

Increasing tolerance of bacteria to high salinity

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Halotolerant bacteria that thrive in saline environments are of considerable scientific and biotechnological relevance. Their adaptive capacity to high salinity and other environmental stress holds promise for many industrial processes and astrobiology. Therefore, a comprehensive evaluation of their ability to adapt to high salinity is important. In this study, we investigated the adaptive capabilities of five soil bacterial strains isolated from Trindade Island. Methods: Our approach involved subjecting bacterial strains to consecutive Tryptic Soy Broth (TSB) medium transfers containing increasing concentrations of NaCl: 100, 150, 200, 240, 260, and 280 g L⁻¹. Parallel control experiments were conducted, in which the inoculum was directly transferred from NaCl-free TSB to the target saline concentration. Subsequently, we compared the growth kinetics of microorganisms in the control treatments (cultivated without prior adaptation) with those that underwent gradual adaptation to an increasingly saline medium. Results: Except for *Halomonas* sp. 23%-S1B5, all bacterial strains acquired increased salt tolerance after gradual adaptation. *Halomonas* sp. 23%-S1B3 increased the salt tolerance from 100 to 200 g L⁻¹ and *Virgibacillus salarius* 23%-S2C4 from 200 to 240 g L⁻¹. *Bacillus glycinifermentans* 12%-S1C5 and 12%-S1C6 exhibited remarkable adaptive potential, increasing their maximum tolerance from 100 and 150 g L⁻¹ to 260 and 240 g L⁻¹, respectively. This study underscores the significant potential of halotolerant bacteria, especially *B. glycinifermentans* 12%-S1C5 and 12%-S1C6, to adapt to saline environments, thereby enhancing their utility in various applications. The mechanisms involved in the increased salt tolerance by each of the bacterial isolates are under scrutiny.

Key words: Halotolerant bacterian; Halophilic; Saline stress; Biotechnology; Trindade Island.

Adaptação de bactérias ao ambiente salino e desenvolvimento do seu potencial biotecnológico

Bactérias halotolerantes que prosperam em ambientes salinos são de considerável relevância científica e biotecnológica. Graças a sua capacidade adaptativa à alta salinidade e outros estresses ambientais, são importantes em processos industriais e para a astrobiologia. Portanto, é importante uma avaliação abrangente da sua capacidade de adaptação à salinidade elevada. Neste estudo, a capacidade adaptativa de bactérias da Ilha de Trindade foi testada a partir de consecutivas transferências de meio contendo concentrações gradativamente maiores de NaCl. Ao final, essa capacidade foi avaliada enfatizando a importância desses organismos para novos estudos e aplicações.

Palavras-chave: Bactérias halotolerantes; Halofílico; Estresse salino; Biotecnologia; Ilha de Trindade.
