

Tri Rahayu.2015.Pengaruh Variasi Jenis Bakteri, Lama Waktu Inkubasi, dan Pemberian *Bulking Agent* terhadap Biodegradasi Limbah Minyak Goreng (Jelantah) di Tanah. Skripsi ini dibimbing oleh Dr. Ni'matuzahroh dan Tri Nurhariyati, S.Si., M.Kes. Departemen Biologi, Fakultas Sains dan Teknologi Universitas Airlangga, Surabaya.

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## ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi jenis bakteri, lama waktu inkubasi, dan pemberian *bulking agent* terhadap proses biodegradasi limbah minyak goreng (jelantah) di tanah. Penelitian menggunakan rancangan faktorial 5x4x2 dengan tiga kali ulangan. Perlakuan terdiri dari tiga faktor, yaitu variasi jenis bakteri terdiri dari 5 variasi, K (tanpa penambahan bakteri), A (*Micrococcus* sp.), B (*Micrococcus* sp. dan *Acinetobacter* sp.), C (*Acinetobacter* sp., *Bacillus subtilis* dan *Pseudomonas putida*), dan D (*Micrococcus* sp., *Acinetobacter* sp., *Bacillus subtilis* dan *Pseudomonas putida*). Lama waktu inkubasi terdiri dari 4 variasi (minggu ke-1,2,4,6), dan pemberian *bulking agent* terdiri dari 2 variasi ( dengan pemberian (-) dan tanpa pemberian (+)). Proses biodegradasi diketahui dari jumlah total bakteri dan persentase degradasi (berat minyak residu). Data jumlah total bakteri (CFU/g-tanah) dan persentase degradasi jelantah (%) dianalisis menggunakan Anova 2 Arah dan dilanjutkan dengan uji Duncan. Hasil menunjukkan, ada pengaruh variasi jenis bakteri terhadap persentase degradasi jelantah (%), dan ada pengaruh pemberian *bulking agent*, lama waktu inkubasi, serta interaksi ketiganya terhadap jumlah total bakteri (CFU/g-tanah) dan persentase degradasi jelantah (%). Hasil tertinggi perlakuan variasi jenis bakteri adalah perlakuan B (44,49%), pemberian *bulking agent* (55,32%), dan waktu inkubasi 6 minggu. Perlakuan dengan jumlah total bakteri tertinggi adalah D+M2 (penambahan *Micrococcus* sp., *Acinetobacter* sp., *Bacillus subtilis* dan *Pseudomonas putida* dengan pemberian *bulking agent* dan waktu inkubasi 2 minggu) yaitu sebesar 23,31 CFU/g-tanah. Perlakuan dengan rata-rata persentase degradasi jelantah tertinggi adalah B+M6 (penambahan *Micrococcus* sp. dan *Acinetobacter* sp. dengan pemberian *bulking agent* dan diinkubasi selama 6 minggu) yaitu sebesar 66,02%.

**Kata kunci** : biodegradasi, variasi jenis bakteri, lama waktu inkubasi, *bulking agent*, jumlah total bakteri, persentase degradasi, jelantah

Tri Rahayu.2015.The Effect of Variation Bacteria, Incubation Period, and Addition of Bulking Agent at Biodegradation of Waste Cooking Oil in Soil.This thesis is underguidance by Dr. Ni'matuzahroh and Tri Nurhariyati, S. Si., M. Kes. Departement of Biology, Faculty of Science and Technology, Airlangga University, Surabaya.

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### **ABSTRACT**

*This study aimed to determine the effect of variations bacteria, incubation period, and addition of bulking agent at biodegradation of waste cooking oil in soil. Research using 5x4x2 factorial design with three replications. The treatment consists of three factors, namely the variations of bacteria consists of 5 variations, there are: K (unaddition of bacteria), A (Micrococcus sp.), B (Micrococcus sp. dnd Acinetobacter sp.), C (Acinetobacter sp., Bacillus subtilis and Pseudomonas putida ), and D (Micrococcus sp., Acinetobacter sp., Bacillus subtilis and Pseudomonas putida). Incubation period consists of 1,2,4,6 week, and the addition of bulking agent consist of unaddition(-) and addition (+). Total number of bacteria and the percentage degradation were observed. The number of total bacteria (CFU / g-soil) and waste cooking oil degradation percentage (%) were analyzed using Two Way Anova and followed by Duncan test. Results showed effect of variation bacteria on the percentage of waste cooking oil degradation (%), and effect of addition bulking agent, incubation time, and their interaction on the total number of bacteria (CFU / g-soil ) and the percentage of waste cooking oil degradation (%). The highest yield of variety of bacteria was treatment B (44.49%), addition bulking agent (55.32%), and the incubation time in 6 weeks. The best treatment to the average of log total bacterial counts (CFU/g-soil) was treatment D+M2 (addition of Micrococcus sp., Acinetobacter sp., Bacillus subtilis and Pseudomonas putida with bulking agent and incubated for 2 week) that was 23.31 CFU/g-soil. The highest percentage of degradation waste cooking oil was treatment B+M6 (addition of Micrococcus sp. and Acinetobacter sp. with bulking agent and incubated for 6 weeks) that was 66,02%.*

**Key word :** *biodegradation, variations of bacteria, incubation period, bulking agent, the number of total bacteria, percentage of degradation, waste cooking oil*