Available online at http://bajas.edu.iq
https://doi.org/10.37077/25200860.2023.36.1.10
College of Agriculture, University of Basrah

Basrah Journal of Agricultural Sciences

ISSN 1814 – 5868 Basrah J. Agric. Sci., 36(1), 120-130, 2023 E-ISSN: 2520-0860

The Impact of Salicylic and Jasmonic Acid in Mitigating Salinity Stress on Date Palm *Phoenix dactylifera* L. Barhi Cv.

Aqeel A. Suhim [1], Khairullah M. Awad [2*], Osama N. Jaffer[2] & Mohammed H. Abass[3]

[1] Department of Horticulture and Land Scape, College of Agriculture, University of Basrah, Iraq
[2] Date palm Research Centre, University of Basrah, Iraq
[3] Department of Horticulture and Land Scape, College of Agriculture, University of Basrah, Iraq

***Corresponding author email**: kmaaljabary@yahoo.com; **A.A.S.** : aqeel.suhaim@uobasrah.edu.iq; **O.N.J.** : almeer@uobasrah.edu.iq; **M.H.A.** : dr.mha24@yahoo.co.uk

Received 18th June 2022; Accepted 3rd February 2023; Available online 27th June 2023

Abstract: Date palm is one of the most important trees for economic and social development in many countries and its fruits with high nutritional value. This aimed to determine the role of salicylic (SA) and jasmonic acids (JA) as antioxidants against salt stress. Salt stress was applied with water irrigation to two-year-old date palm offshoots by using 200 mM NaCl alone or in combination with foliar sprays of JA and SA at 1, 2 and 3 mgL^{-1}. Results indicate that salinity at 200 mM NaCl remarkably increased the content of osmolytes (e.g., proline, glycine betaine and soluble sugars) in date palm leaves. Moreover, with the combination of 2 and 3 $mg.L^{-1}$ SA and 1 $mg.L^{-1}$ JA with salinity, the osmolyte content was remarkably higher than in salinity treatment alone. When date palm was exposed to salinity alone, the levels of oxidative markers, Malondialdehyde as a lipid peroxidation marker and H_2O_2 as a ROS accumulation marker, substantially increased compared with the control. Importantly, the levels of these oxidative markers remarkably decreased when plants were subjected to combined salinity and treatment with at 2 and 3 $mg.L^{-1}$ SA and 3 $mg.L^{-1}$ SA compared with the salinity treatment alone. In addition, spraying 2 and 3 $mg.L^{-1}$ SA and 3 $mg.L^{-1}$ JA on leaves combined with salinity treatment remarkably decreased the salinity effect on membrane stability index. Moreover, when 2 or 3 $mg.L^{-1}$ were sprayed, no remarkable difference was detected for any investigated characteristics, and SA had a greater effect than JA in alleviating the salinity effect.

Keywords: Abiotic stress, Glycine betaine, Lipid peroxidation, ROS.

Introduction

Salinity stress is one of the most significant environmental stresses, affecting more than 20% of cultivated land worldwide (Arora, 2019). Plants must not only grow and develop, but also tolerate harsh environmental conditions to survive and reproduce, because they are frequently subjected to both biotic and abiotic stresses (Atkinson & Urwin, 2012). The changes in Phytohormones levels in response to stress form part of the early defence response of plants (Zeng *et al*., 2019). Plants respond to salinity stress by regulating osmotic and ionic re-equilibrium, the detoxifying reactive oxygen species, and cell development and division (Zhao *et al*., 2020). Phytohormones are essential regulators of