

INTISARI

Tempat Pembuangan Sampah Terpadu (TPST) Piyungan terletak di Desa Sitimulyo, Kecamatan Piyungan, Kabupaten Bantul, Yogyakarta. TPST Piyungan menghasilkan sampah mencapai 200-300 ton sampah dalam satu hari. Tumpukan sampah yang bercampur menghasilkan limbah cair (lindi) yang sangat berbahaya bagi lingkungan. *Micro-bubble Generator* merupakan suatu solusi pengolahan limbah cair akibat tumpukan sampah yang efektif dan hemat energi.

Pada penelitian ini dilakukan pengujian performa dari MBG pada kolam uji air lindi dengan ukuran 5 m x 5 m x 3 m. Dua buah rangkaian yang terhubung dengan 2 buah pompa sentrifugal dengan daya total 2500 watt digunakan untuk mensirkulasikan air lindi ke-8 buah MBG jenis *porous pipe* dan orifice yang terpasang di dalamnya. Pengujian dilakukan dengan menerapkan 6 jenis variasi antara debit air lindi dengan waktu kerja efektif pompa untuk mendapatkan variasi kombinasi yang paling efektif dalam meningkatkan level DO dan menurunkan level COD air limbah. Selain itu, pengukuran juga dilakukan untuk nilai debit udara yang masuk ke dalam masing-masing MBG dengan memvariasikan nilai debit air lindi yang keluar dari pompa.

Hasil penelitian ini menunjukkan bahwa variasi II mampu menghasilkan peningkatan nilai DO dan penurunan nilai COD paling tinggi dibandingkan variasi-variasi yang lain. Nilai DO naik mencapai 8,24 mg/L, sedangkan nilai COD turun 19 %. Sementara untuk nilai debit udara masuk MBG, dengan mengalirkan debit air lindi 10 m³/jam mampu menghasilkan distribusi nilai debit udara masuk MBG yang lebih merata dan lebih tinggi dibandingkan dengan debit air lindi 8 m³/jam.

Kata kunci: MBG, variasi, debit air lindi (Q_L), debit udara masuk MBG (Q_G), Dissolved Oxygen (DO), Chemical Oxygen Demand (COD)

ABSTRACT

Integrated Waste Disposal Sites (TPST) Piyungan is located in the village Sitimulyo, Piyungan subdistrict, Bantul, Yogyakarta. About 200-300 tons of garbage bins is produced by TPST Piyungan in a day. Leachate (waste water) is generated due to the piles of both organic and non-organic garbage mixed contaminating the clean water sustainability on the area nearby the Landfill. Micro-bubble generator is a solution to tackle leachate or lindi problem in Piyungan Sanitary Landfill performing an efficient and less energy consumed technology.

In this experiment, a test pond with a size of 5 m x 5 m x 3m was used to examine the performance of Micro-bubble Generator. 2 Series of MBG configuration connected to 2 one-phased centrifuge pump with total power 2500 watt were used to circulate the leachate flowing through 8 porous-pipe and orifice type micro-bubble generator. Six variations of waste water flow rate and effective pumping work combinations were implemented on this experiment to get the most effective combination in increasing level of Dissolved Oxygen (DO) and decreasing level of Chemical Oxygen Demand (COD). Furthermore, the measurement of air flow rate sucked into each MBG was also measured on this experiment by adjusting the waste water flow rate flowing out of the centrifuge pump.

The result of this experiment showed that variation II was the most effective variation to increase the level of Dissolved Oxygen (DO) and to decrease the level of Chemical Oxygen Demand (COD) among the others. The level of Dissolved Oxygen (DO) increased around 8,24 mg/L, while the level of Chemical Oxygen Demand (COD) decreased around 19 %. For the air flow rate sucked into each MBG, by flowing waste water flow rate 10 m³/h out of centrifuge pump produced higher and more equal air flow rate distribution than flowing waste water rate 8 m³/h

Keywords: MBG, Variation, Waste Water Flow Rate (Q_L), Air Flow Rate (Q_G), Dissolve Oxygen (DO), Chemical Oxygen Demand (COD)