

Abstract

Feverfew plant, scientifically called *Tanacetum Parthenium*, is a two or more-year-old type from aster Asteraceab family, that used in the treatment of headaches, migraines, ringing in the ears, vertigo, arthritis, fever and tranquilizing its pains, and decreasing abdominal pain, toothache and insect bites. Sesquiterpene lactones are the most abundant compounds in the plant that among the compounds, parthenolide classified in Germacranolid group, up to 85 percent contains the sesquiterpene of plant and most properties of this plant have been attributed to this compound. Osmotic stress in plants produces free radical and for cleaning up the toxic radical, plants adopt different strategies, the most important one is the production and accumulation of secondary metabolites. Nanoparticle is one of these elicitors recently used. Nanoparticles are the most important tools of nanotechnology used a lot in biology sciences. This study investigates the effects of non-biological elicitors (nanoparticles and drought stress) on the gene expression of Germacrene A synthase (*TpGAS*) and parthenolide synthase (*TpPTS*) involved in the production of the feverfew parthenolide plant. This experiment was conducted in Zabol University Environmental Center (biosynthesis) in 2015 winter and plants in the vegetative stage, about 15cm tall with the silver nanoparticles of green synthesis and chemical synthesis 30 ppm and nano-iron with the ratio of two per thousand ml were treated and were affected by drought stress. After drought stress treatment and spraying nanoparticle samples are taken from the plant. Gene expression was evaluated by Real Time PCR, and parthenolide was measured through the extraction method by HPLC and by the parthenolide standard curve. The results showed that gene expression Germacrene A synthase (*TpGAS*) and parthenolide synthase (*TpPTS*) in the case of applying green synthesis of silver nanoparticles compared to control plants, treated chemically synthesized silver nanoparticles and nano iron chelated significant increase in the % 1 percent indicated the highest expression of Germacrene A synthase (*TpGAS*) and parthenolide synthase (*TpPTS*) in the case was that the plant is under stress, and the green is the synthesis of silver nanoparticles treatment. The positive correlation between gene expression Germacrene A synthase (*TpGAS*) and parthenolide synthase (*TpPTS*) were observed with the parthenolide. So that the changes in gene expression changes of parthenolide was consistent with the actions of various nanoparticles.



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**Effects of elicitors on germacrene A synthase
(*TpGAS*) and parthenolid synthase (*TpPTS*) gene
expression involved in parthenolid production in
plant *Tanacetum parthenium***

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