

**DETERMINATION OF LEACHABLE HEAVY METALS IN EARTHEN
KITCHENWARE: A CASE STUDY OF KENYAN POTS**

BY

JOHNPETER N. NGUNJIRI, B. SC. (HONS) MOI UNIVERSITY

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Department of Chemistry

Moi University

Eldoret, Kenya

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ABSTRACT

Levels of Cd, Co, Ni, Pb and Zn were determined by AAS in pottery clay soils and leachates from pots subjected to different conditions of pH, temperature and contact time. In clay soils, which are the raw materials for making pots had high metal levels with average concentrations of 9.0 mg/kg for Cd, 17 mg/kg for Co, 34 mg/kg for Cu, 122 mg/kg for Ni, 55 mg/kg for Pb, and 77 mg/kg for Zn. Most elements showed significant concentration increment in the baked pottery clay with averages of 0.9 mg/kg for Cd, 9.0 mg/kg for Co, 5.8 mg/kg for Cu, 4.6 mg/kg for Pb and 24.8 mg/kg for Zn. Ni recorded reduction in concentration for all the collection sites.

The ranges of concentrations of leached Cd, Co, Cu, Ni, Pb and Zn in the pH controlled pot solutions decreased with increasing pH from 3.5 to 9.2 by average values of 0.009 $\mu\text{g/ml}$ for Cd, 1.4 $\mu\text{g/ml}$ for Co, 8 $\mu\text{g/ml}$ for Cu, 1.4 $\mu\text{g/ml}$ for Ni, 1.2 $\mu\text{g/ml}$ for Pb and 2.4 $\mu\text{g/ml}$ for Zn. In the boiled solution, strong relationships were found for the leaching trends of Cu, Co and Zn, which leached by more than 60% in the last half of the cooking time, while Pb and Ni leached almost continuously over the same period of time. Cd, uniquely, leached by over 70% in the first half of the cooking time. Concentrations of metals in the stored solutions showed similar trends for Cd, Cu and Zn as in the cooking experiment, but the percentages were higher. Co concentration remained constant after the first week of storage. Therefore, the risk of heavy metals contamination from the earthen pots was eminent and required precautionary measures.