

# Halophilic and halotolerant polysaccharide-producing bacteria associated with the roots of the halophyte plant (*Halocnemum strobilaceum*) in Biskra region

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## Abstract

In Algeria, several factors contribute to soil degradation with negative consequences on plant productivity. Salinity is one of the essential factors, since it affects nearly 80% of the Algerian soils. Regarding to these data, we hypothesize that halophilic and halotolerant bacteria, which produce exopolysaccharides, can play a protective role against the deleterious effects of an excess of salt on crops. In the present study, we evaluated the potential of exopolysaccharide-producing halophilic and halotolerant bacteria isolated from a salty soil growing halophytic plant in Biskra region. Soil samples were taken at two levels: root adhering soil of *Halocnemum strobilaceum* plant and bulk soil. Then, we counted total bacteria using TSA 1/10 and polysaccharide-producing bacteria by YESA (2% sucrose) media. To evaluate the halophilic or halotolerant character of the two bacterial groups, different concentrations of NaCl were tested (0 M- 0.8 M- 1.2 M- 1.8 M and 2.5 M). Our results demonstrated that the number of root adhering soil bacteria was significantly higher than that in bulk soil. On the other hand, the number of halotolerant and halophilic rhizobacteria counted on TSA and YESA evolved respectively from  $5 \times 10^6$  and  $2 \times 10^6$  CFU/g of dry soil (DS) in the absence of salt to  $2 \times 10^7$  and  $5 \times 10^7$  in the presence of salt at 0.8M NaCl. On YESA medium without NaCl, no bacteria were isolated from the bulk soil unlike the soil adhering to the roots ( $2 \times 10^6$  CFU/g DS). In conclusion, our study showed that the presence of salt and/or the roots of the plant promotes the growth of halotolerant and halophilic exopolysaccharide-producing bacteria. These microorganisms could positively contribute to the improvement of plant productivity by reducing the negative effect of soil salinity.

**Keywords:** Bacteria - Polysaccharide - Soil - Salinity.