

## ABSTRAK

Nurika Pratama Putri, 2021, Efisiensi Penurunan BOD, COD, TSS Pada Limbah Domestik Menggunakan Metode Kombinasi Kolam Oksidasi Dan Fitoremediasi, Tugas Akhir, Program Studi Teknik Lingkungan, Universitas PGRI Adi Buana Surabaya, Dosen Pembimbing: Dra. Indah Nurhayati, S.T., M.T dan Dian Majid, S.si., M.Eng.

Limbah domestik mengandung limbah organik: karbohidrat, lemak, protein serta limbah pemakaian produk *cleaning service* yang mengandung desinfektan. Sehingga berakibat naiknya kadar *Biochemical Oxygen Demand* (BOD), *Chemical Oxygen Demand* (COD), *Total Suspended Solid* (TSS). Penelitian ini bertujuan untuk: 1) Mengetahui konsentrasi awal BOD, COD, TSS limbah cair domestik di sungai Bringin Bendo Kec. Taman, Kab. Sidoarjo, 2) Mengetahui efisiensi penurunan konsentrasi BOD, COD, TSS setelah pengolahan pada kolam oksidasi, 3) Mengetahui efisiensi penurunan konsentrasi BOD, COD, TSS yang diolah dengan gabungan metode kolam oksidasi dan fitoremediasi tanaman ganggang (*Hydrilla verticillata*), 4) Mengetahui efisiensi penurunan konsentrasi BOD, COD, TSS yang diolah dengan gabungan metode kolam oksidasi dan fitoremediasi dan tanaman kayu apu (*Pistia Stratiotes L.*), 5) Mengetahui metode yang paling efektif dalam penurunan BOD, COD, TSS. Metode kolam oksidasi menggunakan sistem aerasi dengan menempatkan nozzle pada dasar kolam selama 7 hari, lalu dilanjutkan dengan metode fitoremediasi, 1 jenis tanaman ditempatkan pada 1 reaktor, dan dilakukan s/d hari ke-19. Uji dilakukan pada hari ke- 0,7,13,19 untuk mengetahui efisiensi penurunan BOD, COD, TSS. Simpulan dari penelitian ini: 1) Konsentrasi awal sampel limbah cair domestik, BOD 487,3 mg/L, COD 1042 mg/L, TSS 266 mg/L, air limbah belum memenuhi PerMen LHK No. P.68 Tahun 2016. 2) Efisiensi penurunan BOD, COD, TSS setelah proses kolam oksidasi, BOD 54,96%, COD 51,96%, TSS 63,16%, tetapi belum memenuhi baku mutu. 3) Efisiensi penurunan BOD, COD, TSS menggunakan gabungan metode kolam oksidasi dan fitoremediasi tanaman (*Hydrilla V.*), BOD 94,77%, COD 93,89%, TSS 96,24%, sudah memenuhi baku mutu. 4) Efisiensi penurunan BOD, COD, TSS limbah domestik menggunakan gabungan metode kolam oksidasi dan fitoremediasi tanaman (*Pistia Stratiotes L.*), BOD 96,28%, COD 94,33%, TSS 96,27%, sudah memenuhi baku mutu. 5) Pengaruh tanaman (*Hydrilla V.*) dan tanaman (*Pistia Stratiotes L.*) terhadap penurunan kadar BOD, COD, TSS pada limbah domestik memiliki efisiensi yang hampir sama.

**Kata kunci** : *Biochemical Oxygen Demand* (BOD), *Chemical Oxygen Demand* (COD), Fitoremediasi, Kolam oksidasi, *Total Suspended Solid* (TSS)

*Domestic waste sources contain organic wastes such as carbohydrates, fats and proteins as well as waste from using cleaning serving products that contain disinfectants. This results in increased levels of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solid (TSS) and pH levels. This study aims to: 1) Determine the initial concentration of BOD, COD, TSS of domestic domestic liquid waste in the Bringin Bendo river, Kec. Park, District. Sidoarjo, 2) Knowing the efficiency of reducing the concentration of BOD, COD, TSS of domestic wastewater after processing in an oxidation pond, 3) Knowing the efficiency of reducing the concentration of BOD, COD, TSS of domestic waste treated using a combination of oxidation pond methods and phytoremediation of algae (Hydrilla verticillata), 4) Knowing the efficiency of reducing the concentration of BOD, COD, TSS of domestic waste treated using a combination of oxidation pond methods and phytoremediation and apu wood (Pistia Stratiotes L.), 5) Knowing the most effective method in reducing BOD, COD, TSS. The oxidation pond method uses an aeration system by placing a nozzle on the bottom of the pond surface, this process is carried out for 7 days, then followed by the phytoremediation method, where 1 pond is filled with 1 type of plant, and this process is carried out until the 19th day. The test was carried out on days 0,7,13,19 to determine the efficiency of decreasing BOD, COD, TSS. Conclusions from this study: 1) The initial concentration levels of domestic wastewater samples before processing were BOD 487.3 mg/L, COD 1042 mg/L, and TSS 266 mg/L. P.68 of 2016. 2) Efficiency of decreasing the value of BOD, COD, TSS of domestic wastewater with*

oxidation ponds, decreasing BOD 54.96%, COD 51.96% and TSS 63.16%, but not meeting the quality standards. 3) Efficiency of decreasing the value of BOD, COD, TSS using a combination of oxidation pond method and algae plant phytoremediation (*Hydrilla verticillata*), decreasing BOD 94.77%, COD 93.89%, TSS 96.24%, has met the quality standard. 4) Efficiency of decreasing the value of BOD, COD, TSS of domestic waste using a combination of oxidation pond method and phytoremediation of apu wood (*Pistia Stratiotes L.*), decreasing BOD 96.28%, COD 94.33%, TSS 96.27%, has met the standard quality. 5) The effect of algae (*Hydrilla Verticillata*) and apu wood (*Pistia Stratiotes L.*) on decreasing TSS, BOD, COD levels in domestic waste has almost the same efficiency.

*Keywords: Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oxidation ponds, Phytoremediation, , Total Suspended Solid (TSS)*