

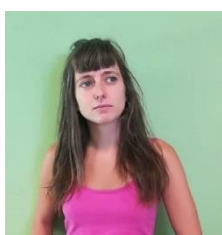
EFFECT OF FOLIAR APPLICATION OF AN *ARTHROSPIRA* SP. BASED EXTRACT ON HYDROPONICALLY GROWN LETTUCE (*LACTUCA SATIVA* L. VAR. *CAPITATA*)

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BSc degree in 2013 in Agricultural Sciences and Technologies at the University of Florence with a thesis entitled “Culture of the microalga *Phaeodactylum tricornutum* under nutrient stress for the production of biofuels”. MSc degree in 2017 in Plant and Microbial Biotechnology at the University of Pisa with a thesis on “Molecular and functional characterization of arbuscular mycorrhizal fungi from a biodiversity hot spot of the UNESCO reserve Selva Pisana”. Since 2013 collaboration with F&M (Fotosintetica & Microbiologica S.r.l.) in isolation and characterization of microalgal and cyanobacterial strains and in the maintenance of the F&M algae culture collection. Currently PhD student at the Department of Agrifood Production and Environmental Sciences (DISPAA) of the University of Florence, in the group led by Prof. Mario Tredici, working on the use of microalgae and cyanobacterial strains for the development of new biostimulants.

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Abstract:

Biostimulants are increasingly being integrated into horticultural production systems with the goal of modifying physiological processes and maximising productivity and quality of plants. Algae extracts are among the most used biostimulants; in particular they mostly derive from a few macroalgal species,

while application of microalgae in this field is still at the beginning. The aim of this work was to investigate the effects of foliar spraying with an *Arthrospira* sp. based extract on lettuce growth, photosynthetic parameters, pigment content, and nitrate accumulation in leaves. As positive controls we used commercial biostimulants: an *Ascophyllum nodosum* extract (MC_EXTRA by Valagro) and an animal protein hydrolysate (Siapton[®] by Isagro). Plants were hydroponically cultured for 28 days inside a growth chamber at 22 °C, 75% relative humidity, 16:8 light:dark photoperiod, and average light intensity of 280 $\mu\text{mol photons m}^{-2}\text{s}^{-1}$. Plants were sprayed weekly with two different concentrations (1 and 3 g l⁻¹ extract dry weight) of an *Arthrospira* sp. based extract and at the doses recommended on the label for the commercial biostimulants. Treatment with *Arthrospira* sp. based extract at 1 g l⁻¹ was the most effective in promoting plant growth, with an increase in shoot fresh weight of about 20% compared to the untreated control and a concomitant reduction of nitrate content in the leaves. Treatment with Siapton[®] showed a lower biostimulant activity, increasing yield by 16% compared to the untreated control. The *Arthrospira* sp. based extract at 3 g l⁻¹ and MC_EXTRA treatments showed no significant effects on lettuce growth. These results suggest that *Arthrospira* sp. based biostimulants are a promising tool for improving yields and quality of horticultural crops.

Keywords:

Arthrospira based extract, biostimulants, hydroponics, *Lactuca sativa* L.



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