Electronic Supplementary Material (ESI) for RSC Advances.

A novel bioemulsifier produced by *Exiguobacterium sp.* strain N4-1P isolated from petroleum hydrocarbon contaminated coastal sediment

-- Supplementary Information

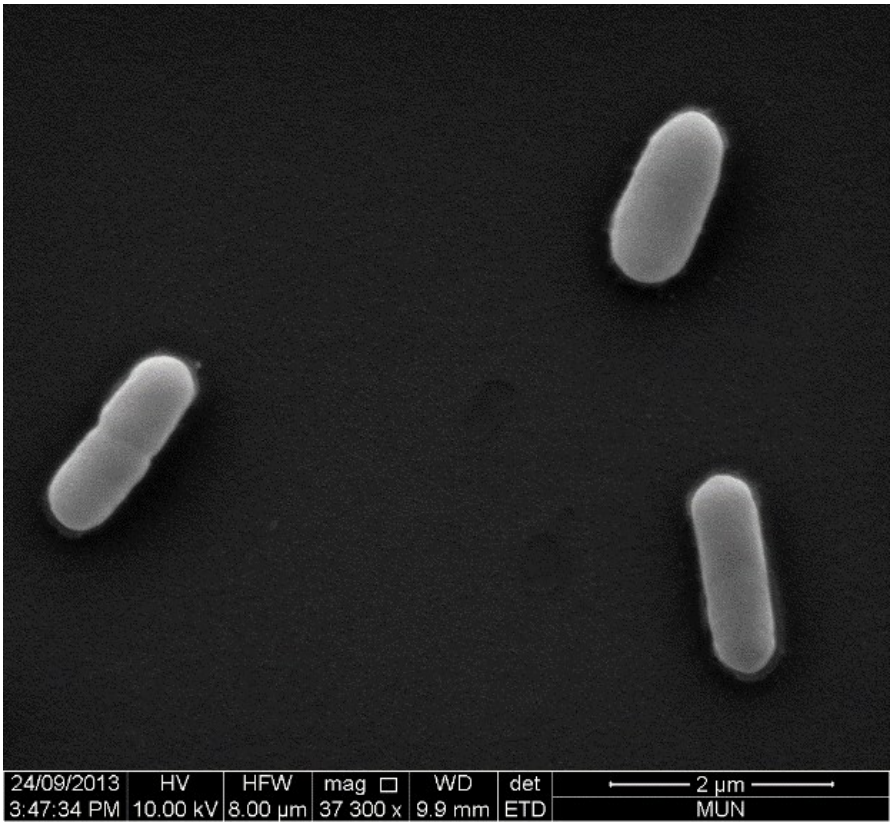

Fig. S1 SEM visualization results of Exiguobacterium sp. N4-1P

Table S1 BIOLOG® metabolic profile

Characteristics	*E. mexicanum* DSM 16483^T	*E. aurantiacum* DSM 6208^T	*E. aestuari* DSM 16306^T	*E. marinum* DSM 16484^T	*E. artemiae* DSM 16484^T	*E. acetylicum* DSM 20146^T	*E. undae* DSM 14481^T	*E. antarcticum* DSM 14480^T	*E. oxidotolerans* DSM 17272^T	*E.* sp. N4-1P
α-Cyclodextrin	+	-	+	+	+	-	-	-	+	-
β-Cyclodextrin	+	-	+	+	+	-	-	-	+	-
Glycogen	+	-	+	+	+	+	+	+	+	-
Mannan	-	+	-	+	-	+	w	w	+	-
N-*Acetyl* mannosamine	+	-	+	w	-	-	w	w	-	w
Cellobiose	-	-	-	w	+	+	+	+	+	+
d-Galactose	-	-	-	-	-	-	+	+	+	-
d-Gluconic acid	-	-	-	w	+	-	-	-	-	w
d-Mannitol	-	-	+	+	+	+	+	-	+	+
3-Methyl glucose	-	+	+	+	+	+	+	+	w	-
d-Raffinose	-	-	+	-	-	-	+	+	+	-
d-Ribose	+	-	+	+	+	-	+	+	+	w
Salicin	-	-	+	+	+	-	-	-	-	-
d-Sorbitol	+	-	+	+	+	+	-	-	+	w
Turanose	+	-	-	-	+	-	-	-	-	-
d-Xylose	+	-	-	-	-	-	-	-	-	-
Acetic acid	+	-	+	+	+	w	+	+	+	w
γ-Hydroxy-butiric acid	-	-	+	+	-	-	w	w	-	-

α-ketovaleric acid	+	+	+	+	-	+	+	+	+	+
d-Lactic acid methyl ester	-	-	-	-	+	-	-	-	-	-
l-Lactic acid	+	-	-	-	-	-	-	-	-	-
Methylpyruvate	+	+	+	-	-	-	-	-	+	w
Methylsuccinate	-	-	-	-	-	-	w	w	-	w
Propionic acid	+	-	+	+	-	-	-	w	+	-
d-Alanine	-	-	-	-	+	-	-	-	-	-
l-Alanine	-	-	-	-	+	+	w	w	-	-
l-Alanyl glycine	-	-	-	-	-	w	-	+	+	-
l-Glycyl glutamic acid	-	-	-	-	-	-	-	+	-	-
l-Serine	-	-	-	w	-	w	-	w	-	w
2,3-Butanediol	-	-	+	+	-	-	w	+	-	-
Thymidine	+	+	+	+	-	+	+	+	+	+
Adenosine 5′-monophosphate	-	-	-	+	-	-	-	+	-	-
Thymidine 5′-monophosphate	-	-	-	+	+	-	w	+	-	-
Uridine 5′-monophosphate	-	-	-	+	-	-	-	+	-	-
Fructose 6-phosphate	-	-	-	w	-	+	-	-	-	-
Glucose 1-phosphate	-	-	-	-	-	+	-	-	-	-

Glucose 6-phosphate	-	-	-	-	-	+	-	-	-	-
dl-α-Glycerol Phosphate	-	-	-	-	-	+	-	-	-	-
Tween 40	-	-	-	+	-	-	-	-	-	+
Tween 80	-	-	-	+	-	-	-	-	-	+
Reference	[1]	[2]	[3]	[3]	[1]	[1]	[2]	[2]	[4]	This study

Table S2 PLFA composition of *Exiguobacterium* sp. N4-1P and relevant strains (Unit: %, n=3)

Fatty acids	*E. mexicanum* DSM 16483^T	*E. aurantiacum* DSM 6208^T	*E. aestuari* DSM 16306^T	*E. marinum* DSM 16484^T	*E. artemiae* DSM 16484^T	*E. acetylicum* DSM 20146^T	*E. undae* DSM 14481^T	*E. antarcticum* DSM 14480^T	*E. oxidotolerans* DSM 17272^T	*E.* sp. N4-1P
iC11:0	1.5	2	0	0	0	0	0	0	0	0
iC12:0	2.1	3	1.7	2.6	1.6	0	2	3	1.4	2.7
C12:0	8.3	2	0	0	0	1	0	1	0	0
iC13:0	**11.2**	**18**	**11.5**	**11.5**	**13.2**	5	9	**12**	8.5	8.9
aC13:0	8.9	**12**	**15.6**	**18.1**	**12**	6	9	**11**	9	**11.8**
iC14:0	0	0	1.3	0	1.2	1	2	1	2.7	2.3
C14:0	6.1	3	0	0	1.3	**13**	3	2	0	2.3
C14:1 ω5c	0	0	0	0	0	2	0	0	0	0
iC15:0	1.7	4	**13.1**	**10.4**	**11.8**	8	**10**	**11**	**20.7**	**15.5**
aiC15:0	0	0	3.2	2.6	2.9	1	3	2	4.2	5.1
iC16:0	0	0	7.1	5	1.4	0	2	0	7.1	0
C16:1	16.8	10	0	0	4.5	41	8	21	0	**11.4**
C16:0	**32.8**	**27**	5.3	4.3	**22.9**	**10**	**17**	**13**	2.9	**12.5**
iC17:0	0	0	**27.2**	**34.4**	**12.2**	1	7	5	**23.3**	**13.6**
aiC17:0	0	6	8.2	7.1	2.1	1	2	0	6.1	5.6
C18:1	0	2	0	0	1.1	7	6	6	0	**0**
C18:0	7	5	1.7	0	7.7	1	6	5	0	4.82
Reference	[1]	[2]	[1]	[3]	[3]	[1]	[2]	[2]	[4]	This study

Table S3 Composition of the bioemulsifiers produced by Exiguobacterium sp. N4-1P (n=3)

Composition	%	Hydrophobic moiety fatty acids	%
Protein	0.93	C14:0	2.58
Amino acids/peptides	50.82	C14:1	3.73
Carbohydrate	5.1	iC15:0	2.38
Lipid	45.32	aiC15:0	1.07
		C15:0	0.27
		C15:1	3.05
		iC16:0	0.63
		C16:0	32.18
		C16:1w9	0.46
		C16:1w7	0.30
		iC17:0	2.00
		aiC17:0	1.40
		C17:0	1.13
		C18:0	40.99
		C18:1w9	4.45
		C18:1w7	1.42
		C18:3w3	0.50
		C22:1w9	1.48
		∑Saturated	84.63
		∑Monounsaturated	14.88
		∑polyunsaturated	0.50
		∑Branched	7.64

References:

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