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Exploring the microbiota of *Eucalyptus globulus* leaves: identification of potential beneficial microorganisms

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Abstract

Background: The most common eucalyptus species in Portugal, *Eucalyptus globulus* Labill., has been planted as a source of wood for producing high-quality paper pulp since the mid-20th century (ICNF, 2019). Over the past 70 years, the area of eucalyptus plantations has steadily expanded, significantly impacting productivity and leading to an increased reliance on chemical fertilizers to sustain soil fertility across multiple growth cycles. Thus, eco-friendly bio-resources are a promising trend to meet more sustainable agriculture/forestry needs (Hawrylak-Nowak et al, 2019; Nosheen et al, 2021). **Objective:** This study aims to isolate and identify the microbiota community present on Eucalyptus globulus leaves in pure culture, to screen them for plant growth promoting effects. **Methods:** The isolation from leaves surface and extracts, in Luria-Bertani medium (LB), PYGV AGAR (DSMZ Medium 621) and potato dextrose agar media (PDA), with subsequent identification based on the 16S rRNA gene allowed the isolation of 45 strains. **Results:** The most common genus obtained was *Bacillus*, but *Curtobacterium*, *Frigobacterium*, *Pseudomonas*, *Priestia*, *Staphylococcus*, *Paenibacillus*, *Rossellomorea*, *Acetobacter* sp (a potential new species) and the yeast *Rhodotorula* were also detected. Furthermore, to assess the biofertilizer potential of the species, the indole-3-acetic acid (IAA) production and phosphorus solubilization capacity of all the isolates were evaluated. Strains like *Pseudomonas azotoformans*; *Curtobacterium flaccumfaciens* and *Bacillus* sp. demonstrated the ability to produce IAA and solubilize phosphorus. Moreover, *Priestia megaterium, Bacillus* sp*, Rossellomorea* sp, *Rhodotorula* sp and *Frigoribacterium* sp produces IAA and *Staphylococcus warneri* and *Bacillus* sp, solubilizes phosphorus. **Conclusions:** Therefore, this approach represents a significant step toward the development of a biofertilizer consortium that will promote *E. globulus* growth, enabling a more sustainable management of this hardwood species.

Keywords: biofertilizer; IAA; phosphorus solubilization

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References

1. ICNF, "Relatório sumário," 2019. Accessed: Apr. 12, 2024. [Online]. Available: https://www.icnf.pt/api/file/doc/c8cc40b3b7ec8541Dillard, J.P. et al.
2. Hawrylak-Nowak B. et al., Biostimulation and biofortification of crop plants – new challenges for modern agriculture," *Acta Agrobotanica*, **2019**, vol. 72, no. 2, doi: 10.5586/aa.1777.
3. S. Nosheen S. et al., Microbes as biofertilizers, a potential approach for sustainable crop production **2021**, *Sustainability (Switzerland)*, vol. 13, no. 4, pp. 1–20, Feb., doi: 10.3390/SU13041868.