

Organochlorine Pesticides Residues in Lake Naivasha Catchment Water

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Lake Naivasha, Kenya, hangs precariously in balance between economic exploitation and biodiversity conservation. There is increasing intensity of horticultural activities around the lake, believed to result in excessive water abstraction and heavy use of agrochemicals. This paper reports the findings of an investigation conducted to determine the extent environmental contamination of 17 organochlorine pesticides including metabolites namely p,p'-DDT, p,p'-DDE, p,p'-DDD, endosulfan I, endosulphan II, endosulphan sulfate, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, aldrin, dieldrin, methoxychlor, α -HCH, β -HCH, γ -HCH and δ -HCH in 36 water samples collected from Lake Naivasha catchment. Residues of varying magnitude and spatial distribution were detected in the samples. The concentrations of α -HCH varied from 0.013-0.776 $\mu\text{g/l}$, γ -HCH (0.033-0.419 $\mu\text{g/l}$), β -HCH (0.004-0.059 $\mu\text{g/l}$), δ -HCH (<0.010-0.059 $\mu\text{g/l}$), heptachlor (0.571-7.000 $\mu\text{g/l}$), heptachlor epoxide (0.0050-0.177 $\mu\text{g/l}$), aldrin (0.0050-0.597 $\mu\text{g/l}$), dieldrin (0.004-0.765 $\mu\text{g/l}$), endrin (0.005-0.195 $\mu\text{g/l}$), endrin aldehyde (0.020-0.256 $\mu\text{g/l}$) endosulphan I (0.020-0.124 $\mu\text{g/l}$), endosulphan II (<0.002-0.267 $\mu\text{g/l}$), endosulphan sulphate (<0.008-0.735 $\mu\text{g/l}$), p,p'-DDT (0.006-0.197 $\mu\text{g/l}$), p,p'-DDE (0.030-0.588 $\mu\text{g/l}$), p,p'-DDD (0.018-0.050 $\mu\text{g/l}$) and methoxychlor (<0.002-0.891 $\mu\text{g/l}$), with heptachlor giving the highest overall concentration in most of the sites. The concentration showed wide variations from one sampling site to the other reflecting the socioeconomic diversity around the lake. Total pesticide concentrations in the catchment was in the following order Σ heptachlors > Σ methoxychlor > Σ aldrins > Σ endosulphans > Σ HCHs > Σ DDTs > Σ endrins. These results suggest that the occurrence is as a result of use of organochlorine pesticides in the catchment. Concern is therefore raised regarding the possible deleterious effects including endocrine disruption not only in livestock and human population but also wildlife, thus constituting a threat to the ecosystem health around the lake.