



**Seventh Article** (Considered Single - Shared with others outside the specialization – Published in International Journal).

**Selenium Modulates Antioxidant Activity, Osmoprotectants, and Photosynthetic Efficiency of Onion under Saline Soil Conditions.**

Wael M. Semida <sup>1</sup>, Taia A. Abd El-Mageed <sup>2</sup>, Abdelsattar Abdelkhalik <sup>1</sup>, Khaulood A. Hemida <sup>3</sup>, **Hamdi A. Abdurrahman** <sup>2</sup>, Saad M. Howladar <sup>4</sup>, Ahmed A. A. Leilah <sup>5</sup> and Mohamed O. A. Rady <sup>6</sup>  
1 Fayoum University, Faculty of Agriculture, Horticulture Department, Fayoum, Egypt.  
2 Fayoum University, Faculty of Agriculture, Botany Department, Fayoum, Egypt.  
3 Fayoum University, Faculty of Agriculture, Soil and Water Department, Fayoum, Egypt.  
4Turabah University College, Turabah Branch, Department of Biology, Taif University.Saudi Arabia.  
5 South Valley University, Faculty of Science, Botany and Microbiology Department, Qena, Egypt.  
<sup>6</sup>Agronomy Department, Faculty of Agriculture, Fayoum University, Fayoum 63514, Egypt.

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**Abstract**

Selenium (Se) has been recently reported to play a crucial role in ameliorating the negative impact of abiotic stress, including salinity, on several plant species. Two field experiments (2016/17 and 2017/18) were carried out to investigate the possible effect of exogenous Se application at two levels (25, 50 mg L<sup>-1</sup>) on growth, bulb yield, physio-biochemical attributes, and antioxidant activities of onion grown under saline (5.25 dS m<sup>-1</sup>) soil condition. Se (25 or 50 mg L<sup>-1</sup>) foliar application enhanced growth characteristics, as well as membrane stability index (MSI) and relative water content (RWC) as a result of the osmotic adjustment by accumulating more osmoprotectants and enhancing the activity of antioxidants defense system, thus improving photosynthetic efficiency and bulb yield. Proline, glycine betaine, choline, and total soluble sugars content were higher in leaves and bulbs of Se-treated plants under salt stress. Se (25 or 50 mg L<sup>-1</sup>) significantly increased the activities of enzymatic (ascorbate peroxidase, superoxide dismutase, and catalase) and non-enzymatic (ascorbic acid and glutathione) antioxidants in both leaves and bulbs of salt-stressed onion. Se application at 25–50 mg L<sup>-1</sup> may find, in the future, a potential application as anti-abiotic stresses for improving plant growth and productivity under saline soil condition.

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عميد الكلية

أ.د./ نيفين على حسن السواح

أ.د./ عاطف عبد التواب عوض الله