

Peer Review

Review of: "Isolation of a Novel Plant Growth-Promoting *Dyella* sp. from Danish Natural Soil"

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The study identifies *Dyella* sp. A4 as a new species with plant growth-promoting attributes in tomato as well as *Arabidopsis*, with modulation of root architecture as one of the mechanisms for plant growth. The study is well-designed and executed, with clear objectives, appropriate methods, and rigorous data analysis. The results are clearly presented and support the authors' conclusions. The manuscript is well-written and organized, making it easy to follow the research. I would like to add some suggestions that can benefit the manuscript:

Introduction section

- A brief overview of the *Dyella* genus and its known ecological roles could provide valuable context for readers unfamiliar with this bacterial group.
- A clearer rationale for why the authors chose to focus on bacteria isolated from *Arabidopsis* roots would be beneficial. While *Arabidopsis* is a model organism, explicitly stating its relevance to broader agricultural applications would enhance the introduction.
- Focusing on a more in-depth discussion of the mechanisms by which PGPB promotes plant growth would provide a more comprehensive overview.
- Including the missing research gap/question asked in the study would further strengthen the manuscript.

Materials and methods

- In the soil collection and processing section under materials and methods, additional details on soil collection, such as information on soil type, soil pH, and nutrient content, would be valuable.

- While the authors mention that the soil was air-dried, it would be useful to specify the duration and conditions of the air-drying process.
- In the culture-independent analysis section, it would be helpful to indicate how the root samples were separated into "endosphere" and "rhizoplane" fractions.
- Adding the specific version of the KEGG database used would improve reproducibility.
- Why did the authors use gamma irradiation instead of the commonly used autoclaving method for the soil? Including this information in the introduction section would be helpful for the community.

Results

- It would be helpful to briefly explain the biological significance of the observed differences in bacterial community composition (e.g., what these changes might imply for plant health).
- The number of root endophytes isolated in this study (290) is very high when compared to other similar studies. Can the authors specify the reasons for such higher numbers?
- The authors could consider adding a table summarizing the PGP effects of the seven identified strains, including the magnitude of the growth promotion and statistical significance.
- The study observed that the *Dyella* sp. was not a plant colonizer, not even in the rhizoplane region. I believe the authors must discuss this aspect in detail in the discussion section and the mechanisms behind its PGP activity.

Discussion

- The authors could expand the discussion by comparing their findings to other studies that have investigated the role of *Dyella* species in plant growth promotion.
- In my opinion, the discussion section should focus on each of the sections in the results.
- The authors acknowledge that further research is needed to elucidate the molecular mechanisms underlying the PGP activity of *Dyella* sp. A4. It would be beneficial to expand on this by suggesting specific experiments that could be conducted to address this question (e.g., transcriptomic analysis, metabolomics).

Declarations

Potential competing interests: No potential competing interests to declare.