

**THE IMPACT OF WASTE WATER FROM KAMITI
TANNERS ON RIVER GATHARAINI (KASARANI)
NAIROBI- KENYA**

BY **KEBENEY JOSEPH KIPRONO**

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MOI UNIVERSITY

P.O. BOX 3900

ELDORET

KENYA

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MOI UNIVERSITY



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ABSTRACT

This study was aimed at establishing the contribution of Kamiti tanners to the pollution of River Gatharaini. Waste water samples were collected from the tannery for characterization on two different dates while sampling stations G1, G2, G3, G4 and G5 were established along the river. The samples were collected on weekly basis and analyzed for chromium, Cr, lead, Pb, manganese, Mn, cadmium, Cd, magnesium, Mg, calcium, Ca, potassium, K, sodium, Na, iron, Fe, chemical oxygen demand, COD, biochemical oxygen demand, BOD, sulphate, SO_4^{2-} , fluoride, F⁻, total dissolved solids, TDS, total suspended solids, TSS, electrical conductivity, EC, nitrates, NO_3^- , nitrites, NO_2^- , carbonates, CO_3^{2-} , chloride, Cl⁻, dissolved oxygen, DO, temperature, T, and pH. Atomic absorption spectrophotometer, AAS was used to analyze the metals, dichromate refluxing was used to analyze COD while titrations were used for the other parameters.

It was found out that as the tannery effluent left the treatment ponds at K1, the following parameters had concentrations greater than the permissible limits of either the Ministry of Reclamation, Regional & Water Development or those of WHO, EC, USA and Canada DO, Cl⁻, SO_4^{2-} , BOD, COD, Cr, Fe, Mn and Pb. The colour and odour of the effluent were objectionable both to the eye and nose, respectively. For WHO, EC, USA and Canada, the concentrations also exceeded the limits for fisheries and aquatic life.

At the river sampling stations, most of the parameters listed above also went above the permissible limits. DO, for example varied from 2.3 mg/l at G2 to 5.6 mg/l at G1 which was the control point. The electrical conductivity had mean ranges from 204 $\mu\text{s}/\text{cm}$ at G1 to 997 $\mu\text{s}/\text{cm}$ at G5, showing an increase in the number of ions conducting electrical current in the water. Mean TDS concentrations ranged from 145 mg/l at G1 to 682 mg/l at G5. BOD had mean ranges of 79 mg/l at G1 to 373 mg/l at G5 while COD had the lowest mean concentration at G1 (133 mg/l) and the highest at G3 (424 mg/l).

Cr mean concentrations varied from 0.034 mg/l at G1 to 3.6 mg/l at G4. Mean Concentrations of Mn also varied from 0.367 mg/l at G1 to 2.79 mg/l at G3. It was also observed during the study that geological factors could have contributed to the variations in the concentrations of some of the parameters which were being investigated. The change of the gradient or slope between G2 and G3 allowed the total mixing of water, and thereafter the sedimentation of most of the ions.

The study also attempted to find out temporal variations with respect to rainfall effects. Several graphs were drawn to represent these temporal variations. It was observed that during the rainy season, the dilution capacity of the river contributed to the low concentrations of the parameters whereas during the dry season like January and February, the concentrations of most parameters were high.