

**Penurunan *Total Petroleum Hydrocarbon* (TPH) *Oil Sludge* dengan Metode
Komposting Menggunakan Kompos dan Pupuk NPK di Sumur Tradisional
Desa Ledok**

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INTISARI

Oil sludge merupakan lumpur minyak yang mengandung campuran hidrokarbon, air, dan partikel padat, yang bersifat toksik dan sulit terurai secara alami. *Oil sludge* merupakan salah satu limbah industri migas yang mengandung konsentrasi TPH yang tinggi dan berpotensi mencemari lingkungan. Tujuan dilakukannya penelitian ini adalah untuk mengetahui karakteristik *oil sludge*, menganalisis efisiensi penurunan TPH pada *oil sludge* menggunakan metode komposting, dan memberikan arahan pengolahan terkait pengolahan *oil sludge* yang dihasilkan dari kegiatan di Sumur Tradisional Desa Ledok.

Sampel *oil sludge* diambil di kolam timbunan dan dilakukan analisis karakteristik awal berupa pengukuran TPH awal menggunakan metode gravimetri. Pengukuran pH dan suhu menggunakan *soil meter*. Kadar air diukur menggunakan metode oven. Efisiensi penurunan TPH dengan menerapkan metode komposting menggunakan tiga variasi kompos dan pupuk NPK, yaitu P1 (80%:20%), P2 (50%:50%), dan P3 (20%:80%), selama 50 hari. Pengujian nilai TPH dilakukan setiap 10 hari sekali untuk memantau efisiensi penurunan TPH pada masing-masing perlakuan. Setelah melakukan proses komposting selesai maka dapat diketahui variasi rasio optimal yang dapat digunakan untuk arahan pengolahan dengan melihat efisiensi penurunan TPH tertinggi.

Karakteristik awal *oil sludge* sebelum dilakukan pengolahan berupa kadar TPH 13%, pH 5,8, suhu 32°C, dan kadar air 36,463%. Hasil penelitian menunjukkan penurunan nilai TPH menggunakan variasi P3 memberikan hasil penurunan paling tinggi, yaitu dari 13% menjadi 1,7% dengan nilai efektivitas penurunan sebesar 86,92%. Arahan pengelolaan yang direkomendasikan adalah dengan menggunakan variasi P3 serta membangun kolam penampung dan pengolahan *oil sludge* yang dilapisi oleh geomembrane HDPE.

Kata kunci: *Oil sludge*, TPH, komposting, kompos, pupuk NPK, bioremediasi

**Reduction of Total Petroleum Hydrocarbon (TPH) Oil Sludge
by Composting Method Using Compost and NPK Fertilizer in Traditional Wells
of Ledok Village**

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ABSTRACT

Oil sludge is a mixture of hydrocarbons, water, and solid particles that is toxic and difficult to break down naturally. Oil sludge is one of the industrial wastes from the oil and gas industry that contains high concentrations of total petroleum hydrocarbons (TPH) and has the potential to contaminate the environment. The objective of this study is to determine the characteristics of oil sludge, analyze the efficiency of TPH reduction in oil sludge using the composting method, and provide guidelines for the treatment of oil sludge generated from activities at the Traditional Well in Ledok Village.

Oil sludge samples were taken from the storage pond and initial characteristics were analyzed by measuring initial TPH using the gravimetric method. pH and temperature measurements were taken using a soil meter. Moisture content was measured using the oven method. The efficiency of TPH reduction was assessed by applying the composting method using three variations of compost and NPK fertilizer, namely P1 (80%:20%), P2 (50%:50%), and P3 (20%:80%), over a 50-day period. TPH value testing was conducted every 10 days to monitor TPH reduction efficiency in each treatment. After the composting process was completed, the optimal ratio variation that could be used for processing guidance could be determined by observing the highest TPH reduction efficiency.

The initial characteristics of the oil sludge before processing were TPH content of 13%, pH of 5.8, temperature of 32°C, and moisture content of 36.463%. The research results showed that the TPH reduction using variation P3 yielded the highest reduction, from 13% to 1.7%, with a reduction efficiency of 86.92%. The recommended management guideline is to use variation P3 and construct a storage pond and oil sludge treatment facility lined with HDPE geomembrane.

Keywords: *Oil sludge, TPH, composting, compost, NPK fertilizer, bioremediation.*