Pesticide residues in sugarcane plantations and environs after long-term use: the case "of TPC ltd, Kilimanjaro region

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This thesis reports on a pesticide residue analysis study conducted at Tanganyika Planting Company (TPC) sugarcane estate in Arusha Chini, Kilimanjaro region, which is the earliest intensive user of pesticides in Tanzania. In the study, a total of 80 water, sediment and soil samples were collected from both the TPC plantations and the environs during the dry and the rainy season, and were analysed for pesticide residues. This was done so as to investigate their occurrence, types, concentrations and dispersion trends after a long-term use, as well as their seasonal variation trends. Sixteen different types of organochlorine pesticide residues and metabolites were detected in 85% of the samples, namely, p,p'-DDT, o,p'-DDT, p,p'-DDE and p,p'- DDD, HCHs (a-,|3-,Y- and 8- isomers), aldrin, dieldrin, y-chlordane, endosulfan- alfa, endosulfan-beta, endosulfan-sulphate, heptachlor epoxide and heptachlor. DDT and its metabolites were the predominantly detected compounds in all of the samples. The least detected pesticides were the endosulfans. Heptachlor was detected in some few soil samples only. Mean concentrations of the detected pesticides, ranged between 1.1 - 636.7 ng/1,1.7 - 716.7 ng/g, d.w, and. 0.2 - 577.5 ng/g d.w in water, sediment and soil samples, respectively with respective percentage recoveries of 70.5 -112%, 72 - 105% and 71 - 88%. The matrix blank samples which were analysed in parallel with these samples had no traces of pesticide residues. Concentrations of the detected pesticide residues were therefore not corrected to the procedural blanks and recoveries. For water and soil, the rainy season samples showed lower levels of residues in terms of their concentrations and detection frequencies than the dry Reason samples, whereas no significant difference was observed in the sediment, samples. Samples from the plantations had higher residue levels than those from the environs.