

## Abstract

In order to evaluate the efficacy of salicylic acid and *Bacillus amyloliquefaciens* PTCC1732 on gene expression and some physiological characteristics of *Dracocephalum moldavica*, a factorial experiment in a completely randomized design with three replications, in 1392, Zabol University Agricultural Research was conducted in the greenhouse in which the effect of spraying salicylic acid in 3 levels (0, 1, and 2 mM) and bacterial injection in plant root, in two levels (0 and  $1 \times 10^{-7}$  CFU/ml), were evaluated. In this study the gene expression of phenylalanine ammonia lyase and phenylalanine ammonia lyase enzymes, proline, carbohydrates, Photosynthesis pigments (chlorophyll a, b and Carotenoids), antioxidants (guaiacol peroxidase and catalase), total phenolics and flavonoids were measured. The result of analysing the variance showed that *Bacillus* bacteria and salicylic acid had a significant effect on the level of gene expression and increase the amount of phenylalanine ammonia lyase activity, Photosynthesis pigments, flavonoid, total phenolics, proline and carbohydrate compared to the control and the activity of enzymatic antioxidant were decreased, but the bacteria were more effective than salicylic acid on the characteristics indicated above. In this study, for evaluating PAL gene expression pattern by salicylic acid and *Bacillus amyloliquefaciens* treatment with using real time PCR, was observed and the results showed that the treatments which were applied, increased the gene expression. Based on the findings of this research, it can be concluded that the use of *Bacillus amyloliquefaciens* PTCC1732 and salicylic acid are effective on increasing the yield and quality traits.

**Keywords:** *Dracocephalum moldavica* , *Bacillus amyloliquefaciens* PTCC1732, Physiological traits, Salicylic Acid, gene Phenylalanine ammonia lyase



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**Evaluation of the different levels of salicylic acid and  
*Bacillus amyloliquefaciens*PTCC1732 on gene  
expression Phenylalanine ammonia lyase in  
*Dracocephalum moldavica***

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