Supplementary Material

Evaluation of *Haloferax mediterranei* Strain R4 Capabilities for Cadmium Removal from Brines

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Table S1. Microorganisms with bioremediation potential for different metals. Note: NS=Non stated.

Specie	Metal	Concentration	Field	Description	Reference
Chlamydomonas sp.	Cd (II)	< 0.8 mM	Organisms isolated from Cd-contaminated sites; *Ex situ* laboratory assay	Tolerance and accumulation of Cd; The higher Cd concentration and the larger exposure time result in a higher accumulation of Cd	[1]
Thiobacillus ferroxidans DSM 583	Cd (II)	1 M	*Ex situ* laboratory under way of being implemented in the treatment of real industrial discharges	Growth decreases when [Cd] ≥ 50mM; It accumulates Cd at acidic pH (1.6-6)	[2]
Halococcus salifodinae BK6	Cd (II)	2 mM	*Ex situ* laboratory assay	Gradual reduction of growth and pigmentation when Cd concentration increases	[3]
Haloferax volcanii BBK2		1 mM		Growth reduces when [Cd] ≥ 0.5mM	
Haloarcula japonica BS2		2 mM		Gradual reduction of growth and pigmentation when Cd concentration increases	
Halorubrum sp. BS17		< 0.5 mM		There is not tolerance to Cd at tested concentrations	
Haloferax volcanii BBK2	Cd (II)	1 mM	*Ex situ* laboratory assay	Tolerance to 4mM of Cd showing a significant growth reduction; The maximum accumulation of Cd was at [Cd] = 0.5mM	[4]
Pseudomonas stutzeri LA3	Cu (II)	400 mg L^{-1}	*Ex situ* laboratory assay	Removal percentage is indirectly proportional to Cu (II) concentration in the medium; Highest removal percentage was at [Cu (II)] = 50 mg L^{-1}	[5]
Thermococcus gammatolerans Ej3	Cd (II) Co (II) Zn (II) Ni (II) Cu (II) As (II)	2 mM 2 mM 2 mM 0.5 mM 0.5 mM 0.25 mM	*Ex situ* laboratory assay	Cd tolerance is caused by the coding of about a hundred genes that are expressed 120 minutes after Cd exposure	[6]
Methanosarcina acetovirans C2A	Cd (II)	100 μM	*Ex situ* laboratory assay	Cd induces methanogenesis	[7]

Sulfolobus metalicus DSM 6482	Cd (II)	5 mM	*Ex situ* laboratory assay	ATPases efflux heavy metals outwards the cell to detoxify the intracellular environment	[8]
	Cu (II)	>200 mM			
Sulfolobus solfataricus	Cd (II)	< 0.05 mM			
	Cu (II)	NS			

Table S2. ICP-OES and ICP-MS operating conditions.

	ICP-OES	**ICP-MS**
Plasma forward power (W)	1400	1550
	Argon flow rate (L min^{-1})	
Plasma	15	15
Auxiliary	1.50	0.90
Nebulizer	0.70	1.09
Sample uptake rate (mL min^{-1})	0.5	0.3
View mode	Axial	-
Cell gas		He
Cell gas flow (mL min^{-1})		4
Number of replicates	3	3
Scanning mode	-	Peak Jump
Points per Peak	-	3
Dwell time (μs)	-	150
Number of sweeps	-	40
Element (wavelength, nm) / Nuclide	Ca (422.673); Cd (226.502); Fe (238.204); K (404.721); Mg (285.213); Mn (257.610); Na (588.995); Zn (213.857)	$^{27}Al^{\pm}$; $^{59}Co^{\pm}$; $^{63}Cu^{2\pm}$ $^{60}Ni^{\pm}$; $^{88}Sr^{\pm}$; $^{137}Ba^{\pm}$
Internal standard	Sc (391.182, 361.383)	$^{101}Ru^{\pm}$

Table S3. Summary of ANOVA results for elemental variation analysis according to the different Cd treatments (0, 0.2 and 0.4 mM of Cd (II)).

Source of variance	**F-value ($F_{2,6}$)**	**p-value**	**Tukey HSD test**
Al	0.002	n.s.	-
Ba	1.529	n.s.	-
Ca	30.51	n.s.	-
Co	0.647	n.s.	-
Cu	1.146	n.s.	-
Fe	1.465	n.s.	-
K	5.802	< 0.05	0 < 0.2; 0.2 = 0.4; 0 = 0.4
Mg	6.035	< 0.05	0 = 0.2; 0.2 = 0.4; 0 > 0.4
Mn	98.730	< 0.001	0 < 0.2 < 0.4
Na	4.473	n.s.	-
Ni	1.885	n.s.	-
Sr	3.709	n.s.	-
Zn	114.300	< 0.001	0 > 0.2 > 0.4

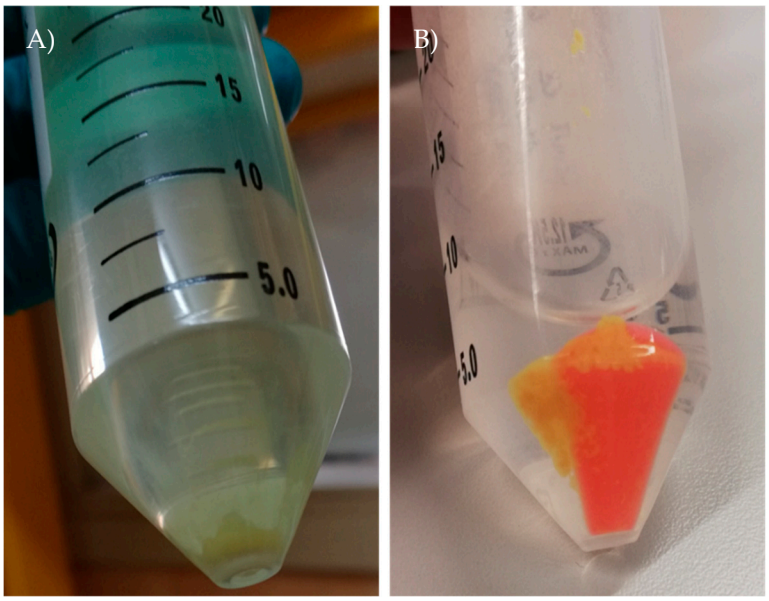

Figure S1. Appearance of the yellow precipitate CdS in CM. **A**) No centrifuged CM without cells and **B**) centrifuged CM with cells. Note: pink pellet corresponds to the cell biomass.

References

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