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The diversity and efficiency of sulfate-reducing bacteria in selected groundwater at West Bank, Palestine

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ABSTRACT

Sulfate-reducing bacteria (SRB) are unique groups of bacteria that can reduce sulfate to sulfide. They are considered an essential member of microbial communities and potentially be used in reducing the high concentration of sulfate in water or soil. So, this study aimed to isolate SRB species that survive and grow under severe saline conditions and test their efficiency in SO_4 reduction under lab conditions. Bacteria isolates were isolated from 7 water samples and two soil samples above Lisan white soil using a culture-dependent enrichment method. Molecular identification was carried out by amplification and sequencing of *dsrAB* gene from isolated instances. Depending on the sequence of *dsrAB* gene, five genotypes of bacteria with sulfate reduction ability were solitary and found. They belong to both traditional (*Desulfovibrio*) and non-traditional (*Enterobacter cloacae*, *Citrobacter werkmanii*, *Citrobacter freundii*, *Alcanivorax xenomutans*, *Pseudomonas aeruginosa*) SRB. In non-traditional SRB, the *dsrAB* gene was found to be active. All bacterial isolates were found to have a good ability in sulfate reduction, which reached up to 58% for *Desulfovibrio* while it was 45% and 41% for *Citrobacter* and *Enterobacter cloacae*, respectively. These results have shown the future potential of using these isolates to reduce sulfate in groundwater.

Keywords: Sulfate-reducing bacteria; *dsrAB* gene; Jericho

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