

ABSTRAK

ISOLASI DAN KARAKTERISASI BAKTERI UREOLITIK ASAL KOLAM AERASI PADA PROSES INSTALASI PENGOLAHAN AIR (IPAL) DI PT. JUANG JAYA ABDI ALAM LAMPUNG SELATAN

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Pencemaran lingkungan akibat limbah peternakan sapi di PT. Juang Jaya Abdi Alam, Lampung Selatan menjadi salah satu masalah yang membutuhkan penanganan segera. Limbah cair peternakan sapi mengandung konsentrasi urea tinggi yang dapat menyebabkan pencemaran lingkungan jika tidak diolah dengan baik. Salah satu komponen dalam limbah cair peternakan adalah urea, urea yang terkandung dalam urine sapi merupakan salah satu senyawa organik nitrogen yang dominan dalam limbah peternakan. Kandungan urea yang tinggi dalam limbah dapat menyebabkan terjadinya eutrofikasi dan peningkatan kadar amonia. Penelitian ini bertujuan untuk mengisolasi dan mengidentifikasi bakteri ureolitik dari kolam aerasi pada Instalasi Pengolahan Air Limbah (IPAL) PT. Juang Jaya Abdi Alam, Lampung Selatan yang dilakukan pada bulan Desember 2024-Februari 2025 di Laboratorium Mikrobiologi PT. Juang Jaya Abdi Alam Lampung Selatan. Penelitian ini menggunakan metode deskriptif kualitatif yang meliputi pengambilan sampel air limbah, isolasi bakteri, uji aktivitas enzim urease, serta karakterisasi morfologi, mikroskopis dan fisiologi. Hasil penelitian menunjukkan bahwa didapati 6 isolat bakteri ureolitik dengan kemampuan menghidrolisis urea dengan baik. Keenam isolat berbentuk irregular, circular dengan elevasi flat dan umbonate. Warna koloni putih dan krem dengan tepi undulate, lobate dan entire. Keenam isolat memiliki bentuk sel *bacil*, *coccus* dan *coccobacil* serta keenam isolat memiliki sifat Gram positif; isolat CLR9.3, CLR9.4, dan CLR15.4 memiliki spora; mampu memfermentasikan laktosa kecuali CLR9.3 dan CLR9.4, mampu memfermentasikan sukrosa, mampu memfermentasikan maltosa, mampu memfermentasikan manitol kecuali CLR9.3, mampu memfermentasikan glukosa; menghasilkan enzim katalase, bersifat motil kecuali CLR9.1 dan CLR9.3.

Kata kunci : *IPAL, Bakteri Ureolitik, Enzim Urease*

ABSTRACT

ISOLATION AND CHARACTERIZATION OF UREOLYTIC BACTERIA FROM AERATION PONDS IN THE WASTEWATER TREATMENT PLANT (WWTP) PROCESS AT PT. JUANG JAYA ABDI ALAM SOUTH LAMPUNG

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Environmental pollution due to cattle farm waste at PT. Juang Jaya Abdi Alam, South Lampung is one of the problems that requires immediate handling. Cattle farm liquid waste contains high urea concentrations which can cause environmental pollution if not properly processed. One of the components in livestock liquid waste is urea, urea contained in cow urine is one of the dominant organic nitrogen compounds in livestock waste. High urea content in waste can cause eutrophication and increased ammonia levels. This study aims to isolate and identify ureolytic bacteria from the aeration pond at the *Wastewater Treatment Plant* (WWTP) of PT. Juang Jaya Abdi Alam, South Lampung which was conducted in December 2024-February 2025 at the Microbiology Laboratory of PT. Juang Jaya Abdi Alam, South Lampung. This study uses a qualitative descriptive method which includes wastewater sampling, bacterial isolation, urease enzyme activity testing, and morphological, microscopic and physiological characterization. The results showed that 6 isolates of ureolytic bacteria were found with good urea hydrolysis ability. The six isolates were irregular, circular with flat and umbonate elevation. The colony color was white and cream with undulate, lobate and entire edges. The six isolates had *bacil*, *coccus* and *coccobacil* cell shapes and the six isolates had Gram-positive properties; isolates CLR9.3, CLR9.4, and CLR15.4 had spores; able to ferment lactose except CLR9.3 and CLR9.4, able to ferment sucrose, able to ferment maltose, able to ferment mannitol except CLR9.3, able to ferment glucose; produced catalase enzyme, were motile except CLR9.1 and CLR9.3.

Keywords : *Wastewater Treatment Plant, Ureolytic Bacteria, Urease Enzyme*