

Reduction of Toxic Matter from Marginal Water Using Sludge Recycling from Combination of Stepped Cascade Weir with Limestone Trickling Filter

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Abstract : The aim of this investigation is to confirm the activity of a sludge recycling process in trickling filter filled with limestone as an alternative biological process over conventional high-cost treatment process with regard to toxic matter reduction from marginal water. The combination system of stepped cascade weir with limestone trickling filter has been designed and constructed in the environmental hydraulic laboratory, Al-Mustansiriya University, College of Engineering. A set of experiments has been conducted during the period from August 2013 to July 2014. Seven days of continuous operation with different continuous flow rates (0.4m³/hr, 0.5 m³/hr, 0.6 m³/hr, 0.7m³/hr, 0.8 m³/hr, 0.9 m³/hr, and 1m³/hr) after ten days of acclimatization experiments were carried out. Results indicate that the concentrations of toxic matter were decreasing with increasing of operation time, sludge recirculation ratio, and flow rate. The toxic matter measured includes (Mineral oils, Petroleum products, Phenols, Biocides, Polychlorinated biphenyls (PCBs), and Surfactants) which are used in these experiments were ranged between (0.074 nm-0.156 nm). Results indicated that the overall reduction efficiency after 4, 28, 52, 76, 100, 124, and 148 hours of operation were (55%, 48%, 42%, 50%, 59%, 61%, and 64%) when the combination of stepped cascade weir with limestone trickling filter is used.

Keywords : toxic matter, marginal water, trickling filter, stepped cascade weir, removal efficiency

Conference Title : ICCEE 2015 : International Conference on Civil Engineering and Environment

Conference Location : Chicago, United States

Conference Dates : October 08-09, 2015