

Abstract

Perovskia abrotanoides is a Medicinal and ornamental plant with Persian name Brazmbel (local name:Gole Kaboud), and it is a bush or shrub half plant with a meter in length that will duplicate by seeds. The genus of Peroviska L., local named Brazmbel, belongs to the Lamiaceae in Iran, has 3 species that Perovskia abrotanoides has the largest distribution in Khorasan Razavi and Golestan province . The roots of this plant are widely used in medicine for the treatment of Leishmaniasis. Antioxidant function of it, strengthens the heart, and also the deterrent effect of Ldvzrdvktaz has been reported. Also, the concentrations of this plant as cytotoxic in pathogens, viruses and cancer cells have been reported. Diterpenes are one of the most abundant compounds that were identified among these alkaloid compounds of Tanshinone. Osmotic stresses in plants cause the production of free radicals, and plants use various strategies to remove these toxic radicals that the most important of them are the production and accumulation of secondary metabolites. The study investigated the effects of biotic and abiotic Elicitors (yeast extract and silver nitrate) on the expression of DXS, HMGR, and GGPPS genes involved in the production of Tanshinone in Brazambel. Plants in germinator in the 4 leaves- stage II with concentration of yeast extract (1000,200) ml/L and 2 Silver nitrate concentrations (25,125) μM was treated. The roots and leaves were sampled after seven days. The expression of these genes were examined by Real Time PCR and Tanshinone content was measured by HPLC device.. The results showed that yeast extract at a concentration of 1000 mg/L have had the greatest impact on the introduction of Alkaloid Tanshinone and the treatment of silver nitrate at a concentration of 125 μM had least effect. On the other hand overexpression of genes GGPPS and Dxs on a leaf had a positive correlation with this finding and the Interaction effects of the treatment and silver nitrate on the expression of HMGR in leaf had positive results in the production of alkaloids. The items listed show the more correlation of the production of alkaloids Tanshinone with MEP pathway.

Key Words: Brazambel; Gene Expression; DXS,HMGR, GGPPS genes; Tanshinone; Elicitors



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**The effect of yeast extracts and silver nitrate on
the expression of genes involved in the production
of Tanshinone in *Perovskia abrotanoides***

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