

## Improving the quality of petrochemical wastewater via a medium-sized industrial-scale treatment plant

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### ABSTRACT

This paper aims to investigate the performance of a petrochemical wastewater treatment plant with a daily capacity of 450 m<sup>3</sup> of wastewater influent that has an average Chemical Oxygen Demand (COD) concentration of 12021.6 mg/L and pH of 3.02-11.17. The data were registered twice a day at 9:00 am and 9:00 pm and the daily average data was calculated. The wastewater quality data indicated that the COD removal rate during the primary treatment stage was only 50.29%. When the biological treatment was used the COD removal efficiency of the plant increased to 81.78%. The high efficiency of removal was evident in the Upflow Anaerobic Sludge Blanket (UASB) reactors that normally contain high concentrations of solid hydrocarbon; hence the removal of COD is possible even in cases involving highly concentrated influents. Moreover, the average pH of the effluent was 6.8 and the average concentrations of other pollutants such as suspended solids (SS), Oxidation-reduction potential, (ORP), ammonium-nitrogen (NH<sub>4</sub>-N), and orthophosphate were 217.1 mg/L, 146.85 mV, 4.46 mg/L and 2.88 mg/L, respectively. The results indicate that the construction of a UASB reactor could result in higher removal efficiency of petrochemical wastewater pollutants. However, the effluent from the biological treatment needs further treatment before it can be discharged into the ocean.

### KEYWORDS

Biological treatment; COD; Pollutants; UASB reactor; Wastewater

**ACKNOWLEDGMENT**

The authors have obliged the Ministry of Higher Education of Malaysia for providing financial support for this research through the Transdisciplinary Research Grant Scheme (TRGS) number TRGS/1/2018/UMP/02/2/3 (University reference: RDU191802-3).