

VII Simpósio de Microbiologia Agrícola

Inovação e Sustentabilidade para transformar o campo

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Unveiling the role of the *ipdC* gene in indoleacetic acid biosynthesis and plant growth promotion by *Pantoea agglomerans* 33.1

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The indole-3-acetic acid (IAA) is an important phytohormone for root development and plays a key role in plant-bacteria interactions. Biosynthesized by plant growth-promoting bacteria (PGPB), bacterial IAA production occurs majorly via the indole-3-pyruvic acid (IPyA) pathway, mediated by the *ipdC* gene. Among various PGPB, the strain *Pantoea agglomerans* 33.1 stands out for its high IAA production capacity and its significance as a biological product. Given this context, the present study aimed to investigate the role of the *ipdC* gene in IAA biosynthesis within this strain. To achieve this, a 33.1 $\Delta ipdC$ mutant was constructed using the λ -Red recombination system and molecularly validated by PCR and sequencing. The phenotypic impact was evaluated by comparing bacterial growth and indole compound production between the wild-type and mutant strains in media supplemented with the precursor L-tryptophan. Additionally, plant growth promotion was assessed in *Zea mays* under greenhouse conditions, analyzing root parameters through WinRHIZO software. The results reveal that, despite the successful gene knockout, bacterial growth remained unaffected. Furthermore, while IAA synthesis was shown to be dependent on L-tryptophan, the Salkowski assay did not detect significant differences between the wild-type and the mutant. However, root analysis from the greenhouse experiments demonstrated significant differences, with the wild-type strain showing greater plant growth promotion compared to the mutant. As a result, this study provides a foundation for further investigations into the genetics of IAA biosynthesis in *P. agglomerans* 33.1, aiming to optimize its application in sustainable agriculture.

KEYWORDS: IAA, PGPB, *Pantoea agglomerans* 33.1, *ipdC*

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