P324-WE

BRANCHED ALKYLBENZENES: A MAJOR TOXIC COMPONENT OF UNRESOLVED COMPLEX MIXTURES BIOACCUMULATED IN MUSSELS?

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Recent research using comprehensive two-dimensional gas chromatography – time-of-flight –mass-spectrometry (GCxGC-ToF-MS) has identified branched alkylbenzenes (BABs) as a major component of some unresolved complex mixtures of hydrocarbons bioaccumulated in the tissues of N. Sea mussels, *Mytilus edulis*, (Booth *et al.*, 2007 in press) that were previously found to have poor health status (Widdows *et al.*, 1995). Acute aqueous toxicity tests (72h semi-static exposures) using a commercially available complex mixture of $C_{12\text{-}14}$ BABs containing over 340 compounds (Fig. 1) revealed that they possessed a similar toxicity, in terms of mussel clearance rates (a major component of the 'Scope for Growth' health index), to that of the linear C_8 alkylbenzene 1-phenyloctane and established an aqueous BAB EC_{20} of 0.007 mg L^{-1} and a tissue BAB EC_{20} of 10.5 μg g^{-1} dry weight. Acute exposure may not necessarily be relevant to the exposure conditions that mussels and other organisms experience, therefore further research was required to assess the effect of longer term exposure at low aqueous conditions, and to assess the ability of mussels to recover from exposure to BABs.

Mussels were exposed to 5 μg L^{-1} of $C_{12\text{-}14}$ BABs for 14 days with daily water exchanges and continuous food supply. Following exposure, their clearance rates were measured and statistically compared, using analysis of variance (ANOVA), to seawater and solvent (0.005% acetone) control mussels. The cellular viability, in terms of neutral red retention, of subsamples of mussels was also assessed. Subsamples of mussels were taken for tissue extraction and analysis. The remaining mussels were placed in clean seawater for five days to assess their ability to depurate and recover. Tissue extracts were quantified by GC-MS and the profile of compounds bioaccumulated were explored using GCxGC-ToF-MS.

Mussels exposed to BABs were found to have significantly ($P \leq 0.05$) reduced clearance rates: 20% compared to solvent controls and over 30% compared to seawater controls. The cellular viability of the mussels was not significantly affected ($P > 0.05$) by exposure to BABs. Following five days in clean seawater, the clearance rates of the BABs-exposed mussels improved relative to the control mussels. Although the BABs-exposed

mussels did not fully recover, there were no significant differences ($P > 0.05$) between groups which, together with the lack of cellular damage, is consistent with a narcosis mode of action.

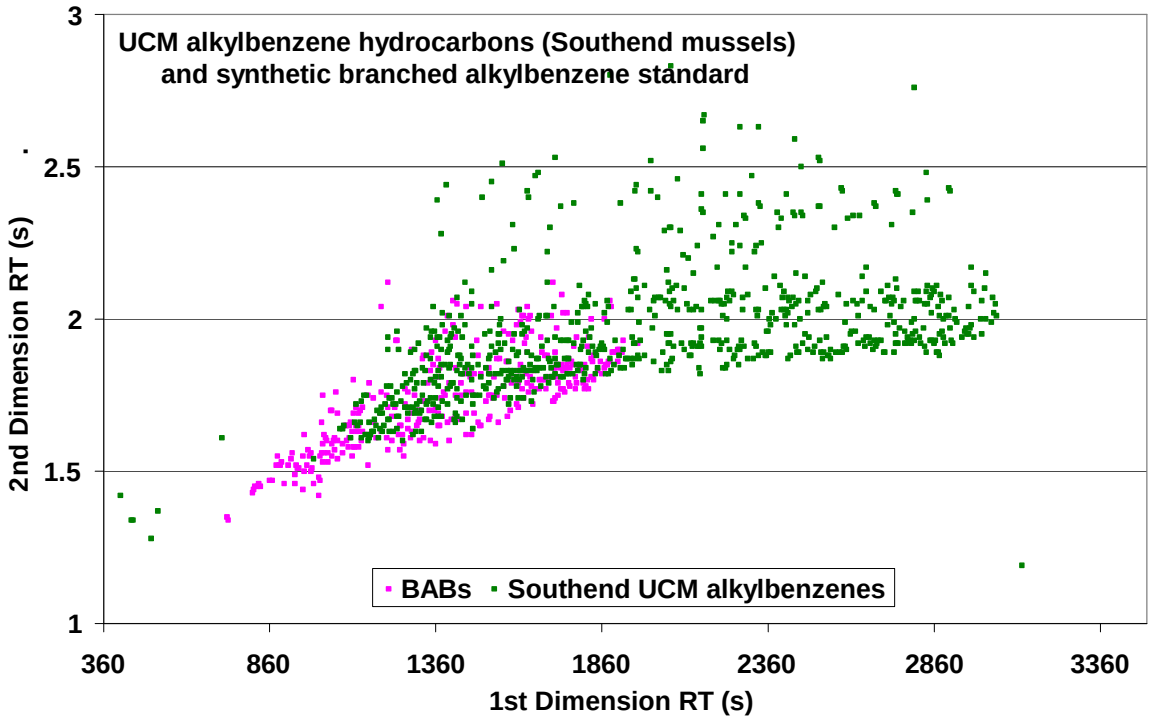

Figure 1. GCxGC-ToF-MS analysis of C_{12-14} branched alkylbenzenes (BABs) showing over 340 unique peak marker identifiers (pink). Also shown are the peak markers (green) for the BABs in mussels from Southend, U.K. that were found to have poor health status.

REFERENCES

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