

**Bromophenols, present both in marine organisms and in industrial flame retardants,  
disturb cellular calcium signaling in neuroendocrine cells (PC12)**

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Bromophenols are present in marine polychaetes as well as in algae like e.g. the brown macroalgae *Sargassum siliquastrum* and *Padina arborescens*, containing high concentrations up to 7000 ng/g. They are thought to cause the typical sea-like taste and flavour (Chung *et al.*, 2003).

The ecological role of brominated phenols is not clear, they may play a role in chemical defence and deterrence (Kicklighter *et al.*, 2004). Some brominated phenols are commercially used as industrial flame retardants as 2,4,6-tribromophenol and are suspected to disrupt the humoral system by binding to the estrogen receptor (Legler & Brouwer, 2003). We found that some of the compounds we tested, especially 2,4-dibromophenol and 2,4,6-tribromophenol show a disturbance of calcium homeostasis in endocrine cells (PC12) at concentrations in the  $\mu\text{M}$  range. The reduction of depolarization induced calcium elevations by 2,4-dibromophenol and 2,4,6-tribromophenol and the increase of intracellular calcium levels by both substances at higher concentrations may suggest a link to the disrupting effect of endocrine systems by brominated phenols. 2,4-Dibromophenol was the most potent substance we tested, reducing voltage dependent calcium currents as revealed in whole cell patch clamp experiments. In respect to a related experimental approach using brominated pyrrole alkaloids from marine *Agelas* sponges (Bickmeyer *et al.*, 2004), brominated marine phenol and pyrrole metabolites seem to disturb cellular calcium signaling with differential efficacy.

Bickmeyer U., Drechsler C., Köck M., Assmann M., (2004). Brominated pyrrole alkaloids from marine *Agelas* sponges reduce depolarization-induced cellular calcium elevation. *Toxicol.*, **44**,. 45-51. 2004

Chung H. Y., Ma W. C. J., Ang P. O., Kim J. S., Chen F., (2003). Seasonal variations of bromophenols Bromophenols in brown algae (*Padina arborescens*, *Sargassum siliquastrum* and *Lobophora variegata*) collected in Hong Kong. *J. Agric. Food Chem.*, **51**,. 6752-6760. 2003

Kicklighter C. E., Kubanek J., Hay M. E., (2004). Do brominated natural products defend marine worms from consumers? Some do, most don't. *Limnol. Oceanogr.*, **49**,. 430-441. 2004

Legler I., Brouwer A., (2003). Are brominated flame retardants endocrine disruptors? *Environ. Int.*, **29**,. 879-885. 2003