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Supplementary Material

Biodemulsifiers produced by *Achromobacter* sp. and their features in improving the biodegradation of Phenanthrene

Chunyan Li, Tingting Jia, Meng Fu, Ning Hou, Huiming Cao, Qiaoruo Wang,
Dapeng Li*

College of Resources and Environment, Northeast Agricultural University, Harbin
150030, China

*Corresponding author Tel.: +86 451 55190034, E-mail address:
houning571@163.com

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Table S1

Levels of various factors affecting the demulsification of W/O-model emulsions

Factor	Name	Units	Low (-1)	Mid (0)	High (1)
A	temperature	°C	30	33	36
B	concentration of substrate	mg·L ⁻¹	50	75	100
C	pH		6	7	8
D	inoculum size		3	4	5

Table S2

RSM experimental design and results for strain LH-1 for the demulsification efficiency for the W/O-model emulsion (%)

Run	Factors				Response Y
	A	B	C	D	
1	0	0	-1	1	80.23
2	1	1	0	0	58.67
3	0	-1	0	1	73.38
4	0	-1	-1	0	61.38
5	-1	-1	0	0	74.84
6	-1	0	-1	0	80.57
7	1	0	-1	0	74.12
8	0	0	-1	-1	80.32
9	1	0	1	0	79.22
10	0	1	0	-1	61.68
11	0	0	0	0	92.25
12	0	0	0	0	94.45
13	0	0	0	0	94.28
14	1	-1	0	0	69.13
15	-1	0	1	0	79.93
16	1	0	0	-1	87.55
17	0	0	0	0	93.37
18	0	0	1	1	80.35
19	0	-1	1	0	66.85
20	-1	1	0	0	55.87
21	-1	0	0	1	88.77
22	1	0	0	1	81.32
23	0	0	0	0	93.94
24	0	1	1	0	50.68
25	0	1	-1	0	51.86

26	-1	0	0	-1	85.95
27	0	0	1	-1	85.98
28	0	-1	0	-1	73.48
29	0	1	0	1	59.34

Table S3

Analysis of variance (ANOVA) for the response surface quadratic model of demulsification for the W/O-model emulsion by LH-1

Source	SS	df	Mean square	F-value	p-value	
Model	4990.07	14	356.43	288.99	<0.0001	significant
A	18.55	1	18.55	15.04	0.0017	
B	544.86	1	544.86	441.76	<0.0001	
C	20.02	1	20.02	16.23	0.0012	
D	11.29	1	11.29	9.15	0.0091	
AB	18.11	1	18.11	14.68	0.0018	
AC	11.36	1	11.36	9.21	0.0089	
AD	20.48	1	20.48	16.60	0.0011	
BC	11.06	1	11.06	8.96	0.0097	
BD	1.14	1	1.14	0.93	0.3517	
CD	7.76	1	7.76	6.29	0.0251	
A ²	156.98	1	156.98	127.28	<0.0001	
B ²	4023.14	1	4023.14	3261.88	<0.0001	
C ²	711.33	1	711.33	576.73	<0.0001	
D ²	32.90	1	32.90	26.67	0.0001	
Residual	17.27	14	1.23			
Lack of Fit	13.80	10	1.38	1.59	0.3470	not significant
Pure Error	3.47	4	0.87			
Cor. Total	5007.34	28				
R ²	0.9966					
R ² _{Adj}	0.9931					
Pred. R-Squared	0.9830					
Adeq. Precision	53.192					

df: degrees of freedom; SS: sum of squares

Table S4

Growth and demulsification activity of LH-1 grown on different chlorinated aliphatics
hydrocarbons (CAHs) carbon source

Carbon source	Growth (OD=600 nm)	Demulsification rate (W/O) (%)
Liquid paraffin	0.83±0.2	96.27%±0.1%
Frying oil	0.78±0.1	93.45%±0.2%
n-Hexadecane	0.69±0.1	83.16%±0.1%