Enhanced specialized metabolite, trichome density, and biosynthetic gene expression in *Stevia rebaudiana* (Bertoni) Bertoni plants inoculated with endophytic bacteria *Enterobacter hormaechei*

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ABSTRACT

Stevia rebaudiana (Bertoni) Bertoni is a plant of economic interest in the food and pharmaceutical industries due its steviol glycosides (SG), which are rich in metabolites that are 300 times sweeter than sucrose. In addition, *S. rebaudiana* plants contain phenolic compounds and flavonoids with antioxidant activity. Endophytic bacteria promote the growth and development and modulate the metabolism of the host plant. However, little is known regarding the role of endophytic bacteria in the growth; synthesis of SG, flavonoids and phenolic compounds; and the relationship between trichome development and specialized metabolites in *S. rebaudiana*, which was the subject of this study. The 12 bacteria tested did not increase the growth of *S. rebaudiana* plants; however, the content of SG increased with inoculation with the bacteria *Enterobacter hormaechei* H2A3 and *E. hormaechei* H5A2. The SG content in leaves paralleled an increase in the density of glandular, short, and large trichome. The image analysis of *S. rebaudiana* leaves showed the presence of SG, phenolic compounds, and flavonoids principally in glandular and short trichomes. The increase in the transcript levels of the *KO*, *KAH*, *UGT74G1*, and *UGT76G1* genes was related to the SG concentration in plants of *S. rebaudiana* inoculated with *E. hormaechei* H2A3 and *E. hormaechei* H5A2. In conclusion, inoculation with the stimulating endophytes *E. hormaechei* H2A3 and *E. hormaechei* H5A2 increased SG synthesis, flavonoid content and flavonoid accumulation in the trichomes of *S. rebaudiana* plants.

Subjects Agricultural Science, Biotechnology, Microbiology, Molecular Biology, Plant Science

Keywords *Stevia rebaudiana*, Endophytic bacteria, Trichomes, Steviol glycosides, Biosynthetic genes, UDP-glycosyltransferases, Bacteria-plant association, Plant-endophytic microorganism interactions, Kaurene oxidase, Specialized metabolite

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