

## Abstract

Basil (*Ocimum basilicum*), annual herb and a member of the Lamiaceae family, is used in traditional Iranian medicine in treatment of headaches, diarrhea, coughs, warts, and kidney malfunctions. Phenylpropanoid compounds that is important part of essential oils of basil leaves, is passed from shikimate pathway. Important phenylpropanoid compounds in basil are for example eugenol, methyleugenol, chavicol, methylchavicol, myristicin, methylcinnamat. These compounds is regulated by several groups of enzymatic reactions that phenyl alanine amonia-lyase (PAL) is the key enzyme in production of phenylpropanoids. It catalyzes the first step of the phenylpropanoids pathway in which L-phenyl alanine is deaminated to trans-cinnamic acid. Many factors affected on synthesis of *PAL* and the resulting plants phenolics, these factors include age, concentration of growth factors, herbivory, tissue wounding, pathogenic attack, UV irradiation and low temperature. Chitosan, as a useful biotic elicitor, has been approved for improving the biosynthesis of secondary metabolites in many medicinal plants. In the present study, the effect of chitosan on *PAL* gene expression and on essential oils of basil was evaluated and relation between gene expression and *PAL* activity with phenypropanoid content and total phenolic compounds was studied. This experiment was performed in biocentre of Zabol university in autumn 2012. The plants were treated by chitosan at preflowering stage and harvested in different times, 1, 2, 3, and 5 days after chitosan. *PAL* gene expression was assayed by Real time PCR, essential oils were identified by GC-MS. The results showed that *PAL* activity and gene expression increased one day after using chitosan and decreased five days after using chitosan. Totally, *PAL* gene expression and enzyme activity changes were correlated with phenyl propanoids and total phenols changes in different harvest sages. Thus, chitosan as a biotic elicitor increased phenyl propanoid compounds by increasing *PAL* gene expression and enzyme activity.

**Key words:** *Ocimum basilicum*, essential oils, gene expression, phenylalanine ammonialyase



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**The effect of chitosan on gene expressio for  
phenylalanine ammonialyase and essential  
oils in basil (*Ocimum basilicum*)**

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