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EFFECTS OF SALICYLIC ACID ON TOTAL PHENOLIC AND ROSMARINIC ACID CONTENTS IN LEMON BALM (*MELISSA OFFICINALIS* L.) PLANTS EXPOSED TO NICKEL STRESS

Elahe Soltani[1*], Tayebeh Radjabian[1], Parvaneh Abrishamchi[2], Massoud Taghizadeh[1]

[1]*Department of Biology, Shahed University, Tehran, Iran*
[2]*Department of Biology, Ferdowsi University, Mashhad, Iran*
E-mail: soltanielahe66@gmail.com

Lemon balm (*Melissa officinalis* L., Lamiaceae) is a well-known medicinal plant mainly due to two groups of compounds, the essential oil and the phenylpropanoid derivatives. Rosmarinic acid (RA) is a prominent phenolic compound of *M. officinalis* which is the dimer form of an ester of caffeic acid and 3, 4-dihydroxyphenyllactic acid. Rosmarinic acid shows a number of interesting biological activities and antioxidant, anti-inflammatory, antiviral and antimicrobial properties of RA have also been reported [1]. This study was undertaken to determine the phenolic content and RA contents in leaves of *M. officinalis* plants treated with salicylic acid (SA) during Ni-induced stress. Sterilized seeds were transferred into pots and irrigated with Hoagland nutrient solution, under glasshouse conditions. Plants at 6-8 leaf stage were treated with different concentrations of Ni (0, 25, 50, 75, 100, 250, 500 µM) every alternate day and SA (0 and 1000 µM) mixed with tween-20 was sprayed in the evening of the same day. After two months, leaf samples were extracted in methanol and total phenolic content of extracts were determined spectrophotometrically [2]. Hydroalcoholic extracts of the dried and powdered samples were prepared for analysis of RA [3]. A HPLC method was developed to determine the content of RA in extracts. The results indicated that RA content slightly increased with increasing of Ni concentration and reached to 3.05 mg/g dry weigth in 500 µM Ni. Total phenolic content was increased with increasing of Ni concentration as expected, except for the concentration of 75 µM Ni (9/83 mg/g). The highest total phenolic content was observed in 500 µM Ni concentration (23.15 mg/g). With increasing Ni concentration, exogenous SA significantly decreased total phenolic content, as well as RA content in stressed plants. Our data suggest that phenolic compounds as potent antioxidants play an important role in the metabolism of *M. officinalis* to survive under heavy metal pollution. The toxic effects of Ni were however alleviated by the exogenously applied SA thereby underscoring the beneficial role of this signal molecule in mediating defense response in plants under stress [4].

References

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