

Comparison of the effects of *Arthrospira* and *Nostoc*-based formulations as biostimulants for different plant species

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1. Introduction

Biostimulants are today considered one of the tools that could help meet the growing global food demand and promote sustainability of modern agricultural practices (Rouphael and Colla 2020). Since the definition used for plant biostimulants in the European Union Fertilizing Products Regulation (EU 2019/1009) is claim-based, the demonstration that a product is indeed a biostimulant depends on the demonstration of its effect and, according to the regulation, a plant biostimulant “shall have the effects that are claimed on the label for the plants specified thereon” (Ricci et al. 2019). Consequently, the in-depth study of the application of a biostimulant on different plant species will be crucial to ensure credibility and marketability of a new product on the EU market.

Among the products currently on the market, microalgae-based biostimulants represent only a small niche and, despite the growing number of scientific publications in this field, there are still many aspects of their application on plants to be clarified (Santini et al. 2021). *Arthrospira* is one of the most studied microalgae for biostimulant applications and is currently used in the preparation of commercial products, while *Nostoc* is among the most well-known photosynthetic microorganism traditionally used in agriculture, especially for applications as biofertilizer and soil conditioner (Santini et al. 2021).

2. Materials & methods

In the present work, data obtained in several trials performed over three years of experimentation, in which extracts and hydrolysates obtained from the same *Arthrospira* sp. and *Nostoc* sp. biomasses were applied on different plant species, are examined to detect differences in plant responses to treatments.

3. Results

According to the results obtained on plant growth and yield, the effectiveness of the same microalgae-based biostimulant varies in relation to the plant species and can be enhanced in plants subjected to abiotic stress. In particular, the *Nostoc*-based formulation significantly increased the yield and root development in basil plants, but had no effects on tomato plants. In the case of *Arthrospira*-based formulations, the greatest effects were instead recorded with the application on stressed tomato plants.

4. Final remarks

These results highlight that the use of a biostimulant cannot guarantee the effectiveness in all conditions and on all plant species, as many environmental and physiological factors can affect its

performance. Therefore, extensive agronomic studies are needed to deepen the knowledge on the effects of microalgae on different plant species and to identify the cultivation/environmental conditions that enhance their biostimulant effects.

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6. References

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