EFFECTS OF CATCHMENT CHARACTERISTICS AND LAND USE PRACTICES ON SURFACE WATER QUALITY IN THE YAN OYA RIVER BASIN

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Water is a basic need for the survival of all living beings and there is no alternative to it. Catchment characteristics and anthropological activities including land use patterns cause deterioration of water quality as reflected in the physical, chemical, and biological parameters of water. The Yan Oya river is the fifth longest river in Sri Lanka and flows through three districts, *viz.* Matale, Anuradhapura, and Trincomalee via cascaded irrigation systems. The people in the North-Central Province (Anuradhapura) and Trincomalee District suffer from acute shortage of potable drinking water. Thus, the Government of Sri Lanka has a plan to provide potable drinking water from the Yan Oya Reservoir Project commissioned recently. Therefore, it is critical to understand whether the water quality of Yan Oya river meets the standards for potable drinking water. The present study was focused on analysis of general water quality in the Yan Oya river basin from its head region to the meandering zone. Thirty surface water samples were collected in the dry season (April 2019) using standard sampling method. The collected samples were subjected to analyzed physicochemical and microbiological parameters. Surface water pH, temperature, dissolved oxygen (DO), electrical conductivity (EC) and turbidity were measured on-site and collected water samples were kept in the ice box (4 °C) during transportation and microbial analysis was performed within 24 hours of sampling. Surface water, chemical oxygen demand (COD), total hardness (TH), total inorganic nitrogen and total phosphate (TP) concentrations were measured using standard titrimetric and spectrophotometric methods. Fluoride concentration was measured using SPANDS colorimetric method where total coliform (TC) and fecal coliform (FC) counts were obtained by the standard membrane filtration method. The results indicate that, surface water pH ranged from 6.62 to 8.46 and the values remained within the Sri Lankan Standard Institute's (SLSI) drinking water standards. Ninety three percent of the samples indicated high COD values (24.3 - 116.1 mg L^{-1}) which exceeded the standard levels. EC in Yan Oya river basin ranged between 69.0 - 3740.0 µS cm^{-1} and turbidity, total hardness and fluoride were within the range of 2.3 - 46.7 NTU, 64 - 624 mg L^{-1}, 0.09 - 1.48 mg L^{-1}, respectively. Almost all samples showed high turbidity while 14% of the samples had high concentrations of fluoride. Acceptable levels of TP and total inorganic nitrogen were detected. Among the sampling locations 97% of the samples were contaminated with TC as 90% of the samples were contaminated with FC. Though the results of chemical and physical parameters indicate that Yan Oya river has a great potential to be used as a drinking water source, the results of microbial parameters indicated that the water is not suitable for direct consumption without proper purification procedures.

Keywords: Yan Oya, River basin, Surface water, Water quality, Microbial contamination

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