

Quantification of River Ravi Pollution and Oxidation Pond Treatment to Improve the Drain Water Quality

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Abstract : With increase in industrialization and urbanization, water contaminating rivers through effluents laden with diverse chemicals in developing countries. The study was based on the waste water quality of the four drains (Outfall, Gulshan -e- Ravi, Hudiara, and Babu Sabu) which enter into river Ravi in Lahore, Pakistan. Different pollution parameters were analyzed including pH, DO, BOD, COD, turbidity, EC, TSS, nitrates, phosphates, sulfates and fecal coliform. Approximately all the water parameters of drains were exceeded the permissible level of wastewater standards. In calculation of pollution load, Hudiara drains showed highest pollution load in terms of COD i.e. 429.86 tons/day while in Babu Sabu drain highest pollution load was calculated in terms of BOD i.e. 162.82 tons/day (due to industrial and sewage discharge in it). Lab scale treatment (oxidation ponds) was designed in order to treat the waste water of Babu Sabu drain, through combination of different algae species i.e. chaetomorphasutoria, sirogoniumsticticum and zygnema sp. Two different sizes of ponds (horizontal and vertical), and three different concentration of algal samples (25g/3L, 50g/3L, and 75g/3L) were selected. After 6 days of treatment, 80 to 97% removal efficiency was found in the pollution parameters. It was observed that in the vertical pond, maximum reduction achieved i.e. turbidity 62.12%, EC 79.3%, BOD 86.6%, COD 79.72%, FC 100%, nitrates 89.6%, sulphates 96.9% and phosphates 85.3%. While in the horizontal pond, the maximum reduction in pollutant parameters, turbidity 69.79%, EC 83%, BOD 88.5%, COD 83.01%, FC 100%, nitrates 89.8%, sulphates 97% and phosphates 86.3% was observed. Overall treatment showed that maximum reduction was carried out in 50g algae setup in the horizontal pond due to large surface area, after 6 days of treatment. Results concluded that algae-based treatment are most energy efficient, which can improve drains water quality in cost effective manners.

Keywords : oxidation pond, ravi pollution, river water quality, wastewater treatment

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