ABSTRACT BOOK

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Samsun, Türkiye

Editors

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Plant growth promotion of wheat seedlings using Bacillus inoculants

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ABSTRACT

Wheat (Triticum aestivum L.) is one of the most widely grown crops used in human diet due to its high protein and energy content. With a growing world population and food demands, enhancing the production potential of wheat is of great importance for agriculture. Microbial inoculants based on plant growth promoting bacteria (PGPB) have emerged as an eco-friendly alternative for sustainable production of cereals. One of the most significant traits of PGPB is the production of indole-3-acetic acid (IAA), as it triggers the seed germination, controls plant cell division and tissue differentiation during early development stages. Therefore, the aim of this research was to evaluate the effects of IAA-producing Bacillus spp. isolates on seed germination and seedlings growth. Bacillus spp. BHC 9.1 and BHC 5.4 were isolated from mildly alkaline soil and alkaline soil, respectively. The ability of isolates to produce IAA was quantified spectrophotometrically using Salkowski reagent method. The ability of bacterial isolates to induce seed germination and seedlings growth of wheat was evaluated in vitro on Petri dishes by filter paper method and results were expressed as relative germination index (RSGI%) and length of shoots and roots. Isolates BHC 9.1 and BHC 5.4 were characterized as IAA producers (1.81 and 6.55 µg mg-1, respectively). Application of both bacterial treatments increased germination of wheat seeds in vitro. Relative seed germination index of wheat seeds treated by isolate BHC 9.1 and BHC 5.4 was 110.5% and 101.3%, respectively. The highest increment of shoots was recorded for BHC 9.1 inoculation (19.5%), while BHC 5.4 increased roots length for up to 12.3%, in comparison to the control. These results indicate the potential of selected Bacillus spp. isolates to enhance germination of wheat seeds. Future studies should aim to enhance the efficiency of Bacillus-based bio-inoculants under semi-controlled and field conditions, providing sustainable agricultural practices.

Key words: Bio-inoculants; early plant development; indole-3-acetic acid; seed germination; sustainable agriculture

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