

Gloeocapsopsis AAB1, an extremely desiccation-tolerant cyanobacterium isolated from the Atacama Desert

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Abstract

The comprehensive study of microorganisms that evolved in the Atacama Desert, the driest and oldest on earth, may help to understand the key role of water for life. In this context, we previously characterized the microenvironment that allows colonization of the underside of quartzes in the Coastal Range of this desert by hypolithic microorganisms (Azua-Bustos et al. *Microb Ecol* 58:568–581, 2011). Now, we describe the biodiversity composition of these biofilms and the isolation from it of a new cyanobacterial strain. Based on morphologic and phylogenetic analyses, this isolate (AAB1) was classified as a new member of the *Gloeocapsopsis* genus. Physiological, morphological and molecular responses by isolate AAB1 show that this strain is extremely tolerant to desiccation. Our results also indicate that the isolate biosynthesizes sucrose and trehalose in response to this stressful condition. We identified two candidate genes involved in sucrose synthesis, namely sucrose 6-phosphate synthase and sucrose 6-phosphate phosphatase. Thus, the *Gloeocapsopsis* isolate AAB1 may represent a suitable model for understanding tolerance to low water availability..

Keywords

Atacama Desert, *Gloeocapsopsis*, Desiccation tolerance.