

Tri Bayu Aji, 2016, Pengaruh Variasi Konsentrasi Dan Waktu Inkubasi Konsorsium Bakteri PD-1 dan PD-6 Terhadap Biodegradasi Polietilen, Skripsi ini dibawah bimbingan Dr. Ni'matuzahroh dan Drs. Salamun, M.Kes., Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi konsentrasi dan waktu inkubasi konsorsium bakteri *Staphylococcus* (PD-1) dan *Alcaligenes* (PD-6) terhadap biodegradasi polietilen (PE) yang ditandai dengan pertumbuhan sel dalam substrat PE dengan perhitungan *Total Plate Count* (TPC), perubahan pH pada kultur dengan substrat PE, dan persentase biodegradasi PE. Penelitian bersifat eksperimental menggunakan rancangan faktorial 4 x 4, yang terdiri dari faktor pertama yaitu konsentrasi konsorsium bakteri pendegradasi polietilen PD-1 dan PD-6 dengan 4 taraf konsentrasi (0%, 1%, 2%, dan 3%) dan faktor kedua berupa waktu inkubasi dengan 4 taraf waktu (1, 3, 5, 7 hari) menggunakan 3 kali pengulangan. PE yang digunakan dalam penelitian ini berbentuk lembaran dengan berat 0,05 gram disetiap botol kultur. PD-1 dan PD-6 diinokulasikan ke dalam media uji kuantitatif sesuai dengan konsentrasinya lalu diinkubasikan dengan masing-masing waktu inkubasi. Setelah diinkubasikan, dilakukan perhitungan jumlah bakteri dengan metode TPC, pengukuran pH akhir kultur dan perhitungan persentase degradasi. Hasil uji analisis statistik menunjukkan bahwa (1) variasi konsentrasi konsorsium bakteri PD-1 dan PD-6 memiliki pengaruh terhadap nilai TPC, pH pada kultur substrat PE, dan biodegradasi PE dengan persentase biodegradasi PE terbaik pada konsentrasi 2% (2) variasi waktu inkubasi konsorsium bakteri PD-1 dan PD-6 hanya mempengaruhi pH kultur substrat PE, biodegradasi PE dengan persentase biodegradasi PE terbaik pada waktu inkubasi hari ke-7 dan (3) kombinasi variasi konsentrasi dan waktu inkubasi konsorsium PD-1 dan PD-6 memiliki pengaruh terhadap nilai TPC, pH pada kultur substrat PE, dan biodegradasi PE dengan persentase 8,78% pada konsentrasi konsorsium 2% dengan waktu inkubasi 7 hari.

Kata kunci : *Staphylococcus* (PD-1), *Alcaligenes* (PD-6), konsorsium, polietilen, biodegradasi, TPC, pH, persentase degradasi PE

Tri Bayu Aji, 2016, Effect of Concentration Variation and Time of Incubation Consortium Bacteria PD-1 and PD-6 Against Biodegradation Polyethylene, this study was under the guidance of Dr. Ni'matuzahroh and Drs. Salamun, M.Kes., Department of Biology, Faculty of Science and Technology, Airlangga University, Surabaya

ABSTRACT

The research aims to determine the effect of variations in the concentration and time of incubation consortium of *Staphylococcus* (PD-1) and *Alcaligenes* (PD-6) on the biodegradation of polyethylene (PE) which is characterized by the growth of cells in the substrate PE with the calculation of Total Plate Count (TPC), a change the acidity of the culture with a PE substrate, and the percentage biodegradation of PE. The research is an experimental 4 x 4 factorial design, which consists of two factor. The first one is concentration of bacterial degrading PE consortium PD-1 and PD-6 with four levels of concentration (0%, 1%, 2% and 3%) and the second factor is incubation time with 4 levels of time (1st, 3rd, 5th, 7th day) using 3 repetitions. PE used in this study is a layer with a weight is 0,05 grams each culture bottle. PD-1 and PD-6 was inoculated into quantitative test medium according to the concentration and then incubated with each of the incubation time. After incubation, the calculation amount of bacteria by TPC method, the final pH measurement and calculation of the percentage of degradation of culture. The result of statistical analysis showed that (1) variations in the concentration of bacteria consortium PD-1 and PD-6 has an influence on the value of TPC, the pH of the culture substrate PE, and biodegradation PE with the best percentage of biodegradation PE at a concentration of 2% (2) variations in incubation time bacterial consortium PD-1 and PD-6 has influence on the pH of the culture substrate PE, biodegradation PE with the best percentage of biodegradation of PE at 7th time of incubation and (3) combination of variations in the concentration and time of incubation consortium of PD-1 and PD-6 has an influence the value of TPC, the pH of the culture substrate PE and PE biodegradation with percentage 8.78% at 2% concentration of consortium and seven day time of incubation.

Keywords : *Staphylococcus* (PD-1), *Alcaligenes* (PD-6), consortium, polyethylene, biodegradation, TPC, pH, percentage degradation of PE