



Quantification of the River Ravi pollution load and oxidation pond treatment to improve the drain water quality

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ABSTRACT

The study was based on the wastewater quality of the four drains (Outfall, Gulshan-e-Ravi, Hudiara and Babu Sabu) entering into river Ravi in Lahore, Pakistan. Pollution parameters were analyzed including pH, dissolved oxygen, biological oxygen demand (BOD), chemical oxygen demand (COD), turbidity, electrical conductivity (EC), total suspended solids, nitrates, phosphates, sulfates and fecal coliform. All parameters of drains exceeded the permissible level of wastewater standards. Hudiara drain showed the highest pollution load in terms of COD: 429.86 t/d while in Babu Sabu drain, highest pollution load was calculated in terms of BOD: 162.82 t/d. Lab-scale treatment (oxidation ponds) was designed to treat the wastewater of the Babu Sabu drain, through combination of different algae species, namely *Chaetomorpha sutoria*, *Sirogonium sticticum* and *Zygnema* sp. Two different size ponds (horizontal and vertical), and three different concentration of algal samples (25, 50 and 75 g/3 L) were selected for 6 d retention time. Percentage removal efficiencies of parameters in vertical and horizontal ponds, that is, turbidity: 62.12%, 69.79%; EC: 79.3%, 83%; BOD: 86.6%, 88.5%; COD: 79.72%, 83.01%; FC: 100%, 100%; nitrates: 89.6%, 89.8%; sulfates: 96.9%, 97%; phosphates: 85.3%, 86.3% and TOC: 75.6%, 79% were observed, respectively. Maximum reduction was observed after day 6 in the 50 g/3 L algae setup in horizontal pond due to large surface area. Results concluded that algae-based treatment is the most energy efficient and cost-effective in improving water quality in drains.

Keywords: Oxidation pond; Ravi pollution; Wastewater treatment; Algal treatment

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