

Title : Evaluation of Plant-Beneficial Actinobacteria for Enhancing Growth and Bioactive Compound Production in Microgreens

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ABSTRACT

Microgreens have gained popularity among health-conscious individuals due to their higher nutrient content compared to their mature counterparts. They are particularly rich in bioactive compounds such as antioxidants, carotenoids, flavonoids, glucosinolates, and phenolic compounds. Plant-beneficial actinobacteria have previously been reported to promote plant growth and enhance the accumulation of bioactive compounds. Therefore, this study aimed to evaluate the effect of the actinobacterium *Streptomyces thermocarboxydus* S3 on the growth and bioactive compound production in four types of microgreens: kale, red cabbage, broccoli, and mustard. The following treatments were applied to microgreens: (1) *S. thermocarboxydus* S3 spore suspension (10^8 CFU/mL), (2) *S. thermocarboxydus* S3 supernatant, (3) ISP2 broth, and (4) control (without actinobacteria). The microgreens were cultivated for 9 days under well-watered and reduced water conditions. The results showed that inoculation with *S. thermocarboxydus* S3 spore suspension significantly increased carotenoids and phenolic compound content in kale microgreen compared to other treatments under both water conditions. In addition, inoculation with *S. thermocarboxydus* S3 spore suspension significantly increased carotenoids and total chlorophyll content in broccoli microgreen compared to other treatments under well-watered conditions. Both types of microgreen treated with either the actinobacterial spore suspension or supernatant showed no significant differences in fresh weight, dry weight, antioxidant activity, or vitamin C levels compared to the control. However, the treatments effectively maintained these parameters under both well-watered and reduced water conditions, suggesting a potential role in supporting plant resilience. Study on the effect of *S. thermocarboxydus* S3 on red cabbage and mustard microgreens are ongoing. This study reveals the potential of plant-beneficial actinobacteria to boost bioactive compounds in microgreens, offering new strategies to enhance plant nutrition.