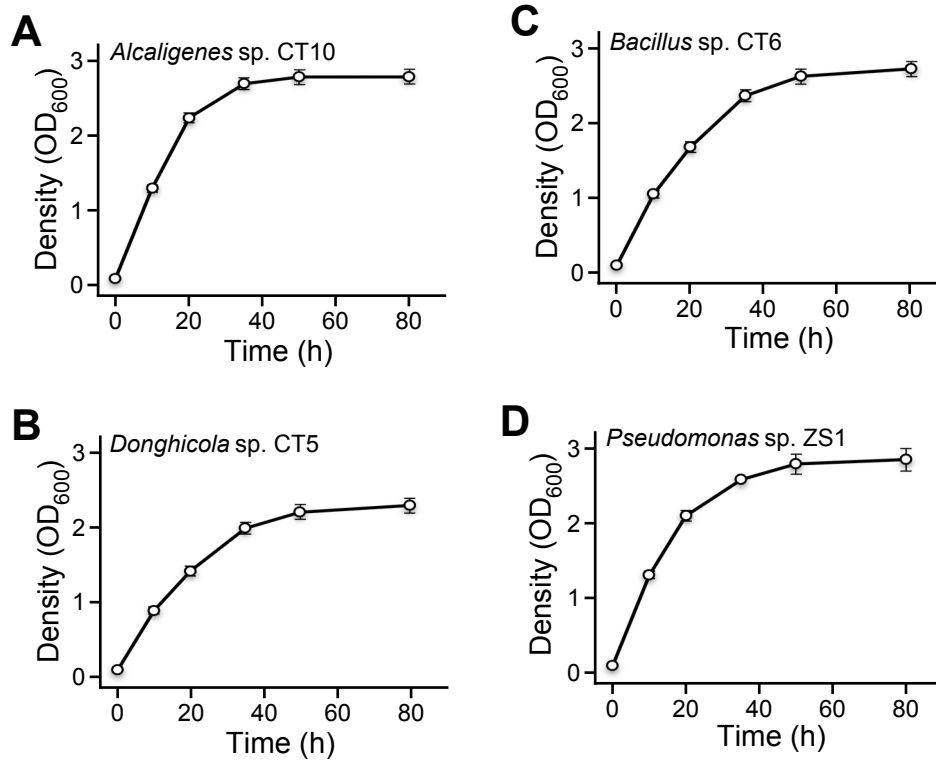
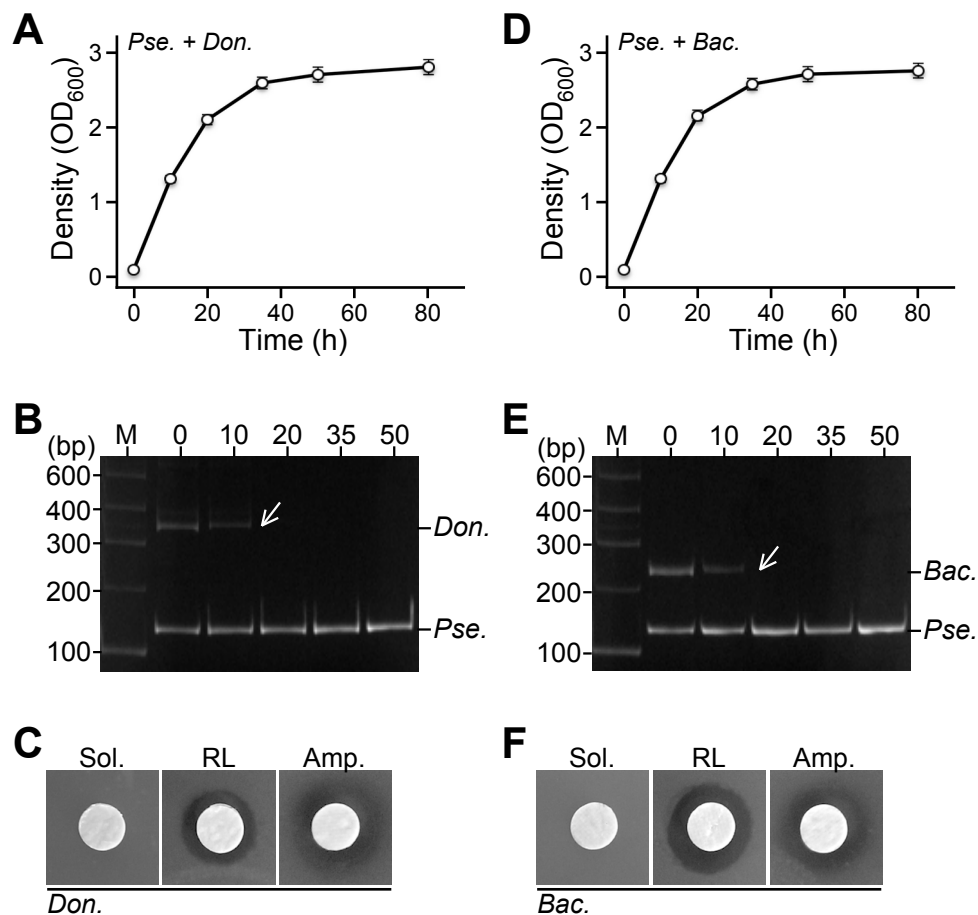


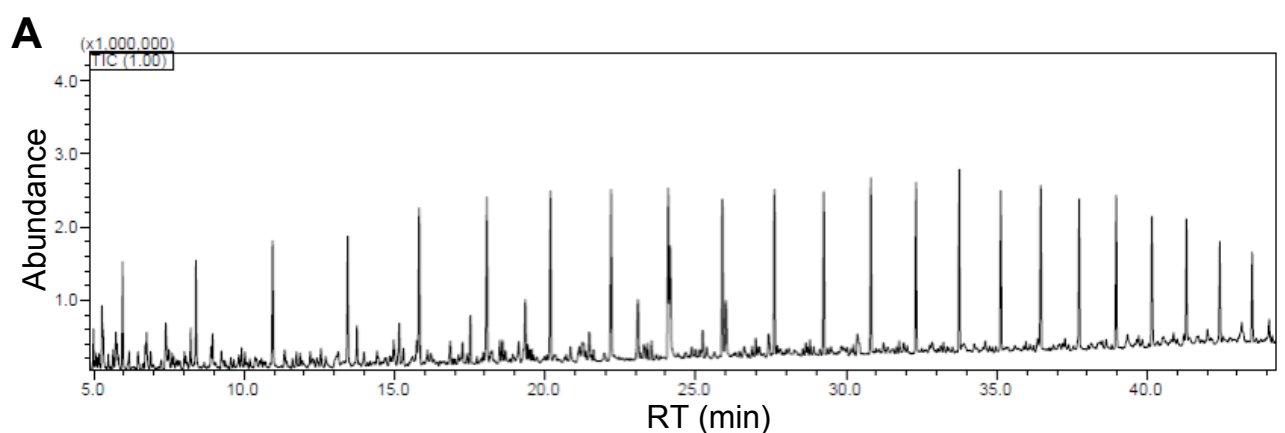
Additional File 1: Figure S1. Growth curve analysis of four strains isolated from oil-sludge. Growth curves of (A) *Alcaligenes* sp. CT10, (B) *Donghicola* sp. CT5, (C) *Bacillus* sp. CT6, and (D) *Pseudomonas* sp. ZS1 in MS medium supplemented with 2% YE.



Additional File 1: Figure S2. *Pseudomonas* sp. ZS1 antagonizes against *Donghicola* sp. CT5 and *Bacillus* sp. CT6. (A) Growth curve of the mixed ZS1 and CT5 cultures. (B) Dynamic change of ZS1 and CT5 populations in mixed culture. Arrow indicates the point that the population diminished. (C) Plate halo assay showing that the growth of CT5 is inhibited by rhamnolipid produced by ZS1. (D) Growth curve of the mixed ZS1 and CT6 cultures. (E) Dynamic change of ZS1 and CT6 populations in mixed culture. (F) Plate halo assay showing that the growth of CT6 is inhibited by rhamnolipid produced by ZS1.



Additional File 1: Figure S3. GC-MS analysis of crude oil compositions used in this study. (A) Total ion chromatogram of the crude oil. (B) Major molecules observed in the crude oil.



B

Oil composition (carbon no.) ¹	Retention time ²	Compound Name ³	Formula ⁴	MW ⁵	Molecular structure ⁶
9 ¹	7.68 ²	n-Nonane ³	C ₉ H ₂₀ ⁴	128 ⁵	
10 ¹	10.34 ²	Decane ³	C ₁₀ H ₂₂ ⁴	142 ⁵	
11 ¹	13.09 ²	n-Hendecane ³	C ₁₁ H ₂₄ ⁴	156 ⁵	
12 ¹	15.76 ²	Dodecane ³	C ₁₂ H ₂₆ ⁴	170 ⁵	
13 ¹	18.29 ²	n-Tridecane ³	C ₁₃ H ₂₈ ⁴	184 ⁵	
14 ¹	20.68 ²	Tetradecane ³	C ₁₄ H ₃₀ ⁴	198 ⁵	
15 ¹	22.94 ²	n-Pentadecane ³	C ₁₅ H ₃₂ ⁴	212 ⁵	
16 ¹	25.07 ²	n-Hexadecane ³	C ₁₆ H ₃₄ ⁴	226 ⁵	
17 ¹	27.09 ²	n-Heptadecane ³	C ₁₇ H ₃₆ ⁴	240 ⁵	
18 ¹	29.02 ²	Octadecane ³	C ₁₈ H ₃₈ ⁴	254 ⁵	
19 ¹	30.85 ²	n-Nonadecane ³	C ₁₉ H ₄₀ ⁴	268 ⁵	
20 ¹	32.59 ²	n-Eicosane ³	C ₂₀ H ₄₂ ⁴	282 ⁵	
21 ¹	34.26 ²	n-Heneicosane ³	C ₂₁ H ₄₄ ⁴	296 ⁵	
22 ¹	35.85 ²	n-Docosane ³	C ₂₂ H ₄₆ ⁴	310 ⁵	
23 ¹	37.38 ²	n-Tricosane ³	C ₂₃ H ₄₈ ⁴	324 ⁵	
24 ¹	38.85 ²	n-Tetracosane ³	C ₂₄ H ₅₀ ⁴	338 ⁵	
25 ¹	40.27 ²	n-Pentacosane ³	C ₂₅ H ₅₂ ⁴	352 ⁵	
26 ¹	41.63 ²	n-Hexacosane ³	C ₂₆ H ₅₄ ⁴	366 ⁵	
27 ¹	42.94 ²	n-Heptacosane ³	C ₂₇ H ₅₆ ⁴	380 ⁵	
28 ¹	44.23 ²	n-Octacosane ³	C ₂₈ H ₅₈ ⁴	394 ⁵	
29 ¹	45.58 ²	n-Nonacosane ³	C ₂₉ H ₆₀ ⁴	408 ⁵	
30 ¹	47.08 ²	n-Triacontane ³	C ₃₀ H ₆₂ ⁴	422 ⁵	
31 ¹	48.77 ²	n-Hentriacontane ³	C ₃₁ H ₆₄ ⁴	436 ⁵	