

RINGKASAN

Salah satu upaya pemulihan lingkungan tercemar yang ramah lingkungan adalah dengan metode bioremediasi. Bioremediasi dapat diartikan proses degradasi, menghilangkan, melumpuhkan dan mengurangi bahan polutan dari lingkungan dengan menggunakan peran dari agen biologis seperti bakteri, tumbuhan, alga dan fungi. Salah satu bahan pencemar lingkungan adalah limbah oli yang dapat mengganggu kehidupan mikroorganisme dan kesuburan tanah. Dari 20 isolat bakteri yang diisolasi dari Pelabuhan Kuala Tungkal Ilir dan Pelabuhan Roro Kuala Tungkal diambil 1 isolat bakteri yang paling berpotensi untuk mendegradasi senyawa hidrokarbon yang diuji dengan uji zona bening. Isolat tersebut akan digunakan sebagai agen bioremediasi tanah tercemar limbah oli. Tujuan penelitian ini adalah untuk menguji kemampuan isolat bakteri potensial pendegradasi minyak untuk menurunkan nilai *Total Petroleum Hydrocarbon* (TPH) tanah tercemar limbah oli dan untuk mengetahui isolat bakteri potensial pendegradasi minyak mampu menurunkan berapa persen konsentrasi nilai *Total Petroleum Hydrocarbon* (TPH) tanah tercemar limbah oli. Penelitian ini termasuk penelitian eksperimental laboratorium yang dilakukan di Laboratorium Agroindustri, Tanaman Obat dan Bioteknologi Fakultas Sains dan Teknologi Universitas Jambi. Metode penelitian ini menggunakan Rancangan Acak Lengkap dengan tahapan penelitian dimulai dari persiapan alat, bahan dan sterilisasi kemudian dilanjutkan pembuatan media, uji pendahuluan, pembuatan suspensi bakteri, pembuatan tanah tercemar dengan konsentrasi limbah oli 4%, 8% dan 12%, uji kemampuan degradasi hidrokarbon, pengukuran *Total Petroleum Hydrocarbon* dan pengukuran parameter sekunder yaitu suhu dan pH. Berdasarkan hasil penelitian diperoleh hasil bahwa bakteri dengan zona bening paling luas adalah RT-4 dengan luas zona bening 11,5 mm dengan kategori kuat. Isolat bakteri RT-4 dapat menurunkan nilai TPH pada setiap perlakuan. Perlakuan K1 dapat menurunkan TPH awal yaitu sebesar 2,48 g/kg dan mengalami penurunan nilai TPH menjadi 0,96 g/kg. Pada perlakuan K2 pengukuran TPH awal diperoleh nilai TPH sebesar 2,91 g/kg dan pengukuran TPH akhir diperoleh nilai TPH sebesar 2,07 g/kg. Perlakuan K3 dengan pengukuran TPH awal 3,59 g/kg dan TPH akhir 3,19 g/kg. Analisis data dilakukan dengan menggunakan ANOVA menggunakan Microsoft Excel dan uji lanjut *Duncan Multiple Range Test* (DMRT). Berdasarkan uji lanjut diperoleh hasil bahwa bakteri 12% paling efektif mendegradasi tanah tercemar limbah oli dengan konsentrasi 4% (8 ml). Dari penelitian ini diharapkan bakteri isolat RT 4 ini dapat digunakan dalam upaya bioremediasi tanah tercemar limbah oli.

Kata kunci : bioremediasi, limbah oli, *Total Petroleum Hydrocarbon* (TPH).

SUMMARY

One of the efforts to restore a polluted environment that is environmentally friendly is the bioremediation method. Bioremediation can be defined as the process of degrading, removing, immobilizing and reducing pollutants from the environment using the role of biological agents such as bacteria, plants, algae and fungi. One of the environmental pollutants is waste oil which can disrupt the life of microorganisms and soil fertility. Of the 20 bacterial isolates isolated from Kuala Tungkal Ilir Harbor and Kuala Tungkal Roro Harbor, 1 bacterial isolate was taken that has the most potential to degrade hydrocarbon compounds tested by the clear zone test. The isolate will be used as a bioremediation agent for soil polluted with waste oil. The purpose of this study was to test the ability of potential oil degrading bacterial isolates to reduce the *Total Petroleum Hydrocarbon* (TPH) value of soil polluted with waste oil and to determine the potential oil degrading bacterial isolates are able to reduce how many percent concentration of *Total Petroleum Hydrocarbon* (TPH) value of soil polluted with waste oil. This research includes laboratory experimental research conducted at the Agroindustry, Medicinal Plants and Biotechnology Laboratory, Faculty of Science and Technology, Jambi University. This research method uses a Completely Randomized Design with the research stages starting from the preparation of tools, materials and sterilization then continued with the preparation of media, preliminary tests, making bacterial suspensions, making polluted soil with a concentration of waste oil of 4%, 8% and 12%, testing the ability to degrade hydrocarbons, measuring *Total Petroleum Hydrocarbon* and measuring secondary parameters, namely temperature and pH. Based on the results of the study, it was found that the bacteria with the largest clear zone was RT-4 with a clear zone area of 11.5 mm with a strong category. RT-4 bacterial isolate can reduce the TPH value in each treatment. Treatment K1 can reduce the initial TPH of 2.48 g/kg and decreased the TPH value to 0.96 g/kg. In the K2 treatment, the initial TPH measurement obtained a TPH value of 2.91 g / kg and the final TPH measurement obtained a TPH value of 2.07 g / kg. K3 treatment with initial TPH measurement of 3.59 g/kg and final TPH of 3.19 g/kg. Data analysis was performed using ANOVA using Microsoft Excel and further *Duncan Multiple Range Test* (DMRT). Based on further tests, it was found that 12% bacteria were most effective in degrading soil polluted with waste oil with a concentration of 4% (8 ml). From this study, it is expected that the RT 4 isolate bacteria can be used in bioremediation efforts of waste oil polluted soil.

Keywords: bioremediation, *Total Petroleum Hydrocarbon* (TPH), waste oil.