ABSTRAK

PENGARUH TEKANAN FLUIDA MASUK *VENTURI* TERHADAP FENOMENA *MICROBUBBLE* GENERATOR UNTUK PENGOLAHAN LIMBAH CAIR

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(2025: xiii + 64 Halaman, 31 Gambar, 13 Tabel, 7 Lampiran)

Penelitian ini mengkaji pengaruh variasi tekanan fluida terhadap kinerja microbubble generator dalam meningkatkan kadar oksigen terlarut (DO) pada limbah cair medis. Empat variasi tekanan (1–4 bar) diuji selama 60 menit menggunakan prototipe tangki aerasi. Hasil menunjukkan bahwa tekanan 3 bar menghasilkan peningkatan DO tertinggi (9,4 mg/L) dengan distribusi microbubble yang lebih homogen. Sebaliknya, tekanan 4 bar menunjukkan efisiensi terendah meskipun volume aerasi lebih besar. Visualisasi percobaan mendukung temuan bahwa tekanan fluida optimum mampu menghasilkan sebaran gelembung mikro yang efektif. Dengan demikian, pemilihan tekanan operasi yang tepat dapat meningkatkan efisiensi proses aerasi dalam pengolahan limbah cair medis secara eksperimental dan mendukung penerapannya di fasilitas pelayanan kesehatan.

Kata Kunci : Microbubble Generator, Tekanan Fluida, Dissolved Oxygen, Limbah Cair Medis, Venturi.

ABSTRACT

THE EFFECT OF INLET FLUID PRESSURE IN THE VENTURION MICROBUBBLE GENERATOR PHENOMENA FOR WASTEWATER TREATMENT

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This study investigates the effect of varying fluid pressures on the performance of a microbubble generator in increasing dissolved oxygen (DO) levels in medical wastewater. Four pressure levels (1–4 bar) were tested for 60 minutes using an aeration tank prototype. The results showed that 3 bar pressure yielded the highest DO increase (9.4 mg/L) with more homogeneous microbubble distribution. In contrast, 4 bar pressure demonstrated the lowest efficiency despite a larger aeration volume. Experimental visualization supported the finding that optimal fluid pressure can produce effective microbubble dispersion. Therefore, selecting the appropriate operating pressure can enhance the aeration process in the treatment of medical wastewater and support its implementation in healthcare facilities.

Keywords : Microbubble Generator, Fluid Pressure, Dissolved Oxygen, Medical Wastewater, Venturi.