Screening halophilic bacteria metabolites for their potential as pyrite bio-depressants in Cu-Mo bioflotation

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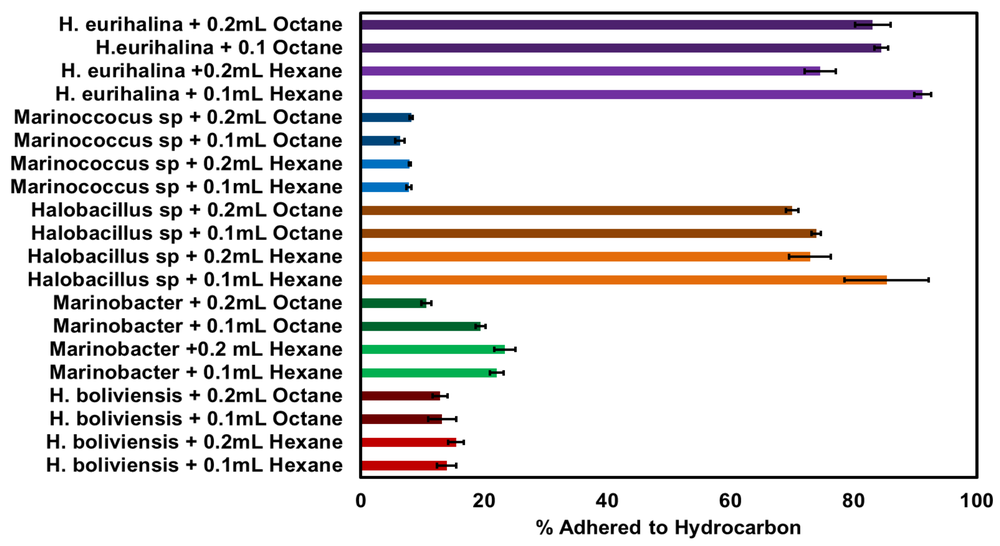
Aim:

To assess the potential of halophilic bacteria metabolites as pyrite biodepressants in flotation using sea water as medium . Namely *Halomonas boliviensis*, *Marinobacter* spp, *Halobacillus* sp, *Marinococcus* sp and *Halomonas eurihalina*.

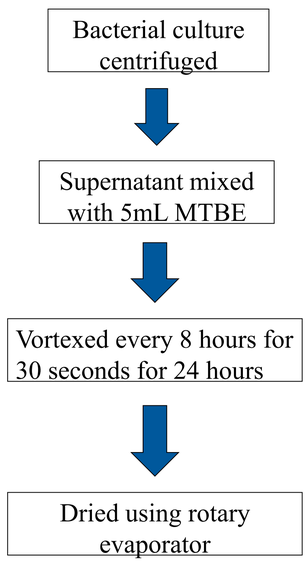
Bacterial adhesion to alkanes: (Hydrophobicity test)

- Method developed by Rosenberg[1] to determine hydrophobicity of bacteria.



Extraction of metabolites using methyl tert-butyl ether[2] (MTBE)

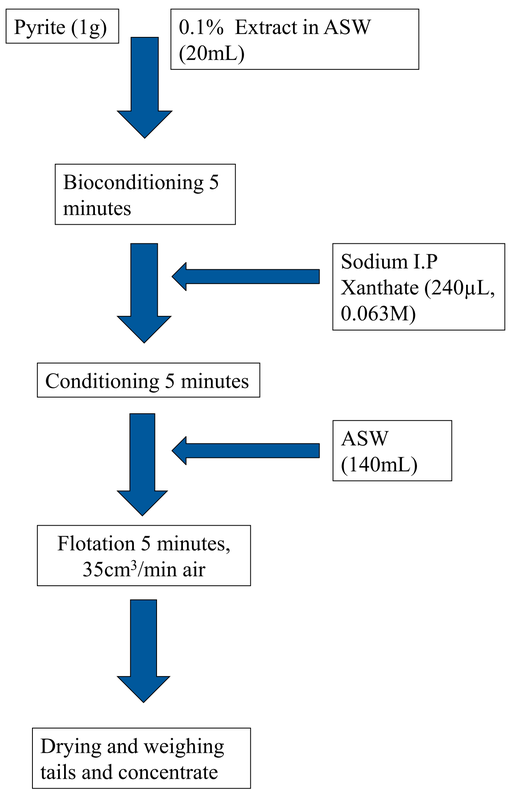
- Extraction method for slightly hydrophobic compounds (e.g. biosurfactants)
- Yield of extracted compounds from hydrophobic strains higher

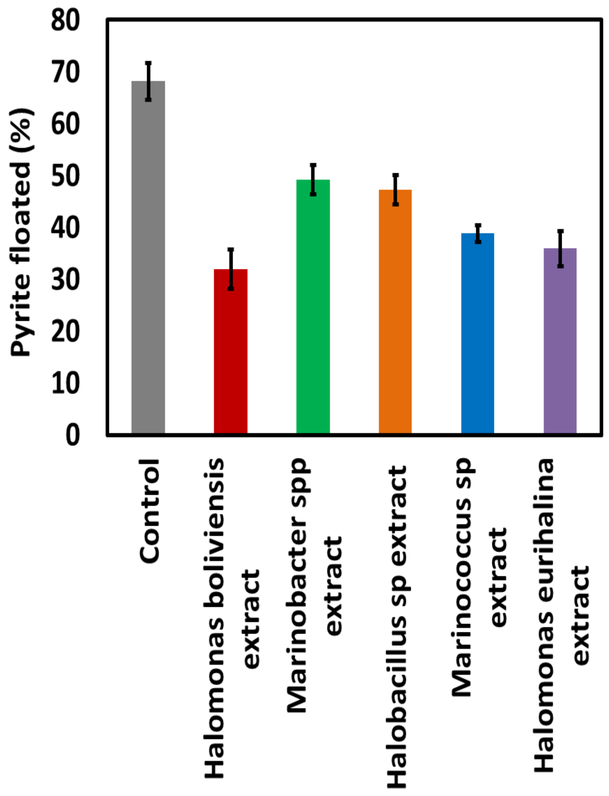


Bacterial extract from High salts medium	Mass (after drying)
Halomonas boliviensis	0.125
Marinobacter spp	0.061
Halobacillus sp	**0.315**
Marinococcus sp	0.029
Halomonas eurihalina	**0.304**

Bacterial extract from artificial sea water	Mass (after drying)
Halomonas boliviensis	0.020
Marinobacter spp	0.017
Halobacillus sp	**0.070**
Marinococcus sp	0.017
Halomonas eurihalina	**0.048**

Microflotation experiments:





Conclusions:

- Depression also occurs although in a much lesser extent than when using bacteria as bioreagents
- Flotation of pyrite most reduced under presence of *Halomonas boliviensis* extract
- Yield of hydrophobic metabolites decreases in artificial sea water
- Bacterial metabolites contribute to the observed biodepression activity of the bacterial cells although not the mayor contributors.

References

1. Rosenberg, M., Gutnick, D. and Rosenberg, E. (1980). Adherence of bacteria to hydrocarbons: A simple method for measuring cell-surface hydrophobicity. FEMS Microbiology Letters, 9(1), pp.29-33.
2. Kuyukina, M., Ivshina, I., Philp, J., Christofi, N., Dunbar, S. and Ritchkova, M. (2001). Recovery of Rhodococcus biosurfactants using methyl tertiary-butyl ether extraction. Journal of Microbiological Methods, 46(2), pp.149-156.