

Evaluation of the Potential of a *Rhizobium* sp. Strain to Improve the Productivity of *Lactuca sativa* L. under Salinity [†]

Miguel Ayuso-Calles ¹, Alejandro Jiménez-Gómez ¹, José David Flores-Félix ² and Raúl Rivas ¹

¹ Department of Microbiology and Genetics, Faculty of Biology, University of Salamanca

² CICS-UBI—Health Sciences Research Centre, Faculty of Health Sciences, University of Beira Interior

* Correspondence:

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Abstract:

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Currently, there is a scientific consensus which indicates that the human production model and energetic consumption are involved in the rising of climate change. The impact that this global climatic alteration causes is translated into various adverse environmental conditions, which affect crop production and yield, such as soil salinity. In this sense, one of the alternatives with great potential to ensure productivity and sustainability within the agriculture is the use of biofertilizers, based on plant growth promoting rhizobacteria (PGPR). The application of microorganisms as fertilizers has been shown as an interesting practice to improve the development and nutritional content of crops, even in stressful situations.

The aim of this work was the search of new bacterial strains with potential to improve plant development under saline stress conditions. Firstly, a *Rhizobium* sp. strain was isolated from white clover nodules. Its ability to solubilize phosphates and produce siderophores and indoleacetic acid (IAA) was showed *in vitro*. Then, fluorescence microscopy assays exhibited that this isolated was able to colonize lettuce root system. Finally, through seedlings and greenhouse experiments, it was possible to verify its ability to improve plant growth. Furthermore, the greenhouse trial, developed under a salinity concentration of 100 mM NaCl, showed that this strain helped mitigate this abiotic stress in lettuce, and even to enhance the content in bioactive compounds, such as phenolic acids and flavonoids, of this horticultural crop.

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