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RHIZOSPHERE-ASSOCIATED *Klebsiella* IN PROMOTING CHILLI GROWTH

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Klebsiella inhabit soil, water, human, animal guts, plants and endophytic environments. While some strains are infectious and opportunistic pathogens, others have been developed as commercial biofertilisers. This study evaluated plant growth promotion (PGP) potential of three chilli rhizosphere-associated *Klebsiella* strains. Two strains, CSTM6 and CSTM14 were identified as *K. aerogenes,* and CWSM11 as *K. variicola* by 16S rRNA sequencing. They were screened for PGP attributes, including phosphate, potassium and zinc solubilisation, siderophore production, nitrogen fixation and indole-acetic-acid (IAA) production. Effects on chilli seedling growth were evaluated through seed inoculation and application of fermentation broth to the potting mixture, with three replicates per treatment and control. Plant growth was measured 45-days after inoculation. All three strains solubilised $Ca_3(PO_4)_2$, $ZnCO_3$ and ZnO. Only CWSM11 solubilised apatite and all tested potassium sources. Strain CSTM14 solubilised mica and MOP, while CSTM6 solubilised only MOP. The iron-chelating siderophore production was limited to two CSTM strains. All three strains were found diazotrophic and contributed to enhancing the availability of essential nutrients in the rhizosphere. They also secreted high levels of IAA (> 50 mg L^{-1}) with CSTM strains producing > 200 mg L^{-1}. Biofilm formation is an important trait for effective seed inoculation of bacteria. Strains CSTM6 was found to be a moderate biofilm maker (optical density = 0.45), while the others were weak producers. Plant growth assessments, including shoot and root lengths, biomass, leaf number and chlorophyll content, showed that both seed inoculation and application of fermentation broth significantly enhanced seedling growth compared to controls. *Klebsiella* fermentation broths, rich in secondary metabolites, notably outperformed on shoot growth by enhancing shoot length, shoot fresh weight, leaf number and chlorophyll content. Root growth was promoted only with CWSM11 fermentation broth treatment. These findings highlight that *K. aerogenes* and *K. variicola* strains from the chilli rhizosphere promote growth by enhancing nutrient availability and producing IAA.

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