

Sequential Antioxidants Foliar Application Can Alleviate Negative Consequences of Salinity Stress in *Vicia faba* L.

**Wael M. Semida, Taia A. Abd El-Mageed , Reham M. Abdalla , [Khaulood A. Hemida](#) ,
Saad. M. Howladar , Ahmed A. A. Leilah and Mohamed O. A. Rady.**

Salinity is one of the most limiting abiotic stresses in agricultural productivity. Exogenously applied antioxidants successfully enabled salt-stressed plants to cope with stress. Two-season field experiments were conducted consecutively in 2016/17 and 2017/18 to study the effects of foliar applications of singular (ascorbate, AsA; proline, Pro; and glutathione, GSH) or sequential (AsA-Pro-GSH and GSH-Pro-AsA) antioxidants on growth, yield, physio-biochemical attributes, and enzymatic and non-enzymatic antioxidative defense system of *Vicia faba* L. (CV. Sakha-1) plants grown under saline soil conditions ($EC = 4.53 \text{ dS m}^{-1}$). Under soil salinity conditions, AsA, Pro, or GSH-Pro-ASA improved growth and productivity, photosynthesis efficiency, stomatal conductance (gs), plant water status, as well as enzymatic and non-enzymatic antioxidants. However, sequential AsA-Pro-GSH foliar application followed by singular GSH significantly exceeded all other treatments (i.e., AsA, Pro, and GSH-Pro-AsA), improving growth characteristics (shoot length, shoot fresh and dry weights, and leaves area), photosynthesis efficiency, stomatal conductance, plant water status, and yield and its components (green pods weight/plant⁻¹, green pods yield/hectare⁻¹, and seed yield/hectare⁻¹), as well as enzymatic (ascorbate peroxidase, catalase, superoxide dismutase, and glutathione reductase) and non-enzymatic (AsA, GSH, Pro, phenolic aglycone, phenolic glycosides) antioxidants compared to control. Overall, our results clearly demonstrate that sequential AsA-Pro-GSH foliar application has a positive effect on salt-stressed *Vicia faba* plant.