

Toxic Chemicals from Industries into Pacific Biota. Investigation of Polychlorinated Biphenyls (PCBs), Dioxins (PCDD), Furans (PCDF) and Polybrominated Diphenyls (PBDE No. 47) in Tuna and Shellfish in Kiribati, Solomon Islands and the Fiji Islands

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Abstract : The most commonly consumed shellfish species produced in the Pacific, shellfish and tuna fish, were investigated for the occurrence of a range of brominated and chlorinated contaminants in order to establish current levels. Polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) and polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) were analysed in the muscle of tuna species *Katsuwonis pelamis*, yellow fin tuna, and shellfish species from the Fiji Islands. The investigation of polychlorinated biphenyls (PCBs), furans (PCDFs) and polybrominated diphenylethers (PBDE No.47) in tuna and shellfish in Kiribati, Solomon Islands and Fiji is necessary due to the lack of research data in the Pacific region. The health risks involved in the consumption of marine foods laced with toxic organo-chlorinated and brominated compounds makes in the analyses of these compounds in marine foods important particularly when Pacific communities rely on these resources as their main diet. The samples were homogenized in a motor with anhydrous sodium sulphate in the ratio of 1:3 (muscle) and 1:4-1:5 (roe and butter). The tuna and shellfish samples were homogenized and freeze dried at the sampling location at the Institute of Applied Science, Fiji. All samples were stored in amber glass jars at -18 ° C until extraction at Orebro University. PCDD/Fs, PCBs and pesticides were all analysed using an Autospec Ultima HRGC/HRMS operating at 10,000 resolutions with EI ionization at 35 eV. All the measurements were performed in the selective ion recording mode (SIR), monitoring the two most abundant ions of the molecular cluster (PCDD/Fs and PCBs). Results indicated that the Fiji Composite sample for *Batissa violacea* range 0.7-238.6 pg/g lipid; Fiji sample composite *Anadara antiquate* range 1.6 - 808.6 pg/g lipid; Solomon Islands *Katsuwonis Pelamis* 7.5-3770.7 pg/g lipid; Solomon Islands Yellow Fin tuna 2.1 -778.4 pg/g lipid; Kiribati *Katsuwonis Pelamis* 4.8-1410 pg/g lipids. The study has demonstrated that these species are good bio-indicators of the presence of these toxic organic pollutants in edible marine foods. Our results suggest that for pesticides levels, p,p-DDE is the most dominant for all the groups and seems to be highest at 565.48 pg/g lipid in composite *Batissa violacea* from Fiji. For PBDE no.47 in comparing all samples, the composite *Batissa violacea* from Fiji had the highest level of 118.20 pg/g lipid. Based upon this study, the contamination levels found in the study species were quite lower compared with levels reported in impacted ecosystems around the world

Keywords : polychlorinated biphenyl, polybrominated diphenylethers, pesticides, organochlorinated pesticides, PBDEs

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