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Bioprospecting Indigenous Drought Mitigating and Plant Growth-promoting Isolates for Chickpea Cultivation in Telangana, A Semi-Arid Region

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KEY WORDS

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Soil microbes

ABSTRACT Drought and diseases are important constraints limiting crop yields around the world. Drought stress is one of the major agricultural problems limiting crop productivity in most of the arid and semiarid regions like Telangana in India. Considering this situation, the present study was aimed to isolate soil microbes possessing plant growth-promoting and drought mitigating potential for improving agricultural output in Telangana. A total of 50 bacteria were isolated from native soils and screened for indole acetic acid (IAA) production. Three isolates (ISO1, ISO2, and ISO3) were found to secrete good levels of IAA. Bacterial isolates, ISO2, and ISO3 were drought tolerant *in vitro* and their ability to produce IAA varied with water stress. *In vivo* plant, growth-promoting potential of these isolates was evaluated by conducting pot culture experiments using chickpea plants during February 2019–March 2019. *Bacillus* sp. ISO2 and *Pseudomonas* sp. ISO3 enhanced the growth of chickpea plants. Drought alleviating ability of plant growth-promoting bacteria strains was investigated after exposing the plants to drought stress. Chickpea plants grown in *Bacillus* sp. ISO2 inoculated soil exhibited good drought stress tolerance. Inoculation of this isolate resulted in improved chlorophyll and proline levels in chickpea plants. This isolate also protected the plant from antioxidant stress as evidenced by levels of superoxide dismutase, peroxidase, polyphenol oxidase, and catalase enzymes.

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