

Bioremediasi tanah tercemar petroleum hydrocarbon: perbandingan penambahan kompos dan lumpur ipal = Bioremediation of petroleum hydrocarbon in contaminated soils: comparison of compost and municipal activated sludge residual addition

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Abstrak

Aktivitas pengelolaan minyak bumi terus meningkat sehingga diperlukan tindakan pengelolaan pencemaran. Penelitian ini bertujuan untuk mengetahui perbedaan pertumbuhan bakteri dan penurunan kadar TPH pada proses bioremediasi yang distimulasi dengan penambahan kompos dan lumpur IPAL pada 5% dan 10% secara eksperimental skala laboratorium dengan simulasi tanah tercemar dengan kadar TPH sebesar 5,5% selama 5 minggu hingga mencapai baku mutu yaitu di bawah 1%. Tanah yang digunakan berasal dari pantai Marunda, kompos dari UPS Merdeka, lumpur IPAL dari Jababeka, dan bakteri diisolat dari tanah tercemar minyak di wilayah sekitrar kilang.

Hasilnya berupa laju pertumbuhan bakteri pada kompos dan lumpur IPAL dengan kadar 5% masing-masing adalah 0,7567/minggu dan 1,154/minggu serta 0,8783/minggu dan 1,1109/minggu pada kadar 10%.

Sedangkan efisiensi penyisihan TPH yang didapatkan adalah 95,32% dan 96,85% untuk penambahan kompos 5% dan 10% serta 91,15% dan 91,02% untuk penambahan lumpur IPAL sebanyak 5% dan 10%.

Hasil uji t menyatakan perbedaan baik pertumbuhan bakteri maupun penurunan kadar TPH tidak signifikan. Kemudian hasil uji korelasi menunjukkan korelasi rendah berbanding terbalik untuk hubungan TPH dengan jumlah bakteri.

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Crude oil's processing into energy continuous to increase, hence the treatment for its environmental impact is needed. This study aims to determine the differences of bacterial growth rate and removal efficiency of Total Petroleum Hydrocarbon (TPH) between compost and WWTP sludge addition at 5% and 10%. Those effect was acknowledge through experimental in laboratory scale using soil contaminated by 5,5% TPH within 5 weeks until it reach less than 1% as the requirement. The soil comes from Marunda Beach, compost from UPS Merdeka, WWTP sludge from Jababeka, bacterial isolated from soil contaminated at the surrounding of refining.

Result of this study showed that the bacterial growth rate in compost and WWTP sludge at 5% and 10% concentration each are 0,7567/weeks and 1,154/week for compost also 0,8783/week and 1,1109/week for WWTP sludge. While the TPH removal efficiency obtained was 95,32% and 96,85% for the addition of compst as well as 91,15% and 91,02% for the addition of WWTP sludge.at 5% and 10% concentration. Due to t-Test, the differences between all the variation of concentration are not significant. The correlation test between TPH degradation to bacterial growth showed that there is a weak downhill (negative) linear relationship.