

**THE SPATIAL AND TEMPORAL VARIATION OF SELECTED HEAVY
METALS, NITROGEN AND PHOSPHORUS IN WATER AND SOILS OF YALA
SWAMP, KENYA**

BY

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DECLARATION

Declaration by the student

This thesis is my original work presented to University of Eldoret for the Master of Science degree in chemistry. The work has not been presented for a degree in any other university. No part of this thesis may be reproduced without the prior permission of the author and /or University of Eldoret.

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DEDICATION

This work is dedicated to my wife, Dorothy and children, Davica, Arnold and Adrian for their moral support and encouragement during the period of study.

ABSTRACT

Studies involving pollutants in the environment have been used as an indicator of their accumulation resulting from human activities. A study of spatial and temporal variation of pollutants involving forty four water and soil samples collected from four different fields within the Yala swamp has been undertaken. The samples were collected in duplicates. Soil samples were dried in the open, crushed, sieved through 2 mm sieve, weighed and digested using the wet method in a block digester. Atomic Absorption Spectrometer was used to analyze heavy metals (Zn, Co, Mn, Cd, Cu, Pb, and Cr). Total N and P were analyzed using colorimetric technique. Respective average levels of Zn and Cu in water 0.505 ppm and 0.129 ppm which were much lower than the maximum values of 5.000 ppm and 1.000 ppm set by WHO/ FAO. Those for Co, Mn, and Cd were 0.219, 1.352 and 0.176 ppm, respectively and were higher than the respective WHO/FAO values. The respective values of Pb and Cr in water were 1.668 and 1.984 ppm, much higher than the maximum limits set by WHO/ FAO and KEBS of 0.010 and 0.050 ppm. The average value of Zn in soil was 0.415 ppm while Co, Mn and Cd had corresponding levels of 0.262, 1.491 and 0.117 ppm which were higher than the maximum set limits of 0.100, 0.100 and 0.003 ppm by WHO / FAO and KEBS. The average value of Cu in soil was 0.237 ppm while those for Pb and Cr were much higher at 1.820 and 5.005 ppm, respectively. The average level of N in water was 0.095 ppm while in soil was 0.118 ppm. The level of P in water was 0.063 ppm while in soil was 0.092 ppm. The results showed a general increasing trend in pollutant accumulation towards the lake hence posing a threat to aquatic life. Therefore, proper and continuous monitoring of pollutants should be done to avoid future dangers caused to the environment.

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