

## Analisis kemampuan biodegradasi hidrokarbon isolat bakteri HL8\_5 dari habitat mangrove = Analysis of hydrocarbon biodegradation ability by bacteria isolate HL8\_5 from mangrove habitat

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### Abstrak

Bioremediasi menggunakan bakteri pendegradasi hidrokarbon, merupakan salah satu solusi alternatif pengendalian pencemaran tanah oleh senyawa hidrokarbon. Isolat bakteri HL8\_5 telah diisolasi dari tanah habitat mangrove. Penelitian bertujuan untuk menganalisis kemampuan biodegradasi senyawa hidrokarbon oleh isolat bakteri HL8\_5 dan mengetahui karakter fenotipik isolat bakteri. Pengukuran pertumbuhan isolat bakteri HL8\_5 dilakukan dengan metode viable plate count, analisis degradasi senyawa hidrokarbon dilakukan dengan gas chromatography/ mass spectrometry (GC/MS), dan karakterisasi isolat bakteri dilakukan melalui pengecatan Gram serta pengamatan karakter morfologi dan biokimia.

Hasil penelitian menunjukkan bahwa isolat bakteri HL8\_5 mampu tumbuh dalam medium Bushnell-Haas dengan penambahan 1% (v/v) minyak diesel dan mengalami peningkatan jumlah populasi bakteri dari  $6,98 \times 10^7$  CFU/mL hingga  $1,08 \times 10^{10}$  CFU/mL setelah inkubasi selama 48 jam. Analisis GC/MS menunjukkan bahwa senyawa 9-octadecenoic acid mengalami degradasi terbesar oleh isolat bakteri HL8\_5 hingga mencapai 40,33% dalam waktu 48 jam, diikuti oleh senyawa tetracosane (9,43%) dan tricosane (4,94%). Hasil karakterisasi fenotipik menunjukkan bahwa isolat bakteri HL8\_5 merupakan bakteri dari famili Enterobacteriaceae.

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Bioremediation using hydrocarbon degrading bacteria, is one of the alternative solutions for handling soil contamination by hydrocarbons. Bacteria isolate HL8\_5 has been isolated from soil mangrove habitat. The objective of this study is to analyze the biodegradation capabilities of bacteria isolate HL8\_5 on hydrocarbons and to observe the phenotype characters of bacteria isolate. Growth of bacteria isolate HL8\_5 was measured using viable plate count, analysis of hydrocarbon degradation carried out by gas chromatography/ mass spectrometry (GC/MS), and characterization was done by observing Gram reaction and observation of morphological and biochemical characters.

The results show that bacteria isolate HL8\_5 is able to grow in the Bushnell-Haas medium with addition of 1% (v/v) diesel oil and exhibit increase in the number of bacteria population from  $6.98 \times 10^7$  CFU/mL to  $1.08 \times 10^{10}$  CFU/mL after 48 hours incubation. The GC/MS analysis shows that 9-octadecenoic acid has the largest degradation by bacteria isolate HL8\_5 up to 40.33% within 48 hours, followed by tetracosane (9.43%) and tricosane (4.94%). The phenotypic characterization indicates that bacteria isolate HL8\_5 is a bacteria from family Enterobacteriaceae.