

## RINGKASAN

Lailatul Qadariyah, 240361100001, Magister Pengelolaan Sumber Daya Alam Program Pascasarjana Universitas Trunodjoyo Madura, 22 Juni 2026. Efektivitas Probiotik Pada Instalasi Pengolahan Air Limbah (IPAL) Untuk Penurunan Parameter Pencemaran Lingkungan Rumah Potong Hewan (RPH) Tanah Merah. Komisi Pembimbing, Ketua: Dr. Agr. Eko Setiawan, S.P., M.Si Anggota: Dr. Akhmad Farid, S.Pi., M.T.

Karakterisasi limbah cair non-perlakuan sangat penting dalam merancang sistem pengelolaan limbah yang efektif. Penelitian ini mengeksplorasi profil cemaran air limbah dari Rumah Pemotongan Hewan (RPH) berdasarkan regulasi Permen LH No. 5 Tahun 2014. Selain itu, penelitian ini menganalisis fluktuasi Chemical BOD, COD, TSS, pH, dan Minyak Lemak selama 14 hari dengan variasi perlakuan P0 hingga P5. Pengujian laboratorium di Universitas Trunodjoyo Madura menunjukkan tingkat kontaminasi organik yang sangat tinggi. BOD mencapai 246,66 mg/L, melebihi ambang batas 100 mg/L. COD sebesar 286,93 mg/L juga melebihi ambang batas 200 mg/L. TSS sebesar 166,63 mg/L, Minyak dan lemak sebesar 3,70 mg/L, serta pH sebesar 5,38. Parameter BOD, COD, TSS, dan pH belum memenuhi standar, sedangkan minyak dan lemak masih berada di bawah baku mutu. Tingginya rasio beban organik mengindikasikan risiko deoksigenasi masif pada badan air. Selama pengujian, respons degradasi COD menunjukkan variasi signifikan secara statistik pada fase awal (hari 0 dan 3) dan akhir (hari 14). Namun, tidak ada variasi yang signifikan pada fase menengah (hari 5 dan 7). Perlakuan P2 di hari ketiga menunjukkan hasil terbaik dengan COD terendah 119,57 mg/L. Ini menandakan eliminasi senyawa organik sederhana yang reaktif. Pada fase menengah, stagnasi terjadi karena kesulitan dalam biotransformasi senyawa kompleks menjadi produk antara. Di fase akhir, perlakuan P0 menghasilkan penurunan COD paling optimal menjadi 116,33 mg/L, yang menunjukkan stabilisasi sistem. Perlakuan lain, yaitu P1, P2, P3, dan P5, mengalami akumulasi senyawa organik persisten dengan COD tetap di atas 270 mg/L. perlakuan yang diberikan mampu memperbaiki kualitas limbah cair RPH-R Tanah Merah. Perlakuan P3 merupakan perlakuan yang paling efektif secara keseluruhan karena mampu menghasilkan penurunan BOD terbesar dan paling stabil, sedangkan perlakuan P0 paling efektif menurunkan COD, serta perlakuan P1 paling efektif menurunkan kadar minyak dan lemak. Dengan demikian, kombinasi perlakuan dan waktu kontak berpengaruh terhadap penurunan kandungan pencemar limbah cair sehingga kualitas efluen menjadi lebih baik dan mendekati baku mutu yang dipersyaratkan.

## SUMMARY

Lailatul Qadariyah, 240361100001, Master of Natural Resources Management Postgraduate Program, Trunodjoyo University of Madura, June 22, 2026. The Effectiveness of Probiotics in Wastewater Treatment Plants (WWTP) for Reducing Environmental Pollution Parameters of Tanah Merah Slaughterhouses (RPH). Supervisory Commission, Chairman: Dr. Agr. Eko Setiawan, S.P., M.Si Member: Dr. Akhmad Farid, S.Pi., M.T.

The characterization of untreated liquid waste is essential in designing an effective waste management system. This study explores the profile of wastewater contamination from Slaughterhouses (RPH) based on the regulation of the Minister of Environment No. 5 of 2014. In addition, this study analyzed the fluctuations of Chemical BOD, COD, TSS, pH, and Fatty Oils for 14 days with treatment variations of P0 to P5. Laboratory testing at Trunojoyo University Madura showed a very high level of organic contamination. BOD reached 246.66 mg/L, exceeding the threshold of 100 mg/L. COD of 286.93 mg/L also exceeded the threshold of 200 mg/L. TSS of 166.63 mg/L, Oil and fat of 3.70 mg/L, and pH of 5.38. The parameters of BOD, COD, TSS, and pH have not met the standards, while oils and fats are still below quality standards. The high organic load ratio indicates a risk of massive deoxygenation in water bodies. During testing, the COD degradation response showed statistically significant variation in the initial (days 0 and 3) and late (day 14) phases. However, there was no significant variation in the intermediate phase (days 5 and 7). P2 treatment on day three showed the best results with the lowest COD of 119.57 mg/L. This signifies the elimination of reactive simple organic compounds. In the intermediate phase, stagnation occurs due to difficulties in the biotransformation of complex compounds into intermediate products. In the final phase, P0 treatment resulted in the optimal reduction of COD to 116.33 mg/L, indicating system stabilization. Other treatments, namely P1, P2, P3, and P5, experienced persistent organic compound accumulation with a fixed COD above 270 mg/L. P3 treatment is the most effective treatment overall because it is able to produce the largest and most stable reduction in BOD, while P0 treatment is the most effective in lowering COD, and P1 treatment is most effective in lowering oil and fat levels. Thus, the combination of treatment and contact time has an effect on reducing the pollutant content of liquid waste so that the quality of the effluent becomes better and closer to the required quality standards.