

**PERANCANGAN PENGOLAHAN DENGAN SISTEM AERASI
SEDIMENTASI FILTRASI (ASF) LIMBAH CAIR RUMAH
PEMOTONGAN AYAM (RPA) “AYAMKU AYAM SEHAT”
SARIHARJO NGAGLIK SLEMAN**

Hendra Syafi¹, Bambang Suwerda², Tri Mulyaningsih³
Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Yogyakarta
Jl. Tatabumi No.3 Banyuraden, Gamping, Sleman
Email : hendrasyafi1012@gmail.com

ABSTRAK

Latar Belakang : Rumah Pemotongan Ayam (RPA) merupakan industri yang menghasilkan limbah cair dengan kandungan bahan organik, lemak, darah, dan padatan tersuspensi (TSS) yang tinggi. Apabila tidak diolah, limbah tersebut dapat mencemari lingkungan dan menurunkan kualitas air. RPA “Ayamku Ayam Sehat” belum memiliki instalasi pengolahan air limbah (IPAL), sehingga limbah cair hanya ditampung dalam bak sederhana yang berpotensi mencemari tanah dan air di sekitarnya. Hasil uji pendahuluan menunjukkan kadar BOD 1.449 mg/L, COD 2.628 mg/L, dan TSS 810 mg/L, melebihi baku mutu sesuai Peraturan Daerah DIY Nomor 7 Tahun 2016. Oleh karena itu, diperlukan perancangan sistem pengolahan limbah cair dengan metode Aerasi, Sedimentasi, dan Filtrasi (ASF) sebagai upaya menurunkan kadar pencemar agar memenuhi baku mutu lingkungan.

Tujuan : Merancang sistem pengolahan limbah cair Rumah Pemotongan Ayam (RPA) “Ayamku Ayam Sehat” dengan metode Aerasi, Sedimentasi dan Filtrasi (ASF)

Metode Penelitian : Jenis penelitian ini bersifat deskriptif kuantitatif dengan pendekatan perencanaan teknis, meliputi analisis beban pencemar, perhitungan dimensi, dan evaluasi teoretis efisiensi penyisihan BOD, COD, serta TSS.

Hasil : Hasil perhitungan menunjukkan debit limbah sebesar 0,6 m³/hari dengan debit rencana 1 m³/hari. Sistem yang dirancang terdiri dari enam unit utama: screen dan grease trap, equalisasi, aerasi, sedimentasi, filtrasi, dan maturasi, menggunakan aliran gravitasi dengan pipa PVC 1½ inci. Unit aerasi menggunakan blower Resun GF-120 (79 L/menit), media filtrasi berupa kerikil, pasir, dan arang aktif, serta bak maturasi dengan tanaman *Pistia stratiotes*. Secara teoretis, sistem ASF mampu menurunkan BOD, COD, dan TSS hingga mendekati baku mutu, dengan estimasi biaya perencanaan sebesar Rp 10.540.656,00.

Kesimpulan : Berdasarkan hasil perhitungan neraca massa, sistem ASF mampu menurunkan kadar BOD, COD dan TSS serta berpotensi diterapkan pada RPA skala kecil dan menengah.

Kata Kunci : Limbah Cair, RPA, IPAL, Aerasi, Sedimentasi, Filtrasi (ASF)

**DESIGN DESIGN OF WASTEWATER TREATMENT SYSTEM USING
AERATION SEDIMENTATION AND FILTRATION (ASF) METHOD FOR
“AYAMKU AYAM SEHAT” POULTRY SLAUGHTERHOUSE
SARIHARJO NGAGLIK SLEMAN**

Hendra Syafi¹, Bambang Suwerda², Tri Mulyaningsih³
Jurusan Kesehatan Lingkungan Poltekkes Kemenkes Yogyakarta
Jl. Tatabumi No.3 Banyuraden, Gamping, Sleman
Email : hendrasyaafi1012@gmail.com

ABSTRACT

Background : Poultry slaughterhouses generate wastewater containing high levels of organic matter, fats, blood, and suspended solids (TSS). If left untreated, this wastewater can pollute the environment and degrade water quality. The “Ayamku Ayam Sehat” Poultry Slaughterhouse does not have a wastewater treatment plant (WWTP), and its wastewater is only stored in a simple holding tank, which poses a risk of contaminating the surrounding soil and water. Preliminary tests showed BOD levels of 1,449 mg/L, COD 2,628 mg/L, and TSS 810 mg/L, all exceeding the quality standards stipulated in the Yogyakarta Special Region Regional Regulation No. 7 of 2016. Therefore, a wastewater treatment system using the Aeration, Sedimentation, and Filtration (ASF) method is required to reduce pollutant concentrations to meet environmental quality standards.

Objective : To design a wastewater treatment system for the “Ayamku Ayam Sehat” poultry slaughterhouse using the Aeration, Sedimentation, and Filtration (ASF) method.

Research Method : This research is a descriptive quantitative study with a technical design approach, including pollutant load analysis, calculation of unit dimensions, and theoretical evaluation of the removal efficiency for BOD, COD, and TSS parameters.

Results : The calculation results show that the wastewater discharge is 0.6 m³/day with a design flow of 1 m³/day. The designed system consists of six main units: screen and grease trap, equalization, aeration, sedimentation, filtration, and maturation, arranged in series with a gravity flow using 1½-inch PVC pipes. The aeration unit uses a Resun GF-120 blower (79 L/min), while the filtration unit employs gravel, sand, and activated carbon media. The maturation unit is planted with *Pistia stratiotes* to support natural biological processes. Theoretically, the ASF system can reduce BOD, COD, and TSS levels close to the quality standards, with an estimated total design cost of IDR 10,540,656.00.

Conclusion : Based on the mass balance calculations, the ASF system is capable of reducing BOD, COD, and TSS levels, and it has the potential to be applied in small- to medium-scale poultry slaughterhouses..

Keywords : Wastewater, Poultry Slaughterhouse, WWTP, Aeration, Sedimentation, Filtration (ASF).