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HEAVY METAL POLLUTION IN THE MAIN RIVERS OF RWENZORI REGION, KASESE DISTRICT SOUTH-WESTERN UGANDA

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Abstract: Current study established heavy metal pollution of rivers Mubuku, Rwimi and Nyamwamba in Kasese district, Western Uganda. Their integrity is important because communities depend on them for water resources. No recent information is known on rivers' quality status yet traverse a densely populated area with agricultural activities and a history of copper/cobalt mining as heavy metals pose high health risks. The study was conducted from October 2019 to December 2019 and quantified levels of Cu, Zn, Pb and Co in water and fish to estimate the rivers quality. Water samples were randomly collected in sterilised bottle while fish samples were collected using non selective net method, dissected and dried to a constant mass. The total heavy metal load was determined using atomic absorption spectrophotometer. Results showed that, apart from Lead, the levels of Cu, Zn and Co in the waters were all within WHO limits except Co at one site on R. Nyamwamba with 0.233 ± 0.009 mg/L above the limit 0.05 mg/L for drinking water. The overall mean for Pb was 0.030 ± 0.006 mg/L and 0.047 ± 0.003 mg/L at R. Nyamwamba, 0.053 ± 0.003 mg/L at R. Mubuku and 0.067 ± 0.003 mg/L at R. Rwimi, all above the WHO limit of 0.01 mg/L. In fish tissues, Cu was within WHO limit; however, Pb and Zn were above limits (Pb, 2.0 ppm; Zn, 100 ppm) for fish. The average concentration for Pb was 29.05 ± 4.85 ppm, 69.23 ± 9.25 ppm and 32.33 ± 5.93 ppm at R. Nyamwamba, Rwimi and Mubuku respectively and for Zn, 115.05 ± 8.12 ppm, 117.47 ± 8.65 ppm and 118.69 ± 8.79 ppm at R. Nyamwamba, Rwimi and Mubuku respectively. Similarly, for all the three rivers, physico-chemical parameters; pH, temperature, electro-conductivity and dissolved oxygen were within the WHO limits but turbidity, 12.02 ± 0.39 NTU was above the limit of 5.0 NTU. Therefore, there is need for management intervention to control further contamination of rivers with heavy metals and controlled use of water bodies as washing bays.

Keywords: Bioaccumulation; Mubuku; Nyamwamba; Rwimi, Water quality.

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INTRODUCTION

Over the last 150 years, aquatic systems worldwide have been impacted by an array of anthropogenic factors (Falkenmark and Allard, 1991; Rahel, 2000; Dynesius and Nilsson, 2014). Human activities may alter the physical, chemical or biological processes associated with water resources and thus modify the resident biological community (Moyle *et al.*, 1992). Rivers and streams are very susceptible

to contamination, because of their shallow aquifers (Adejuwon and Mbuk, 2011) and therefore unsafe. Despite the present efforts for pollution control in aquatic ecosystems, there are still cases of severe accumulation of industrial pollutants due to past activities. Furthermore, agricultural runoff, urban wastewater and bad operation of some treatment plants add pollutants and nutrients into aquatic systems (Benejam *et al.*, 2008, Khanna and Chugh, 2004). Water