

Abstract

Reducing the damage caused by drought stress in plants using biological fertilizers such as growth promoting bacteria, salicylic acid and improvement of physiological parameters and, thus raising the level of plant yield in arid and semiarid regions are the necessary management to reduce drought stress in plants, including the *Mentha Spicata* plant. Therefore, this experiment was performed in triplicate in the form of factorial based on a randomized complete design with three levels of drought stress, 80% of field capacity as a control, 60% of field capacity and 30% of field capacity, bio-fertilizer (inoculated and non-inoculated) and salicylic (zero as a control and 1 mM). The result of variance analysis showed that the different levels of drought, salicylic acid, growth promoting bacterial (PGPR) and their interactions on the growth of *Mentha spicata* were effective. Drought stress caused reducing some measured traits, while it increased the activity rate of antioxidant enzymes (catalase, peroxidase, polyphenol oxidase). But the use of bacteria (*Bacillus1732*) and salicylic acid resulted in increasing traits such as; photosynthetic pigment, total soluble sugars, proline, flavonoids, total phenols, absorption of nutrient elements, morphological traits and reducing oxidative damage. The interaction of these factors also increased the level of limonene hydroxylase gene expression. According to this study can be concluded that the use of bacteria (*Bacillus1732*) and salicylic acid is appropriate way in order to increase plant resistance against drought. out to study gene expression limonene hydroxylase using Real-time PCR. The results showed that the interaction of these three factors were significant at 5% level.

Keywords: *Mentha Spicata*, Drought stress, Bacteria(*Bacillus amyloliquefaciens* PTCC 1732), salicylic acid, limonene hydroxylase, QReal-time PCR.



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**Evaluation of the effects of *Bacillus
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expression pattern of Limonene hydroxylase
(lim3h) in *Mentha spicata* under drought stress**

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