

**PROJECT TITLE**

Assessing microalgae derived biostimulant properties through plant phenotyping

**CONSORTIUM**

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## SUMMARY OF THE REPORT

The increasing world population and the effects of climate changes and global warming are a current and strong concern for the future. To ensure food availability and security, the development of efficient and sustainable agriculture practises is required and biostimulants represent a possible approach to improve crops yield reducing plant stress. In recent years, microalgae arouse interest for their application as plant biostimulants for a wide variety of crops since they are able to produce many bioactive compounds possibly involved in biostimulation. The aim of this project was to investigate the effects of four different microalgae species on tomato plants (*L. esculentum* L.), using a phenotyping approach to evaluate possible growth improvements that might be species-specific. Microalgae were cultivated at the University of Padova and the harvested biomass was subjected to enzymatic hydrolysis at SICIT Group S.p.A. before performing the bioassays. Different microalgae doses and formulations were applied to seedlings during the experimental campaign and their growth was monitored daily, in order to assess the dose-response effects and possible outcome of the plant development. Enzyme signatures was analysed in order to assess microalgae effect at molecular level. Finally, further experiments were carried out with two microalgae species on tomato plants cultivated in big pots, in order to investigate the effect of microalgae treatments until fructification stage. Thanks to the experiments carried out, it is possible to assess the actual advantage of using microalgae as biostimulant, addressing the main open questions, which include the suitable dosages, the stage of the plants to be treated and the time interval among subsequent treatment applications.