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Compatible Solutes Accumulation Capacity of the Endophytic Bacteria *Kosakonia radicincitans*

Cruz Barrera Fredy Mauricio[1], Desirée Jakobs-Schoenwandt[1], Silke Ruppel[2], Mathias Becker[2], Beatrice Berger[2], Helmut Junge[3], Kristin Dietel[3], Anant Patel[1]

[1] *Bielefeld University of Applied Sciences, Wg Fermentation and Formulation of Biologicals and Chemicals, Germany*
[2] *Leibniz-Institut für Gemüse- und Zierpflanzenbau Großbeeren/Erfurt E.v., Germany*
[3] *ABiTEP GmbH, Germany*

Abstract

Interest in endophytic plant growth promoting bacteria (PGPBs) has increased during the last years because they are better protected inside plant tissues from abiotic stresses such as extreme variations in temperature, pH, nutrient, and water availability as well as biotic stresses such as competition. Endophytic PGPBs can directly or indirectly facilitate the growth of plants, thus decreasing synthetic fertilisers input. Recent studies on endophytic PGPB strain *Kosakonia radicincitans* DMS 16656T isolated by IGZ demonstrated its plant hormones production, N-fixing and phosphorus solubilising capacity, besides showing a wide plant growth promotion activity. However, the drying survival of the Gram-negative cells and shelf life remains poor. As a consequence, cultivation and formulation techniques for *K. radicincitans* are highly needed. Previous studies from our working group demonstrate the benefits of osmotic stress during cultivation on cell drying survival. Here we set out to elucidate the compatible solutes accumulation capacity of *K. radicincitans* triggered by osmotic stress. A high-throughput microfermentation approach with the BioLector® yielded results indicating accumulation affinity to pyrimidines such as ectoine and hydroxyectoine and the amino acid betaine from the culture media, significantly enhancing its growth rate under osmotic stress exerted by 4 % NaCl. When these compatible solutes were added to culture media with a concentration of 1 mM, since the beginning of fermentation, lag phase was reduced down to 6.7 h in comparison to the control media, which required at least 21.6 h. These first results indicate that a systematic approach to cultivation and formulation may increase shelf life of this Gram-negative bacterium.

Keywords: Biofertilisation, BioLector®, cultivation, endophytic bacteria

Contact Address: Cruz Barrera Fredy Mauricio, Bielefeld University of Applied Sciences, Wg Fermentation and Formulation of Biologicals and Chemicals, Bielefeld, Germany, e-mail: fmcruzb@gmail.com