Effect of Salinity Stress on Some Biochemical Characteristics Four Genotypes of Almond (Prunus dulcis)

A. Momenpour ¹ *, A. Imani and D. Bakhshi

Assistant Professor, National Salinity Research Center, Agricultural Research, Education and Extension Organization (AREEO), Yazd, Iran.
a.momenpour@areeo.ac.ir

Associate Professor, Temperate Fruits Research Center, Horticultural Sciences Research Institute, Agricultural Research Education and Extension Organization (AREEO), Karaj, Iran.
Imani_a45@yahoo.com

Associate Professor, Horticultural Department, College of Agriculture, University of Guilan, Rasht, Iran.
bakhshi-d@guilan.ac.ir

Abstract

Scion-rootstock combination and level of salinity affect on the biochemical characteristics of almond cultivars. To evaluate the effect of salinity stress on the biochemical reactions of almond cultivars and genotypes, a factorial experiment was carried out based on completely randomized design (CRD). Treatments included two factors: Factor A: genotypes in four levels (‘Shokofeh’, ‘Sahand’ cultivars, and ‘13-40’ genotype budded on GF677 rootstock, and GF677 (without budding)), and Factor B: irrigation water salinity in five levels (0.5, 2.5, 4.9, 7.3 and 9.8 dS/m). Total phenolic, antioxidant capacity, soluble carbohydrate, non-soluble carbohydrate, proline, total soluble proteins, hydrogen peroxide, malondialdehyde, other aldehydes, enzymes activity of catalase, ghayacol peroxidase and ascorbat peroxidase were measured at the end of the experiment. Results showed that, in all genotypes, with increasing salinity level (up to 9.8 dS/m) the content of hydrogen peroxide, malondialdehyde and other aldehydes was increased. Also, the content of total phenolics, antioxidant capacity, soluble carbohydrate, proline, total soluble proteins, enzymes activity of catalase, ghayacol peroxidase and ascorbat peroxidase were measured at the end of the experiment. Results showed that, in all genotypes, with increasing salinity level (up to 9.8 dS/m) the content of hydrogen peroxide, malondialdehyde and other aldehydes was increased. Also, the content of total phenolics, antioxidant capacity, soluble carbohydrate, proline, total soluble proteins, enzymes activity of catalase, ghayacol peroxidase and ascorbat peroxidase were measured at the end of the experiment. Overall, the highest content of soluble proteins, enzymes activity of catalase, ghayacol peroxidase and ascorbat peroxidase were recorded at salinity level of 7.3 dS/m, and the highest content of total phenolics, antioxidant capacity, soluble carbohydrate and prolin at salinity level 9.8 dS/m were observed in ‘Shokofeh’ cultivar. Also, at salinity levels of 7.3 and 9.8 dS/m, the lowest content of hydrogen peroxide, malondialdehyde, other aldehydes, and total non-soluble carbohydrate were observed in ‘Shokofeh’ cultivar. Finally, ‘Shokofeh’ and ‘Sahand’ budded on GF677 rootstock were recognized as the most tolerant and sensitive cultivars to salinity, respectively.

Keywords: Enzymatic activity, GF677, Proline, Saline water, Shokofeh cultivar

¹ -Corresponding author: Yazd, National Salinity Research Center.
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