

ABSTRAK

Cindy Suci Muliandhira, NIM 4213220045 (2025). Aktivitas Degradasi Bakteri Potensial Yang Diisolasi Dari Sedimen Mangrove Sebagai Agen Biodegradasi Mikroplastik.

Keberadaan mikroplastik menjadi ancaman bagi setiap ekosistem, seperti kawasan mangrove. Penelitian ini bertujuan untuk mengetahui kelimpahan mikroplastik yang terdapat di sedimen mangrove serta mengisolasi bakteri potensial dari sedimen mangrove yang mampu mendegradasi mikroplastik. Penelitian didesain dengan penelitian eksperimental dan dilaksanakan pada bulan April – September 2025 di Laboratorium Biologi Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Medan. Sampel sedimen diisolasi dengan metode *Wet Peroxide Oxidation* untuk pemisahan partikel plastik dengan parameter yang diamati berupa bentuk dan kelimpahan mikroplastik. Bakteri potensial diuji aktivitas degradasi selama 40 hari dengan menggunakan media MSM Broth terhadap lima jenis polimer plastik (yaitu *low density polyethylene* (LDPE), *high density polyethylene* (HDPE), *polypropylene* (PP), *polyethylene terephthalate* (PET), dan *polystyrene* (PS)) dengan parameter yaitu berat partikel plastik dan morfologi permukaan plastik. Didapatkan kelimpahan mikroplastik di zona laut didominasi oleh mikroplastik berbentuk fiber sebanyak 6,2 MP/gram sedangkan zona tengah dan darat didominasi oleh mikroplastik berbentuk fragmen sebanyak 4,2 MP/gram dan 4.4 MP/gram. Didapatkan sebanyak 3 isolat yang diduga dari *Enterobacter* dengan tingkat degradasi terbesar pada plastik jenis LDPE sebesar 12%, *Brevibacillus* pada plastik jenis PP sebesar 17,85%, dan *Klebsiella* pada jenis plastik PP sebesar 2,94% serta terdapat retakan di permukaan plastik uji dari ketiga isolat. Hasil penelitian menunjukkan bahwa ketiga isolat bakteri (*Enterobacter*, *Brevibacillus*, dan *Klebsiella*) berpotensi sebagai agen pendegradasi mikroplastik.

Kata kunci: mikroplastik, kelimpahan mikroplastik, sedimen mangrove, bakteri

ABSTRACT

Cindy Suci Muliandhira, NIM 4213220045 (2025). Degradation Activity of Potential Bacteria Isolated from Mangrove Sediments as Microplastic Biodegradation Agents.

The presence of microplastics is a threat to every ecosystem, such as mangrove areas. This study aims to determine the abundance of microplastics found in mangrove sediments and isolate potential bacteria from mangrove sediments that are capable of degrading microplastics. The study was designed with experimental research and was conducted in April - September 2025 at the Biology Laboratory of the Faculty of Mathematics and Natural Sciences, Medan State University. Sediment samples were isolated using the Wet Peroxide Oxidation method to separate plastic particles with observed parameters in the form of microplastics and abundance. Potential bacteria were tested for degradation activity for 40 days using MSM Broth media against five types of plastic polymers (low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP), polyethylene terephthalate (PET), and polystyrene (PS)) with parameters namely the weight of plastic particles and plastic surface morphology. It was found that the abundance of microplastics in the marine zone was dominated by fiber-shaped microplastics of 6.2 MP/gram while the middle and land zones were dominated by fragment-shaped microplastics of 4.2 MP/gram and 4.4 MP/gram. Three isolates suspected of being *Enterobacter* were found with the highest degradation rate on LDPE plastic at 12%, *Brevibacillus* on PP plastic at 17.85%, and *Klebsiella* on PP plastic at 2.94%, and there were cracks on the surface of the test plastic from the three isolates. The results of the study indicate that the three bacterial isolates (*Enterobacter*, *Brevibacillus*, and *Klebsiella*) have the potential to be microplastic degrading agents.

Keywords: microplastics, microplastics abundant, mangrove sediment, bacteria