LEVELS OF HEAVY METALS IN TILAPIA AND CATFISH SPECIES ALONG RIVER RUIRU, KENYA

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A Research Proposal Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in the School of Pure and Applied Sciences of Kenyatta University

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ABSTRACT

River Ruiru flows in areas where it is subject to pollution due to municipal wastes, urban and agricultural wastes. The river is reported to harbor various species of fish such as tilapia, catfish, eel, and common carps, which may be contaminated by heavy metals present in such wastes. The heavy metals may damage organs such as gills, liver and kidneys of fish. Consuming such fish by other organisms in the aquatic food chains such as birds, besides human can be harmful. Fish concentrate large amounts of heavy metals from polluted waters and when they use other animals as part of the food. It is important to ascertain that such fish is safe for organisms that consume them, including humans. Studies of concentrations of metals in rivers and in fish can also serve as an indicator of the extent of pollution along the rivers. The objective of the proposed study is to carry out a comparative study on the levels of heavy metals in tilapia and catfish species along River Ruiru. Systematic random sampling will be applied to collect water, sediments and fish samples from six sites, along the middle course of Ruiru River. Three sites will be located downstream along the river, 100 meters past Ruiru town. Three control sites will be at the upstream sections of the river, 100 meters away from Ruiru town. The sampling points will be 100 meters apart. Fish samples will be transported to the laboratory for identification. Ichthyologists from the National Museums of Kenya will assist in identifying fish. Levels of heavy metals in the river water, sediments and in gills, liver, and muscles of tilapia and catfish will be analyzed using atomic absorption spectrophotometer. Histopathological and morphometrical changes of gills and liver in fish will also be studied. The data on levels of heavy metals in water, sediments and fish gills, liver and muscles will be analyzed by means of one way analysis of variance (ANOVA). Correlation coefficients will also be calculated to assess the association between biotic factors such as sex, weight, and length of fish, and the concentration of metals in fish gills, liver, and muscles. It will also be used to determine the association between levels of heavy metals in water and sediments and levels in fish gills, liver and muscles. Knowledge of effects of heavy metal pollutants on fish can be a tool for an early warning system in the evaluation and analysis of the health of fish populations and their natural environment. Such information could also guide environmental regulators and decision makers in taking actions in time to minimize damage to the environment and human health.