



uniss
UNIVERSITÀ DEGLI STUDI DI SASSAR



DIPARTIMENTO DI
AGRARIA



XLII CONVEGNO NAZIONALE DELLA SOCIETÀ ITALIANA DI CHIMICA AGRARIA

9-11 SEPTEMBER 2024

ALGHERO, HOTEL CATALUNYA

Plant

Abstract 58

EFFECTS OF SERICIN IN THE RESPONSE TO SALT STRESS IN LETTUCE (LACTUCA SATIVA L.)

Muratore C., Grassi V., Zambelli A., Abruzzese A., Araniti F., Prinsi B., Espen L.*

DiSAA - Università degli Studi di Milano ~ Milano ~ Italy

Sericin, a globular protein obtained from the silk purification process, has interesting characteristics, such as biocompatibility and biodegradability, moisturizing capability, and antimicrobial, antioxidant and UV-protective properties. Preliminary data showed that sericin had a positive effect on seed germination and improved plant resilience to drought.

Salinity is one of the most widespread and detrimental stresses affecting the production of many crops. Lettuce (*Lactuca sativa* L.), belonging to the family Asteraceae, is a horticultural crop most extensively cultivated and consumed as fresh vegetables. The present work aimed to evaluate the impact of sericin on lettuce growth, along with its physiological and biochemical responses to salt stress.

Plants were grown in a simplified substrate composed of 87.5% sand, 9% clay, 2% soil and 1.5% peat to standardize the supply of nutrients, which were provided by adding an appropriate volume of mineral nutrient solution to the pots. After 31 days of growth, plants were maintained in the same growth conditions (Control, C) or treated with a solution of 0.25% w/v of sericin (SER), with a solution of NaCl 80 mM (NaCl) or with SER + NaCl; the treatment was repeated after 7 days. The response was evaluated by monitoring the photosynthetic performance at different times during the treatment, such as net photosynthetic rate (Pn), fluorescence decline ratio (Rfd) and PSII efficiency in dark-adapted leaves (Fv/Fm), as well as the transpiration (gs). After 10 days of treatment, the leaves were sampled, and the mineral composition, total amino acids, reducing sugars and proline content were measured.

The study revealed a positive effect of the SER treatment, inducing an increase of plant growth, which was related to an increase in Pn and gs. The salt treatment induced a decrease in growth, attributable to the typical effects induced by salt stress (i.e. reduction of photosynthetic performance and gs). In this condition, Na, Cl and proline contents in the leaves increased. The addition of SER appeared to alleviate some effects induced by salt stress. The results highlighted some interesting changes at the physiological and biochemical levels induced by SER, supporting the idea of its possible use to improve lettuce yield also in salt stress conditions.

Acknowledgements: the authors thank Artefil srl for providing sericin solutions.

Funding: SILKROP project is funded by CARIPLO Foundation (Milan, Italy), Call Circular Economy for a sustainable future – 2021, grant number: 2021-0665.