

ABSTRAK

Masyarakat di Desa Sungai Itik dan sekitarnya menggunakan air sungai sebagai keperluan untuk memenuhi kebutuhan sehari-hari seperti pengairan pertanian, tambak ikan, mencuci, mandi dan lain-lain. Kualitas air sungai mempunyai nilai kadar besi (Fe) 2,64 mg/L, *Total Dissolved Oxygen* (TDS) 347 mg/L, *Dissolved Oxygen* (DO) 4,7 mg/L, suhu 29⁰C dan pH 5,4. Nilai besi (Fe) yang melebihi baku mutu PerMenKes No. 32 Tahun 2017 diperlukan pengolahan menggunakan *multiple tray aerator*. Tujuan penelitian ini adalah mendapatkan jarak dan jumlah *tray* yang efektif dalam pengolahan air baku Sungai Itik, mengetahui nilai koefisien transfer gas (K_{La}) pada proses aerasi, dan mendapatkan waktu aerasi optimum. Penelitian ini menggunakan *multiple tray aerator* yang terdiri dari 5 *tray* dengan percobaan variasi jarak antar *tray* 30 cm, 40 cm, 50 cm, dan 60 cm, serta dilakukan 3 kali pengulangan pada setiap perlakuan tanpa kerikil dan dengan kerikil. Hasil penelitian diperoleh efektivitas penurunan Fe yang terbaik yaitu perlakuan dengan kerikil pada jarak antar *tray* 60 cm dan menggunakan 5 *tray* yang memiliki penurunan Fe 6,64 % dengan nilai rata-rata 1,51 mg/L menjadi 1,41 mg/L, Nilai rata-rata pH 6,19 dan TDS 890 mg/L. Nilai transfer gas oksigen (K_{La}) tertinggi diperoleh pada jarak antar *tray* 60 cm dengan kerikil yaitu rata-rata sebesar 0,2857/menit dengan waktu aerasi optimum adalah 10 menit, sehingga faktor ketinggian variasi jarak antar *tray*, jumlah *tray* dan penggunaan kerikil mempengaruhi peningkatan nilai transfer gas oksigen (K_{La}) dalam menurunkan kadar Fe.

Kata Kunci : Aerasi, Air Sungai, Koefisien Transfer Gas Oksigen (K_{La}), *Multiple Tray Aerator*

ABSTRACT

Most of the people in Sungai Itik Village and its surroundings use river water as a necessity to fulfill their daily needs as irrigation for agriculture, fish ponds, washing, bathing, and others. River water quality has a value of iron (Fe) 2.64 mg/L, Total Dissolved Oxygen (TDS) 347 mg/L, Dissolved Oxygen (DO) 4.7 mg/L, a temperature of 29 °C, and pH 5.4. The value of iron (Fe) exceeds the quality standards of the Minister of Health No. 32 of 2017 and requires processing using multiple tray aerators. the purpose of this research was to obtain the effective distance and number of trays in the treatment of Itik River raw water, to determine the value of the gas transfer coefficient (K_{La}) in the aeration process, and to obtain the optimum aeration time. This research used multiple tray aerators consisting of 5 trays with experimental variations of the spacing between the tray of 30 cm, 40 cm, 50 cm, and 60 cm, and repetitions 3 in each treatment without gravel and with gravel. The results showed that the best effectiveness of Fe reduction was the treatment with gravels at a distance between trays of 60 cm and using 5 trays which had a reduction of Fe of 6.64% with an average value of 1.51 mg/L to 1.41 mg/, average pH 6.19 and TDS 890 mg/L. The highest oxygen gas transfer (K_{La}) value was obtained at a distance of 60 cm between the trays and the gravel, which was an average of 0.2857/minute with an optimum aeration time of 10 minutes, so that the height factor of variation in distance between trays, the number of trays and the use of gravel affect the increase oxygen gas transfer value (K_{La}) in reducing Fe levels.

Keywords : Aeration, River Water, Oxygen Gas Transfer Coefficient (K_{La}), Multiple Tray Aerator