



Abstract

Analysis of the Potential of a *Pseudomonas* Bacterial Strain to Promote *Brassica napus* Plant Growth and Study of Its Inoculation Effect on Root Bacterial Associated Communities [†]

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[†] Presented at the 1st International Electronic Conference on Plant Science, 1–15 December 2020; Available online: <https://iecps2020.sciforum.net/>.



Citation: González-Dominici, L.I.; Jiménez-Gómez, A.; Saati-Santamaría, Z.; García-Fraile, P. Analysis of the Potential of a *Pseudomonas* Bacterial Strain to Promote *Brassica napus* Plant Growth and Study of Its Inoculation Effect on Root Bacterial Associated Communities. *Biol. Life Sci. Forum* **2021**, *4*, 104. <https://doi.org/10.3390/IECPS2020-08848>

Academic Editor:
Yoselin Benitez-Alfonso

Published: 2 December 2020

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Abstract: Because of their plant-growth-promoting (PGP) properties, microbes play crucial roles in plant development, making them potential candidates for substituting chemical fertilizers, especially when the soil conditions are not the most appropriate to obtain maximum crop yields. This is the case of strain *Pseudomonas brassicacearum* CDVBN10, a bacterial endophyte isolated from rapeseed (*Brassica napus*) roots. Previous in vitro, in planta and in silico experiments have demonstrated that strain CDVBN10 has interesting PGP potential. This endophyte synthesizes cellulose, produces siderophores, solubilizes P, promotes plant height and root length in rapeseed seedlings, and carries genes implicated in several PGP pathways. Based on these data, we conducted greenhouse experiments using this strain as a biofertilizer under normal and salinity stress conditions, finding significant improvements in those inoculated plants, compared to the negative control. To prove its biofertilizer potential under field conditions, we carried out a field trial in which plants inoculated with CDVBN10 showed a 216%, 174.3%, and 197.8% increase in number of pods, seed weight, and aerial part weight, respectively. Along-read (SMRT; PacBio) 16S rRNA gene amplicon sequencing was performed in root samples from this field trials to study possible shifts on the rapeseed root microbiome due to the inoculation with CDVBN10. Interestingly, despite the great plant improvements, there were no significant differences in root bacterial communities of inoculated plants; thus, other potential beneficial members of the plant microbiome had not been displaced. According to the results, the strain *P. brassicacearum* CDVBN10 is suggested as a promising bacterial biofertilizer with great performance on *B. napus* crops.

Keywords: plant-growth-promoting; *Pseudomonas brassicacearum* CDVBN10; *Brassica napus*; salinity stress; biofertilizer; microbiome

Supplementary Materials: The poster presentation is available online at <https://www.mdpi.com/article/10.3390/IECPS2020-08848/s1>.

Author Contributions: Conceptualization, P.G.-F.; methodology, A.J.-G., Z.S.-S. and L.I.G.-D.; software, Z.S.-S.; formal analysis, A.J.-G., Z.S.-S. and P.G.-F.; investigation, A.J.-G., Z.S.-S. and L.I.G.-D.; resources, P.G.-F.; data curation, Z.S.-S.; writing—original draft preparation, L.I.G.-D.; writing—review and editing, P.G.-F.; visualization, A.J.-G., Z.S.-S., L.I.G.-D. and P.G.-F.; supervision, P.G.-F.; project administration, P.G.-F.; funding acquisition, P.G.-F. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by EUROPEAN UNION'S HORIZON 2020 research and innovation programme, grant number 750795.

Acknowledgments: The authors thank the Strategic Research Programs for Units of Excellence, Junta de Castilla y León (CLU-2018-04), for the funded equipment and facilities used in this work