

Durroh Humairoh, 2015, Pengaruh Jenis Limbah Organik, Konsorsium Bakteri, dan Waktu Inkubasi dalam Bioremediasi Limbah Lumpur Minyak Dengan Metode *Composting*, TESIS ini dibawah bimbingan Dr. Ni'matuzahroh dan Prof. Dr. Ir. Tini Surtiningsih, DEA., Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh penambahan jenis limbah organik, konsorsium bakteri, waktu inkubasi, interaksi antara jenis limbah organik, konsorsium bakteri, dan waktu inkubasi terhadap jumlah total bakteri, kadar residu *oil sludge*, persentase degradasi pada perlakuan terbaik di minggu ke-6, kadar rasio C/N di minggu ke-6, dan analisis komponen hidrokarbon yang dapat terdegradasi pada perlakuan terbaik di minggu ke-6. Penelitian ini bersifat eksperimental laboratoris yang menggunakan rancangan acak lengkap dengan menambahkan limbah serbuk gergaji, kotoran sapi, dan konsorsium bakteri dengan waktu inkubasi untuk pengamatan TPC (*Total Plate Count*) dengan 2 kali ulangan. Kadar residu *oil sludge* dan persentase degradasi dideteksi dengan gravimetri, sedangkan analisis komponen hidrokarbon yang terdegradasi menggunakan GC-MS. Analisis kadar rasio C/N dilakukan pada minggu ke-6 di akhir masa inkubasi. Data TPC (*Total Plate Count*) yang diperoleh dianalisis menggunakan *Kruskall-Wallis* dan uji lanjutan *Mann-Whitney* ($p=0,05$). Sedangkan data kadar residu dan persentase degradasi dianalisis menggunakan *Brown-Forsythe* dan dilanjutkan dengan uji *Games-howell* ($p=0,05$). Hasil penelitian menunjukkan bahwa penambahan serbuk gergaji, kotoran sapi dan konsorsium bakteri berpengaruh terhadap hasil TPC, kadar residu *oil sludge*, persentase degradasi, kadar rasio C/N, serta senyawa hidrokarbon yang terkandung dalam tanah yang tercemar *oil sludge*. Kadar rasio C/N pada minggu terakhir berkisar antara 12-101. Perlakuan GSB (penambahan serbuk gergaji, kotoran sapi, dan konsorsium bakteri) pada minggu keenam menunjukkan hasil terbaik dengan persentase degradasi mencapai 70,1%. Komponen hidrokarbon yang mampu terdegradasi adalah senyawa alifatik dan poliaromatik *2,6-dimethyl-Naphthalene*, *2,3-dimethyl-Naphthalene*, *2,3,6-trimethyl-Naphthalene*, *1,6,7-trimethyl-Naphthalene*, *4,6,8-trimethyl-Azulene*, *2,3,6-trimethyl-Naphthalene*, *3-Bromo-5-Chloro-2-Pyridinol*, *2,4,6-trichloro-Benzoic acid*.

Kata kunci: Serbuk gergaji, kotoran sapi, konsorsium bakteri, waktu inkubasi, limbah lumpur minyak, *composting*

Durroh Humairoh, 2015, Effect of Organic Waste type, Bacteria Consortium, and the incubation time in the Bioremediation of Oil Sludge with Composting Methods, This Thesis was under the guidance of Dr. Ni'matuzahroh and Prof. Dr. Ir. Tini Surtiningsih, DEA., Department of Biology, Faculty of Science and Technology, University of Airlangga, Surabaya.

ABSTRACT

This research aimed to evaluate the effect of the addition of the type of organic waste, bacteria consortium, the incubation time, the interaction between the types of organic waste, bacteria consortium, and the incubation time of the total number of bacteria, residue levels of oil sludge, the percentage of the degradation of the best treatment in the sixth week, levels of ratio C/N in the sixth week, and the analysis of the hydrocarbon component degraded on the best treatment in the sixth week. This research is an experimental laboratory that use completely randomized design by adding waste of sawdust, cow dung, and bacteria consortium of with the incubation time for observation of TPC (Total Plate Count) with 2 replicate. Residue levels of oil sludge and the percentage of degradation were detected with gravimetri, while degrading the component of hydrocarbon analysis using GC-MS. Analysis of the levels of C/N ratio performed in the sixth week in the end of the incubation. Log TPC (Total Plate Count) were analyzed using kruskall-wallis and further test mann-whitney ($p = 0,05$). While data levels of residues and the percentage of degradation were analyzed using Brown-forsythe and continue with Games-howell test ($p=0,05$). The results showed that the addition of sawdust, cow dung and a consortium of bacteria impact on the TPC, residue levels of oil sludge, the percentage of degradation, levels of the ratio of C/N, as well as hydrocarbon compounds contained in the land contaminated of the oil sludge. Levels of the ratio of C/N at the last week ranged from 12-101. GSB treatment (the addition of sawdust, cow dung, and a consortium of bacteria in sixth week) showed the best results with the percentage of degradation reached 70,1 %. The component of a hydrocarbon capable of being degraded is an aliphatic and poliaromatik compound such us *2,6-dimethyl-Naphthalene*, *2,3-dimethyl-Naphthalene*, *2,3,6-trimethyl-Naphthalene*, *1,6,7-trimethyl-Naphthalene*, *4,6,8-trimethyl-Azulene*, *2,3,6-trimethyl-Naphthalene*, *3-Bromo-5-Chloro-2-Pyridinol*, *2,4,6-trichloro-Benzoic acid*

Keywords: sawdust, cow dung, bacterial consortium, the time of incubation, waste oil sludge, composting