOWLEDGEMENT

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