

POTENTIAL OF BENEFICIAL BACTERIA ON TOMATO GROWTH IMPROVEMENT

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INTRODUCTION

The rhizosphere is a hot spot of microbial interactions due to the exudates released by plant roots. Among the several suggested mechanisms for improvement in plant growth, the most plausible one is the changes in the endogenous levels of plant-growth-regulating substances caused by the beneficial bacteria. Inoculation of plants by beneficial microorganisms to increase the levels normally found in soil is necessary to take advantage of their beneficial properties for plant yield enhancement. So, the selection of most effective beneficial bacterial strains is a prerequisite. This study was conducted to determine candidate native *Bacillus* strains exhibiting the highest PGP ability on tomato plant under in vitro conditions and pot experiments.

MATERIALS AND METHODS

Bacterial strains. Several *Bacillus* spp. were characterized based on phenotypic and molecular methods previously.

In vitro bioassay. To select candidate strains, plant growth promoting abilities including auxin production, phosphate solubilization, siderophore and HCN production were determined for all isolates.

Greenhouse conditions. Sterilized seeds were coated with peat based inoculums of bacteria (10^8 – 10^9 /g peat). Pots kept in greenhouse at 25°C, 50% humidity. All statistical analyses were carried out using SPSS 16 software under fully randomized design with four replications.

RESULTS AND DISCUSSION

Plant growth promoting abilities. The most active IAA producers were *Bacillus* sp.- WhIr15. Its ability to produce IAA increasing up to 96 h. *Bacillus cereus*- ToIr14 has the ability to produce siderophore on CAS agar and solubilizes tricalcium phosphate.

Pot experiments. Statistical analysis of data revealed that WhIr15 increases root length by 61.5%. Similarly, 84 and 65% increases in shoot length were observed with *Bacillus* sp. WhIr15 and *B. subtilis* WhIr13, respectively over untreated controls. Considerable effect on root and shoot dry matters were also determined. Auxin production and formation of desiccation resistant spores by *Bacillus* spp. offer good opportunity to use these traits in plant growth promotion. Isolates WhIr15 produces only auxin in the highest level, But its effectiveness is acceptable. Therefore it seems the growth promotion of plants by beneficial bacteria is mainly related to phytohormone production rather than other metabolites. Potential for auxin biosynthesis by rhizobacteria is a significant factor causes maximum growth in crops of agronomic interest such as tomato.

Keywords : Beneficial bacteria, indigenous, Tomato

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