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Chemical and Microbial Contamination Status of Ground Water Quality in Kelani River Basin

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Abstract

Water is the key factor in sustaining human life. Water pollution may occur in various forms such as catchment characteristics, anthropological activities, land use practices and industrial discharges. Such polluting agents may affect physical, chemical and biological parameters of surface and ground water. The present study was focused to analyse the present status of ground water pollution in the Kelani river basin by means of physico-chemical and microbiological parameter using standard analytical and microbial methods. Pesticides were detected using pesticide library in the GCMS. Thirty ground water samples from head, transitional and meandering zones were collected for a period of six months from November 2012 to April 2013. pH values of most of the samples were deviated from the SLS drinking water standards and remained acidic during the study period (3.98-6.46). 80% of samples recorded high COD values (12.81-307.19 ppm) and also showed an increasing tendency towards downstream of the river basin. High BOD values were detected in meandering zone (4.80-10.19 ppm) in comparison to the head and transitional zones. The conductivity, TDS and hardness values were ranged between 21.67-917.00 µs/cm, 13.37-596.05 ppm, 2.00-206.67 ppm respectively. Acceptable concentrations of phosphate and nitrate were detected between 0.004-0.344 ppm and 0.01-1.394 ppm. Total coliform and feacal coliform counts were almost above 1,100 for 100ml. Samples from head and meandering zone of the river basin have shown more than 80% and 100% of total and feacal coliform contaminations respectively. Heavy metals such as Cd, Al, Zn, Pb, Cr, Cu remains within the SLS standards for drinking water. During the rainy season in some sampling locations of the head and meandering zone of the river basin, high Cd, Al and Zn were detected, though the concentrations remain below the SLS drinking water standards. Some pesticides/derivatives namely O,O-dimethyle S-methylcarbamoylmethyl phosphorodithioate, 5-bromo-3-sec-butyl-6-methyluracil, O,O-dimethyl S-2-(1-methylcarbamoyl-ethylthio) ethyl phosphorothioate, 1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone were detected in some wells in the transitional zone indicating the effect of anthropological activities on ground water pollution in the Kelani river basin. The study is in progress to identify and quantify pathogenic microbes contamination in the river basin.

Keywords: Kelani river basin, Ground water, Physicochemical and microbiological parameters, Heavy metals, Pesticides