



The Effect of Plant Growth Regulators on Shoot Regeneration and Production of Phenolic Compounds in *Perovskia Abrotanoides* Karel.

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Perovskia abrotanoides Karel. (Lamiaceae) is a medicinal plant which grows as wild populations in some areas of Iran [1]. Several pharmacological effects including antibacterial, anti-inflammatory, anti-cancer, antifungal, and rheumatoid pain relief and cytotoxic effects have been reported for this plant, which are mainly attributed to the presence of phenolic acids, in particular, rosmarinic acid and tanshinones. The purpose of the present study was to establish efficient shoot regeneration protocols for *P. abrotanoides* and optimizing and enhancement of phenolic compounds production in the regenerated shoots using some plant growth regulators. At first, mature seeds were harvested from plants in their natural habitat and after scarification with sandpaper and sterilization were cultured on free-hormone MS basal medium. Then, stem nodal explants from 40-day-old plants were cultured on MS medium supplemented with different concentrations of kinetin (KIN) (ranged 0.125 to 3.5 mg/L), 6-benzylaminopurine (BAP) (ranged 0.25 to 2.0 mg/L), 1-naphthaleneacetic acid (NAA) (0.1 and 0.5 mg/L) and indole-3-acetic acid (IAA) (ranged 0.25 to 2.0 mg/L) alone or in combination to induce shoots. Tissue culture experimental design was completely randomized with 7 replicates and 28 explants per treatment. After 30 days, growth indices, total contents of phenolic acids, phenolic compounds and flavonoids were measured in the regenerated shoots. The concentration of rosmarinic acid in the shoots was determined using HPLC method. The highest dry (0.03 ± 0.003 g) and fresh (0.20 ± 0.015 g) weights for the regenerated shoots were obtained on MS with 0.125 mg/L IAA. The highest contents for total phenol (57.12 ± 1.70 mg gallic acid/g DW) and phenolic acids (15.83 ± 0.50 mg rosmarinic acid/g DW) was determined on MS with 3.5 mg/L KIN + 0.25 mg/L IAA. Also, the maximum amounts for total flavonoid (9.13 ± 0.50 mg quercetin/g DW) and rosmarinic acid (8.37 ± 0.71 mg/g DW) in the regenerated shoots were reported on MS with 0.5 mg/L KIN + 0.125 mg/L IAA. Based on the results, significant increases were observed in the total phenolic (2.42-fold) and flavonoid (2.12-fold) contents, as well as the amounts of phenolic acids (2.48-fold), and rosmarinic acid (4.9-fold) in the regenerated shoots, as compared to the control plants. In conclusion, our findings showed that *in vitro* shoot culture is an efficient tool for improvement of medicinal metabolites production in *P. abrotanoides*.

Keywords: *Perovskia abrotanoides* Karel., Plant growth regulators, Phenolic compounds

References

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