

## Evaluation of the Role of Bacteria-Derived Flavins as Plant Growth Promoting Molecules

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**Abstract :** Riboflavin is a water-soluble vitamin and the direct precursor of the flavin cofactors flavin mononucleotide and flavin adenine dinucleotide. Flavins (FLs) are bioactive molecules that have a beneficial effect on plant growth and development. *Sinorhizobium meliloti* strain 1021 is an  $\alpha$ -proteobacterium that forms agronomically important  $N_2$ -fixing symbiosis with Medicago plants and secretes a considerable amount of FLs (FL<sup>+</sup> strain). This strain was also implicated in plant growth promotion in its association with non-legume host plants. However, the mechanism of this plant growth promotion is not well understood. In this study, we evaluated the growth and development of tomato plants inoculated with *S. meliloti* 1021 and its mutant (FL<sup>-</sup> strain) with limited ability to secrete FLs. Our preliminary experiments indicated that inoculation with FL<sup>+</sup> strain significantly increased seedlings' root and shoot length and surface area compared to those of plants inoculated with FL<sup>-</sup> strain. For example, the root lengths of 9-day old seedlings inoculated with FL<sup>+</sup> strain were 35% longer than seedlings inoculated with the mutant. Proteomic approaches combined with the analysis of plant physiological responses such as growth and photosynthetic rate, stomatal conductance, transpiration rate, and chlorophyll content will be used to evaluate the host-plant response to bacteria-derived FLs.

**Keywords :** flavin, plant growth promotion, riboflavin, *Sinorhizobium meliloti*

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