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Anaerobic treatment of phenolic wastewater: Effect of phosphorous limitation

Athar Hussain*, Pradeep Kumar, Indu Mehrotra

Department of Civil Engineering, Indian Institute of Technology, Roorkee, Roorkee-247 667, India
Tel. +91 1332-284468; Fax +91 1332-273560; email: hussainathar7861@rediffmail.com

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ABSTRACT

Synthetic phenolic wastewater representing an industrial synthetic wastewater was supplemented with varying amount of phosphorous (P) and treated in upflow anaerobic sludge blanket (UASB) reactor. The variation of chemical oxygen demand COD:P from 300:1 to 300:0.1 did not influence the conversion of phenol COD to methane COD. The concentration of P in the influent was reduced from 2.5 to 0.25 mg/L respectively. However, on further reducing the COD:P in the feed from 300:0.1 to 300:0 the (i) CH_4-COD decreased from 90 to 40%, and (ii) cell yield reduced to 25–50%. The average cell yield was 3.5%. Percent P in cells varied from 0.6 to 2.4% respectively. The activity of the sludge assessed as specific methanogenic activity (SMA) was found in the range of 0.15–0.66 g CH_4-COD/g VSS d^{-1}. The optimum COD: P for synthetic phenolic wastewater has been estimated to be 300:0.1.

Keywords: Phenol; Biodegradation; Phosphorous; Reactor; Sludge; Methane

* Corresponding author.