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EXTENDED ABSTRACT

Using of Moving Bed Biofilm Reactor Containing Kaldness Media in Treatment of Produced Water

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Produced Water, Biofilm, Media, COD, Retention Time, Filling Ratio.

1. Introduction

The biological treatment process is considered the most important method in wastewater treatment. The role played by a Biological treatment reactor is to prepare suitable conditions for biological growth of bacteria to remove the contaminants. Various types of reactors (attached growth (biofilm) and suspended growth) are used in biological treatment of wastewater. Moving bed biofilm reactor is the most important of biofilm reactors. Moving bed biofilm reactor (MBBR) was used rare for treatment of wastewater containing petroleum component like as produce water. In this research, MBBR was used for investigation of removal efficiency of crude oil component, those are in produce water.

2. Methodology

2.1. Experimental study

The reactor was built on laboratory scale. Sludge was prepared from urban wastewater treatment plant.The microorganisms were adapted for decomposing petroleum contaminants. For this purpose, Glucose was used as the initial feed and its content was reduced gradually and this decreasing was replaced by petroleum contaminants.

2.2. Sampling for analyses and the controlling parameters

COD and TPH removal efficiencies were dependent variables. Reactor filling ratio, retention times,and intial COD concentration were independent variables.

At the end of the retention time, the aeration pump was turned off and the media and the suspended sludge to be settled at the bottom of the reactor. Following that, about 100 mL of the wastewater was sampled through the sampling valve and it was used for COD and TPH measurement (APHA et al., 2012).

3. Results and discussion

3.1. COD removal efficiencies during adaptation period

As shown in Fig. 1, removal efficiency was declined after of raising in concentration of petroleum products. In every increasing, the efficiency improved with loading repetition and, eventually, a stable stage was reached.

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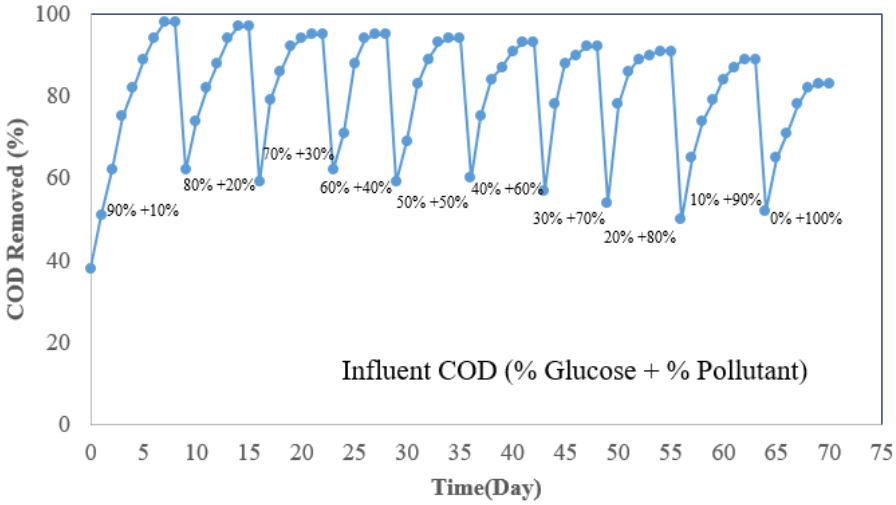

Fig. 1. COD removal efficiencies during adaptation period

3.2. Effects of initial COD, Retention time and media filling ration on the COD removal efficiencies

Effects of initial COD and retention time on the COD removal efficiencies (at media filling ratio of 50%) were shown in Fig. 2. As shown in Fig. 2, removal efficiencies declined with increases in the influent COD and decreases in retention time. As shown in Fig. 3, removal efficiencies improved with increases in media filling ratio.

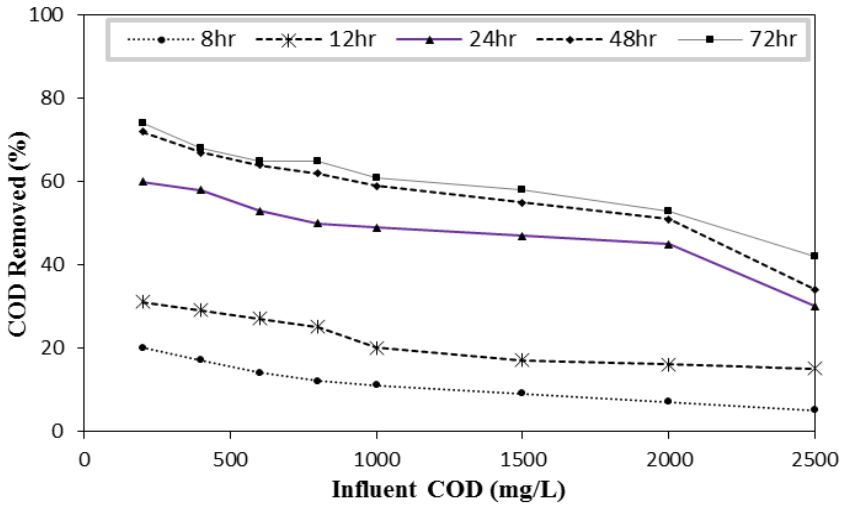

Fig. 2. Effects of initial COD and retention time on the COD removal efficiencies (Media filling ratio= 50%)

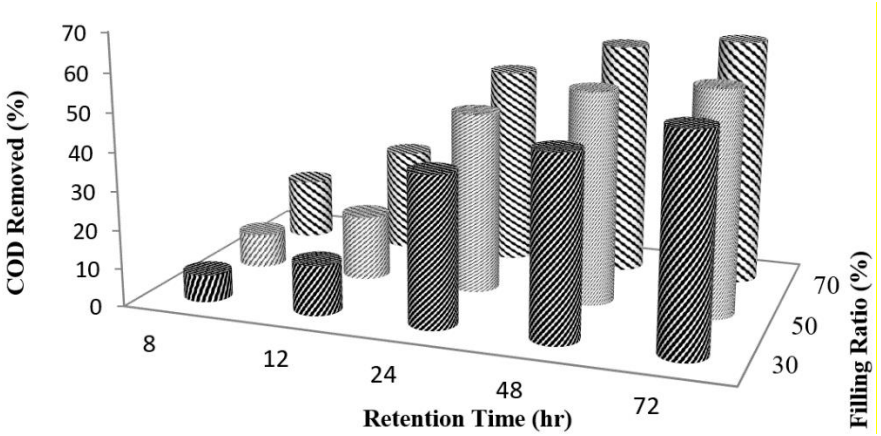

Fig. 3. Effects of media filling ratio and retention time on the COD removal efficiencies (Influent COD= 1500 mg/L)

4. Conclusions

Results of experiments indicated that the adaptation period was 70 days for the reactor. At the end of the adaptation period, COD removal efficiency was 83 percent. Based on the studies and the obtained results, influent COD, retention time and media filling ratio have significant effect on the removal efficiency and the reactor was very capable of removing petroleum contaminants.

5. References

APHA (American Public Health Association), AWWA (American Water Works Association), WEF (Water Environment Federation), 2012, Standard Methods for examination of water and wastewater. 22nd ed. Washington: American Public Health Association, 1496 pp. ISBN-13: 978-087553-013-0.