

Response to Reviewers Comments

Manuscript Title: Unraveling the plant growth promotion potential of *Pseudomonas* species isolated from the rhizosphere of *Lotus creticus* grown in the Mediterranean coastal regions of Morocco
Manuscript ID: EGUSPHERE-2026-298

Dear Editor and Reviewers,

We would like to sincerely thank the reviewers for the careful evaluation of our manuscript and for the constructive and insightful comments. We greatly appreciate the time and effort devoted to reviewing our work. We have addressed all comments point by point, and the corresponding revisions have been incorporated into the manuscript. Our detailed responses are provided below in italics with the reviewer's comments.

Referee 1

1. Line 14: The authors claim that this study is the "first report", but related studies have already been published by the authors in this region (Arakrak et al., 2018; Achkouk et al., 2020). Therefore, I suggest that the authors avoid such overly absolute wording and replace it with a more cautious and accurate statement. **Done**
2. Line 15: The strain numbering is still inconsistent between the Abstract and the main text. Please check Sections 3.2 and 3.3 carefully and ensure consistency throughout the manuscript. **Done**

The strain labels were standardized throughout the entire manuscript, including the Abstract, Sections 3.2 and 3.3, all figures, and all tables. The five strains are now consistently referred to as R8, R15, P79, R125, and R150.

3. Line 70: Please provide the source of the temperature and precipitation data, such as the relevant institution, database, or meteorological station. **Done**

Page 3, line 70: Added : 'Climatic data for the sampling site, including annual precipitation and seasonal temperatures, were obtained from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) database, available at <https://www.ncei.noaa.gov>. Sampling was conducted during the late flowering stage on mobile dunes.'

4. Lines 81-82: Please revise the term "Total Available phosphorus" in the main text and make it consistent with the wording used in the response letter. **Done**

The term was corrected to 'Available phosphorus' throughout the manuscript, consistent with the Olsen method, which specifically measures plant-available phosphorus.

5. **Lines 213-216:** The Methods indicate that growth was tested only at pH 3, 5, 6, 6.5, 7.5, 8.5, 9, and 10, whereas Table 5 reports tolerance of P79 at pH 11. Please resolve this inconsistency. **Done**

Page 7, line 214: Added : ‘Tolerance of the isolates to acidic and alkaline conditions was evaluated by streaking them onto buffered King’s B (KB) medium adjusted to pH values of 3, 5, 6, 6.5, 7.5, 8.5, 9, 10, and 11.’ *This inconsistency was resolved and was corrected to include pH 11, which was part of the tested range.*

6. **Line 225:** The use of "and/or" is too ambiguous for a Methods section and should be replaced by a precise description. The composition of the mineral solution should also be clearly specified. **Done**

Page 7, line 224-229: Added : ‘Additionally, the mineral solution described by Broughton and Dilworth (1971), containing 500 μM KH_2PO_4 , 1000 μM $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, 250 μM $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 250 μM K_2SO_4 , 10 μM ferric citrate, 1 μM $\text{MnSO}_4 \cdot \text{H}_2\text{O}$, 2 μM H_3BO_3 , 0.5 μM $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$, 0.2 μM $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, 0.1 μM $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$, and 0.1 μM $\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$ and adjusted to pH 6.8, was applied every three months throughout the experiment.’

7. **Lines 250-255:** The strain labels remain inconsistent. In addition, "bacillus-shaped colonies" and "cocci-shaped colonies" are not appropriate terms for colony morphology and should be revised using standard microbiological terminology. **Done**

Page 9, line 260-261: Added : ‘three isolates (R8, R15, and P79) exhibited rod-shaped cells (bacilli), whereas two isolates (R150 and R125) displayed spherical cells (cocci).

8. **Lines 274-275:** Please clarify whether the phrase "significant variation" is supported by an explicit statistical analysis. If not, the wording should be made more cautious. **Done**

9. **Line 284:** The text states that "All strains produced IAA and ACC deaminase, though only at low levels", whereas Table 3 reports IAA as "+++". Please reconcile the text with the table. **Done**

Page 11, line 287-289: Added ‘All strains exhibited low IAA levels and ACC deaminase activity, except for P79, which exhibited high IAA production.’

10. **Lines 312-313:** The Results state that P79 tolerated pH 11, but the Methods indicate that growth was tested only up to pH 10. Please check the consistency of the Methods, Results, and Table 5. **Done**

Page 7, line 214: Added : ‘Tolerance of the isolates to acidic and alkaline conditions was evaluated by streaking them onto buffered King’s B (KB) medium adjusted to pH values of 3, 5, 6, 6.5, 7.5, 8.5, 9, 10, and 11.’ *This inconsistency was resolved and was corrected to include pH 11, which was part of the tested range.*

11. **Discussion:** Expressions such as "synergistic effect", "metabolic versatility", "nutrient cycling", and "root colonization efficiency" should be used more cautiously unless they

are directly supported by the present data. Where direct evidence is lacking, the text should be revised to reflect a more tentative interpretation. **Done**

The Discussion was carefully revised to moderate these expressions. Where direct experimental evidence was lacking, interpretations were softened using tentative language (e.g., 'may', 'could', 'appears to', 'seems to'). Study Limitations and future perspectives' paragraph was also added to acknowledge the in vitro basis of the mechanistic claims and the scope of the study.

12. The manuscript would also benefit from further language editing to improve grammar, terminology consistency, logical flow, and overall academic precision. **Done**

The entire manuscript underwent thorough language editing to improve grammar and ensure terminology consistency.

Technical Corrections

1. Figure 3 shows a plate antagonism assay, but the caption states "n = 3 pots". Please correct this. **Done**
2. Please make the sample size description in Figures 4 and 5 fully consistent. If these are pot experiments, "n = 3 pots" is likely more appropriate and should be used consistently throughout. **Done**

The sample size descriptions in Figures 4 and 5 were made fully consistent. Both captions now use 'n = 3 pots', accurately reflecting the pot experiment design.

Referee 2

1. Missing statistical information in Table 1. The table lists specific values for each soil physicochemical parameter but does not indicate whether these values represent a single measurement or the mean of multiple replicates, nor does it provide standard deviations or ranges of variation. **Done**

Page 8, line 244 and line 254: Added : 'Values are expressed as the mean $\pm$ SD of three replicates.' Means and standard deviations values were calculated and added to table 1 and 2.

2. Inappropriate notation in the Figure 3 caption. Figure 3 presents an in vitro antagonism assay (plate confrontation) rather than a pot experiment. The "n = 3 pots" in the caption appears to have been copied and pasted from Figures 4/5. **Done**

The Figure 3 caption was corrected to reflect the in vitro antagonism assay.

3. **Inconsistent significant digits in numerical values. In Table 3, the P solubilization values exhibit inconsistent decimal precision. Done**

The numerical values in Table 3 were harmonized to a uniform decimal precision.

4. **Recommendation: Add a "Study limitations" section. Add a brief "Study limitations" paragraph at the end of the Discussion or before the Conclusion that systematically lists the limitations of the present study and directions for future research. Done**

Page 16, line 417-422: Added ‘However, the plant growth-promoting traits were mainly evaluated in vitro, which may not fully reflect natural soil conditions. Moreover, the underlying mechanisms were inferred from functional assays rather than confirmed by molecular or genomic analyses, and the long-term persistence of the strains was not assessed. Future studies should therefore include field trials across diverse coastal soils, larger sample sizes, and genomic approaches to clarify the mechanisms involved and support the development of effective and sustainable bioinoculant formulations.’