

**UJI BIODEGRADASI DAN KARAKTERISASI ISOLAT
BAKTERI DARI TANAH GUNUNG JAYAWIJAYA,
PAPUA TERHADAP PLASTIK SINTETIK POLIETILEN
TEREFTALAT DAN POLISTIREN**



**FAKULTAS FARMASI
UNIVERSITAS ANDALAS
PADANG
2019**

UJI BIODEGRADASI DAN KARAKTERISASI ISOLAT BAKTERI DARI TANAH GUNUNG JAYAWIJAYA, PAPUA TERHADAP PLASTIK SINTETIK POLIETILEN TEREFTALAT DAN POLISTIREN

ABSTRAK

Sekitar 140 juta ton polimer sintetik diproduksi di seluruh dunia setiap tahun. Dalam bidang farmasi, plastik sintesis digunakan sebagai bahan pembuatan botol infus, botol-botol obat sirup dan kemasan obat tetes mata. Plastik sintesis berjenis polietilen tereftalat dan polistiren sangat lambat didegradasi, sehingga menjadi masalah utama pencemaran lingkungan. Penelitian ini bertujuan untuk mengetahui jenis dan kemampuan isolat bakteri dari tanah gunung Jayawijaya, Papua dalam mendegradasi plastik sintetik polietilen tereftalat dan polistiren. Metode penelitian yang digunakan meliputi karakterisasi isolat bakteri secara makroskopis, mikroskopis dan uji biokimia, kemudian dilakukan uji biodegradasi plastik sintesis polietilen tereftalat dan polistiren (*Shake Flask Experiment*) selama masa inkubasi 1 minggu, 2 minggu, 3 minggu dan 4 minggu menggunakan alat shaker inkubator. Hasil dari penelitian ini adalah 9 isolat bakteri yang dikarakterisasi merupakan genus *Bacillus sp.* dan dapat dikelompokkan menjadi 7 spesies bakteri yang berbeda. Lebih lanjut, 6 dari 7 spesies bakteri memiliki kemampuan mendegradasi plastik sintetik polietilen tereftalat dan polistiren, sedangkan 1 spesies yaitu bakteri ITP 6.2 tidak memiliki kemampuan tersebut. Pada masa inkubasi 4 minggu, persentase penurunan berat pada plastik polietilen tereftalat ditunjukkan oleh masing-masing bakteri yaitu ITP 3.4 sebesar 3,41%, ITP 10.4 sebesar 2,7%, ITP 3.1 sebesar 1,8%, ITP 6.3 sebesar 1,75%, ITP 3.2 sebesar 1,04%, dan ITP 10.5 sebesar 0,9%. Sedangkan persentase penurunan berat pada plastik polistiren ditunjukkan oleh masing-masing bakteri yaitu ITP 10.4 sebesar 11,11%, ITP 3.1 sebesar 11,11%, ITP 3.2 sebesar 10%, ITP 6.3 sebesar 10%, ITP 3.4 sebesar 7,4%, dan ITP 10.5 sebesar 3,7%.

Kata Kunci: Bakteri, biodegradasi, polietilen tereftalat, polistiren.

BIODEGRADATION TEST AND CHARACTERIZATION OF ISOLATE BACTERIA FROM JAYAWIJAYA MOUNTAIN SOIL, PAPUA FOR POLYETHYLENE TEREPHTHALATE AND POLYSTYRENE SYNTHETIC PLASTIC

ABSTRACT

About 140 million tons of synthetic polymers are produced around the world annually. In Pharmacy field, they are used as material for making infusion bottles, syrup bottles, and eye drops. Polyethylene terephthalate and polystyrene synthetic plastics have slowly degraded nature, making them as the main issues in environmental pollution. This research is aimed to find out capability and types of isolate bacteria from Jayawijaya Mountain soil, Papua which has the potential to degrade polyethylene terephthalate and polystyrene synthetic plastic. Method used in this research involved the characterization of isolate bacteria macroscopically, microscopically, biochemical test, and biodegradation test of polyethylene terephthalate and polystyrene (*Shake Flask Experiment*) for 1 week, 2 weeks, 3 weeks, and 4 weeks incubation period using incubator shaker tool. The research showed that 9 isolate bacteria characterized was *Bacillus sp.* genus and differed from 7 different species. Furthermore, 6 of 7 species bacteria had the capability to degrade polyethylene terephthalate and polystyrene synthetic plastic, meanwhile one species which was ITP 6.2 bacteria has no such capability. In 4 weeks incubation period, weight's decrease in percentage of polyethylene terephthalate plastic shown by each bacteria were 3.41%, 2.7%, 1.8%, 1.75%, 1.04%, and 0.9% for ITP 3.4, ITP 10.4, ITP 3.1, ITP 6.3, ITP 3.2 and ITP 10.5 respectively. While, weight's decrease in percentage of polystyrene plastic shown by each bacteria were 11.11%, 11.11%, 10%, 10%, 7.4%, and 3.7% for ITP 10.4, ITP 3.1, ITP 3.2, ITP 6.3, ITP 3.4, and ITP 10.5 respectively.

Keywords: Bacteria, biodegradation, polyethylene terephthalate, polystyrene