

**Title of Article:** Water Quality Modelling: Case Study Of The Impact Of Abattoir Effluent On River ILO, Ota, Nigeria

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**Abstract:** This report presents results obtained from the investigation and water sampling exercise carried out on the segment of River Illo that passes through Sango in Ado Odo-Ota Local Government Area, Ogun State, Nigeria. The report reveals that while some people used water from the river for domestic, food production and recreation purposes, others discharge their wastes without any form of pre-treatment into it. The multipurpose usage of water from River Illo by local residents thus hinges public health on the self-purification capacity of the river alone. Information on water use and waste disposal practices of the local residents were obtained through direct observation and oral interview of members of randomly chosen households built along the river within a distance of 2 km. Single grab samples of water were obtained from the river at the site of an abattoir effluent discharge at distances 0 m, 10 m, 20 m, 30 m, 50 m and 100 m from the point of discharge. A seventh sample was also obtained 10m upstream of the point of effluent discharge to furnish information on ambient conditions of the river prior to pollution while an eighth sample which was prepared by diluting the water obtained at 0m with distilled water (i.e. 25% stream water, 75% distilled water) was included to serve as control sample. All water samples were transported (within 3 hours of isolating them from the river body) to the laboratory for analysis and the results were subjected to graphical, statistical and mathematical analysis. Pollution from the abattoir caused a drop in dissolved oxygen level of the river from an ambient value of 4.6 mg/l to 0.01 mg/l at the point of discharge. The pollution also caused an increase of 447.5 mg/l to 1071.5 mg/l in T.S., 0.04mg/l to 4.4 mg/l in ammonia, 170 mg/l to 670 mg/l in BOD, 0.05mg/l to 3.05mg/l in phosphorus, 50mg/l to 1066.7 mg/l in alkalinity and 18mg/l to 820mg/l in Acidity. It was also found out that between 30m – 80m downstream of the pollution point, a threat of eutrophication is caused by plants growing in the river path. Despite this obstruction, the river recovered considerably to a D.O. level of 3.9 mg/l at 100m downstream. Results from the dispersion modelling shows the self-purification capacity of the river,  $f$ , to be 1.1 within 30 m distance from the point of discharge and 0.8 between 30 m and 100 m from the point of discharge. The results from the application of the Streeter-Phelps model showed that the eutrophication occurring between 30m – 80m is interfering adversely with the self-purification processes of the river. The percentage compliance of each of the eight water samples with Guideline Values (GLV) of WHO and FEPA was performed. None of the samples met the minimum requirements for BOD, COD and TSS, which are indicators of pollution. It was concluded that River Illo is being polluted by abattoir effluents discharge thereby exposing the health of local residents who use the water from

the river for domestic, recreation and food production purposes to avoidable risks. Suggested actions that could further complement the self-purification capacity of the river were offered.