

**Lisa Marjayandari. 2019.** Isolasi dan Karakterisasi Bakteri Hidrokarbonoklastik *indigenous* Lumpur Minyak Balongan

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## ABSTRAK

Penelitian ini bertujuan untuk mengetahui: jumlah isolat bakteri hidrokarbonoklastik *indigenous* lumpur minyak Balongan; respon pertumbuhan isolat bakteri pada medium yang mengandung substrat hidrokarbon ditinjau dari nilai TPC (*Total Plate Count*) (CFU/mL) bakteri; persentase senyawa hidrokarbon yang didegradasi oleh isolat terpilih pada akhir masa inkubasi; nama isolat bakteri hidrokarbonoklastik *indigenous oil sludge* Balongan yang memiliki nilai persentase degradasi tertinggi; dan kehadiran gen penyandi enzim pendegradasi hidrokarbon (alkana monooksigenase & naftalen dioksigenase) pada isolat terpilih. Isolasi bakteri *indigenous* dilakukan pada kultur cair Air Mineral Sintesis (ASM) yang mengandung n-heksana, naftalena, fenantrena dan solar dengan konsentrasi 1% dan diinkubasi selama 3 hari. Uji respon pertumbuhan isolat bakteri dilakukan dengan menumbuhkan isolat pada kultur cair ASM + mengandung n-heksana, naftalena, fenantrena dan solar masing-masing sebesar 1% dan diinkubasi selama 7 hari. Penambahan indikator pewarna *2,6-diclorophenol indophenol* pada kultur cair Bushnell Haas yang berisi isolat bakteri dan senyawa hidrokarbon uji 1% bertujuan untuk uji kemampuan degradasi hidrokarbon. Diamati perubahan warna yang terjadi setiap hari selama masa inkubasi 7 hari. Perhitungan persentase degradasi menggunakan rumus % biodegradasi dilakukan pada hari ke 7. Isolat 7 mampu tumbuh pada semua media kultur hidrokarbon, isolat 6 mampu tumbuh pada media kultur n-heksana, fenantrena dan solar, isolat 4 pada media kultur hidrokarbon naftalena dan solar. Isolat 7 memiliki nilai degradasi sebesar 31%, 63%, 16% dan 45% pada hidrokarbon n-heksana, solar, naftalena dan fenantrena; isolat 6 adalah sebesar 37%, 20%, 10% dan 43% pada hidrokarbon n-heksana, solar, naftalena dan fenantrena; isolat 4 32%, 15%, 28% dan 37% pada hidrokarbon n-heksana, solar, naftalena dan fenantrena. Nama isolat bakteri hidrokarbonoklastik *indigenous oil sludge* Balongan yang terpilih berdasarkan analisis 16S rDNA adalah *Pseudomonas* sp. 7, *Bacillus* sp. 6 dan *Bacillus* sp. 4. Hasil identifikasi dengan BLAST menunjukkan gen penyandi *alkM* dan *ndo* tidak terdeteksi.

Kata kunci : 2,6-DCPIP, isolat bakteri *indigenous*, hidrokarbon, isolasi, lumpur minyak

**Lisa Marjayandari. 2019.** Isolation and Characterization of Hydrocarbonoclastic Bacteria Indigenous of Balongan Oil Sludge

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### ABSTRACT

This study aims to determine: the number of isolates of indigenous hydrocarbonoclastic bacteria Balongan oil mud; growth response of bacterial isolates in a medium containing a hydrocarbon substrate in terms of bacterial TPC (Total Plate Count) (CFU / mL) values; the percentage of hydrocarbon compounds degraded by isolates selected at the end of the incubation period; the name of isolates of Balongan indigenous hydrocarbonoclastic bacteria which has the highest percentage degradation value; and the presence of genes encoding the hydrocarbon degrading enzymes (alkane monooxygenase & naphthalene dioxygenase) in selected isolates. Indigenous bacterial isolation was carried out on liquid Synthesis Mineral Water (ASM) containing n-hexane, naphthalene, phenanthrene and diesel with a concentration of 1% and incubated for 3 days. The growth response test of bacterial isolates was carried out by growing isolates in liquid culture ASM + containing n-hexane, naphthalene, phenanthrene and diesel each by 1% and incubated for 7 days. The addition of 2,6-dichlorophenol indicator on Bushnell Haas liquid culture containing bacterial isolates and 1% test hydrocarbon compounds aims to test the hydrocarbon degradation ability. Observed discoloration that occurs every day during the 7 day incubation period. Calculation of the percentage of degradation using the biodegradation formula was carried out on day 7. Isolate 7 was able to grow on all hydrocarbon culture media, isolate 6 was able to grow on n-hexane, phenanthrene and diesel culture media, isolate 4 in naphthalene and solar hydrocarbon culture media. Isolate 7 has a degradation value of 31%, 63%, 16% and 45% in n-hexane, diesel, naphthalene and phenanthrene hydrocarbons; isolates 6 were 37%, 20%, 10% and 43% in n-hexane, diesel, naphthalene and phenanthrene hydrocarbons; isolate 4 32%, 15%, 28% and 37% in n-hexane, diesel, naphthalene and phenanthrene hydrocarbons. The name of the isolates of indigenous hydrocarbonoclastic bacteria Balongan oil sludge selected based on 16S rDNA analysis was *Pseudomonas* sp. 7, *Bacillus* sp. 6 and *Bacillus* sp. 4. The results of identification with BLAST showed that the *alkM* encoding gene and the *ndo* were not detected.

Kata kunci : 2,6-DCPIP, indigenous bacterial isolates, hydrocarbons, isolation, oil sludge