

MAFTUH AHNAN NIM 220351100050 Efektivitaas Formulasi Bakteri *Indigenous* Dari Air Limbah Cucian Garam (*Bittern*) Dalam Mendegradasi Plastik *Low-Density Polyethylene* (LDPE). Di bawah bimbingan **Dr. Haryo Triajie, S.Pi., M.Si.**

ABSTRAK

Pencemaran plastik merupakan salah satu masalah lingkungan yang semakin serius, terutama pada ekosistem perairan, karena sifat plastik yang sangat resisten terhadap degradasi alami. Penelitian ini bertujuan untuk menganalisis nilai *Optical Density* (OD), *Total Plate Count* (TPC), pH, serta persentase efektivitas formulasi bakteri *indigenous* dari air limbah cucian garam (*bittern*) dalam mendegradasi plastik *Low-Density Polyethylene* (LDPE) pada media *Nutrient Broth* (NB) + glukosa 0,1%. Penelitian dilaksanakan pada bulan Agustus hingga Oktober 2025 di beberapa laboratorium Universitas Trunodjoyo Madura. Rancangan penelitian menggunakan Rancangan Acak Lengkap (RAL) dengan satu variabel bebas berupa variasi formulasi bakteri *indigenous*, yaitu F1, F2, dan F3, serta kontrol menggunakan *Bacillus megaterium* (BPS 4) dan *Bacillus subtilis* (BPS 3). Sampel plastik uji berwarna hitam berukuran 1 × 1 cm. Metode penelitian yang digunakan bersifat eksperimental, dengan analisis deskriptif kualitatif berdasarkan perubahan OD, TPC, pH, dan persentase penurunan berat kering plastik sebelum dan sesudah proses degradasi pada media NB + glukosa 0,1%. Hasil penelitian menunjukkan bahwa nilai OD formulasi F1, F2, F3, dan F4 masing-masing adalah 1,880; 1,667; 1,342; dan 1,956, yang mengindikasikan pertumbuhan bakteri selama inkubasi. Nilai pH mengalami penurunan menjadi 6,52; 6,35; 6,67; dan 6,75, menandakan terbentuknya metabolit asam. Persentase penurunan berat kering plastik setelah inkubasi 7 hari pada F1, F2, F3, dan F4 berturut-turut mencapai 19,62±11,10%; 17,47±11,95%; 13,65±7,54%; dan 12,09±8,35%, dengan F1 menunjukkan efektivitas degradasi tertinggi. Penelitian ini memberikan kontribusi terhadap pengembangan teknologi biologi dalam upaya pengelolaan limbah plastik secara ramah lingkungan.

Kata Kunci: *Indigenous*, Degradasi plastik, Formulasi, *Bittern*

MAFTUH AHNAN NIM 22035100050 Effectiveness of Indigenous Bacterial Formulations from Salt-Washing Wastewater (Bittern) in Degrading Low-Density Polyethylene (LDPE) Plastic. Under the guidance of **Dr. Haryo Triajie, S.Pi., M.Si.**

ABSTRACT

Plastic pollution is an increasingly serious environmental problem, especially in aquatic ecosystems, due to the highly resistant nature of plastic toward natural degradation processes. This study aims to analyze the values of Optical Density (OD), Total Plate Count (TPC), pH, and the percentage effectiveness of indigenous bacterial formulations derived from salt-washing wastewater (bittern) in degrading Low-Density Polyethylene (LDPE) plastic in Nutrient Broth (NB) medium supplemented with 0.1% glucose. The research was conducted from August to October 2025 in several laboratories at the University of Trunodjoyo Madura. The experimental design applied a Completely Randomized Design (CRD) with one independent variable, namely variations of indigenous bacterial formulations: F1, F2, and F3, while the control treatments used *Bacillus megaterium* (BPS 4) and *Bacillus subtilis* (BPS 3). The test plastic samples were black LDPE pieces measuring 1 × 1 cm. This study employed an experimental method with qualitative descriptive analysis based on changes in OD, TPC, pH, and the percentage reduction in plastic dry weight before and after degradation in NB + 0.1% glucose medium. The results showed OD values for formulations F1, F2, F3, and F4 of 1.880; 1.667; 1.342; and 1.956, indicating active bacterial growth during incubation. The pH decreased to 6.52; 6.35; 6.67; and 6.75, suggesting the formation of acidic metabolites. The reduction in plastic dry weight after 7 days of incubation reached 19.62±11.10%; 17.47±11.95%; 13.65±7.54%; and 12.09±8.35%, with F1 showing the highest degradation effectiveness. This study contributes to the development of biologically based technologies as an environmentally friendly approach to plastic waste management.

Keywords: Indigenous, Degradation Plastic, Formulation, Bittern