

Persistent organohalogen contaminant burdens in Antarctic krill (*Euphausia superba*) from the eastern Antarctic sector: A baseline study

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Abstract

A baseline for persistent organohalogen compound (POC) accumulation in the Antarctic keystone species, Antarctic krill (*Euphausia superba*) has been established for a 50° longitudinal range of the eastern Antarctic sector. Samples of adult krill, caught from 12 sites distributed between 30° and 80°E (60°–70°S), were analysed for > 100 organohalogen compounds including chlorinated pesticides, polychlorinated biphenyls (PCBs), polybrominated organic compounds and polychlorinated dibenzo-*p*-dioxins/furans (PCDD/Fs).

Organochlorine pesticides dominated measured krill contaminant burdens with hexachlorobenzene (HCB) as the single most abundant compound quantified. Krill HCB concentrations were comparable to those detected at this trophic level in both the Arctic and temperate northwest Atlantic, lending support for the hypothesis that HCB will approach global equilibrium at a faster rate than other POCs. *Para, para*-dichlorodiphenylethane (*p,p*-DDE) was detected at notable concentrations. Measurements of DDT and its degradation products provide an important baseline for monitoring the temporal and geographical influence of renewed, DDT usage for malaria-control in affected southern hemisphere countries.

In contrast to the Arctic, PCBs did not feature prominently in contaminant burdens of Antarctic krill. The major commercial polybrominated diphenyl ether (PBDE) congeners -99 and -47 were quantified at low background levels with clear concentration spikes observed at around 70°E, in the vicinity of modern, active research stations. The likelihood that local anthropogenic activities are supplementing low PBDE levels,

delivered otherwise primarily via long-range environmental transport, is discussed. The suspected naturally occurring brominated organic compound, 2,4,6-tribromoanisole (TBA), was a ubiquitous contaminant in all samples whereas the only PCDD/Fs quantifiable were trace levels of octachlorodibenzo-*p*-dioxin (OCDD) and 1,2,3,4,7,8/1,2,3,4,7,9- hexachlorodibenzofuran (HxCDF).

With the aims of; i) Generating a robust and broadly applicable POC auditing platform for the scarcely studied eastern Antarctic sector; ii) Determining the compounds accumulating in Antarctic krill for further toxicity evaluation studies and iii) Establishing a baseline for Antarctic predator exposure to POCs, this study represents one of the most comprehensive reports of POC contamination of the Antarctic food web to date.

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