Alleviating the inhibitory effect of salinity stress on nod gene expression in Rhizobium tibeticum – fenugreek (Trigonella foenum graecum) symbiosis by isoflavonoids treatment

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Abstract:

Rhizobia-legume symbiosis depends on molecular dialog, which involves the production of specific plant flavonoid compounds as signal molecules. Rhizobium tibeticum was recovered from the root nodule of fenugreek and identified by sequencing the 16S rRNA gene. The effect of salinity stress on nod gene expression was measured in terms of $\beta$-galactosidase activity. R. tibeticum containing Escherichia coli lacZ gene fusions to specific nodulation (nod) genes were used to determine $\beta$-galactosidase activity. Combination of hesperetin (7.5 mM) and apigenin (7.5 mM) significantly increased $\beta$-galactosidase activity more than the single application of hesperetin or apigenin. Preincubation of R. tibeticum with hesperetin and apigenin combination significantly alleviates the adverse effect of salinity on nod gene expression and therefore, enhances nodulation and nitrogen fixation of fenugreek.

Keywords:

Rhizobium tibeticum; isoflavonoids; salinity; $\beta$-galactosidase; nodulation

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