Original Research

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Journal of Environmental Biology

JEB™ p-ISSN: 0254-8704
e-ISSN: 2394-0379
CODEN: JEBIDP

DOI : http://doi.org/10.22438/jeb/40/3/MRN-914

Isolation and characterization of sulphur oxidizing bacteria (*Halothiobacillus* sp.) from aquaculture farm soil

Paper received: 04.05.2018 *Revised received*: 16.10.2018 *Re-revised received*: 11.12.2018 *Accepted*: 07.01.2019

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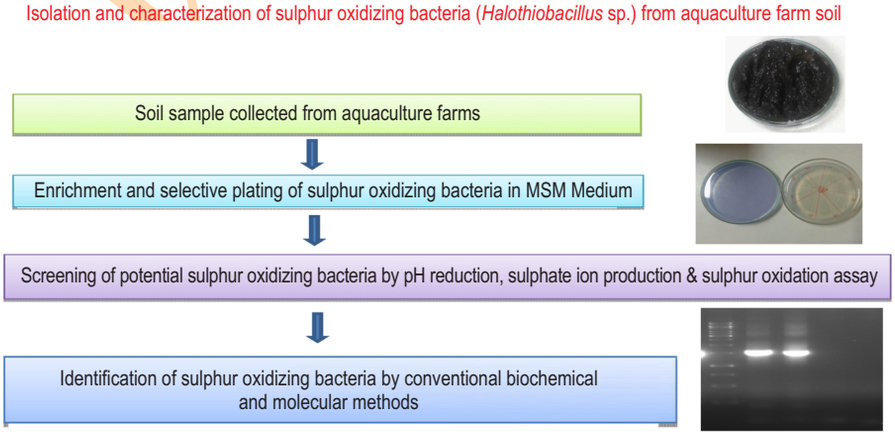
Abstract

Aim : Isolation and characterization of *Halothiobacillus* sp. from the shrimp aquaculture farm soil and their sulphur oxidation ability and utilization of H_2S in *in-vitro* model.

Methodology : Starkeys mineral salt medium was used to screen autotrophic sulphur oxidizing bacteria. For the qualitative screening, bacterial isolates were inoculated in mineral salt medium containing bromo phenol blue indicator to monitor change in pH. The isolates were studied further for their sulphate ion production, sulphur oxidase enzyme production and utilization of Na_2S. Identification was carried out by conventional biochemical and molecular methods.

Results : Fifty isolates showed distinct sulphur oxidizing ability on the mineral salt medium. The pH reduction test revealed that out of fifty isolates six could efficiently reduce the pH of the medium to 3.0 from an initial pH of 7 within 96 hr of incubation at 30°C. Maximum sulphate ion (12.65 mg ml^{-1}) and sulphur oxidase enzyme (16.64 mM sulphate hr^{-1} ml^{-1}) was produced by a bacterial isolate, *Halothiobacillus* sp. strain rk3. All the six isolates efficiently utilized Na_2S in *in-vitro* conditions. Conventional and molecular identification (16S rRNA sequence analysis) revealed that the sulphur oxidizing bacterial isolates belonged to *Halothiobacillus* spp. Furthermore, sequencing similarity calculation showed an average nucleotide identity (ANI) values higher than 99% which suggests that the isolates were not genetically different.

Isolation and characterization of sulphur oxidizing bacteria (*Halothiobacillus* sp.) from aquaculture farm soil



Interpretation : The present investigation revealed the presence of *Halothiobacillus* sp. as natural microflora of farm soils in shrimp aquaculture.

Key words: Aquaculture, *Halothiobacillus*, Sulphur oxidizing bacteria, Sulphur oxidase, Sulphate ion

How to cite : Nadella, R.K., M. Vaiyapuri, A.B. Kusunur, T.C. Joseph, L.K. Velayudhan and M.P. Mothadaka: Isolation and characterization of sulphur oxidizing bacteria (*Halothiobacillus* sp.) from aquaculture farm soil. *J. Environ. Biol.*, **40**, 363-369 (2019).