

## The effect of Non-Thermal Plasma treatment on antioxidant molecules of different edible organs: two case studies on leafy vegetables and edible flowers

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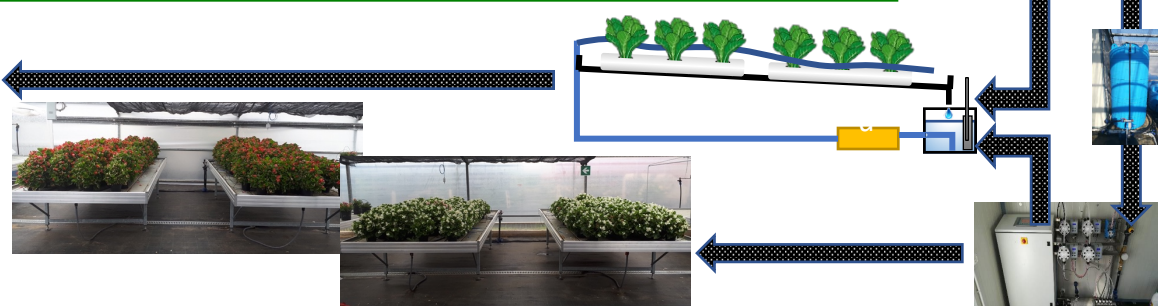


### Introduction

Non-Thermal Plasma (NTP) treatments have been proposed to improve crop yield and quality. NTP-treated water is indeed enriched in radical oxygen and nitrogen species and its application might influence the antioxidant molecule contents potentially improving the nutraceutical proprieties of treated plants. Despite the potentiality of this practice, the effect of NTP on real (*i.e.*, commercial or semi-commercial) growing conditions has been poorly investigated.

### Materials and Methods

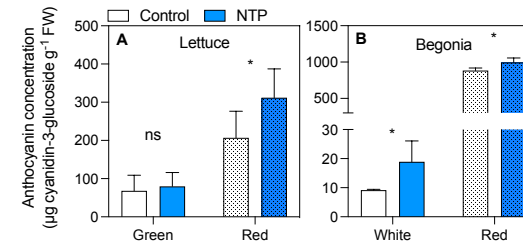
The NTP devices was used to treat crop canopy and root zone through the irrigation water on soilless cultures in a prototype greenhouse at CREA-OF in Pescia, Italy. The effect of NTP was evaluated on some antioxidant molecules in two varieties of Salanova® lettuce (green and red) and the edible flowers of two varieties of *Begonia cucullata* Willd. (white and red) (**Fig. 1**).



**Fig. 1.** Experimental unit. NTP devices were used in close (lettuce) and open (begonia) systems treating the nutrient solution and the water used for canopy spraying.

### Results

The NTP treatment showed a positive effect on few antioxidant molecules, such as the anthocyanins in red lettuce and begonia flowers (**Fig. 2**) while it had a negative effect on other compounds, such as phenols and carotenoids in red lettuce and begonia flowers, respectively (**Fig. 3** and **4**). The NTP treatment increased the chlorophylls of white and red begonia flowers while the same parameter was decreased in green and red lettuce (data not shown).



**Fig. 2.** Anthocyanins in green and red lettuces (A) and white and red begonia flowers (B). Bars represent mean + SD. Data were analysed by *t*-test (\**P* < 0.05).



**Fig. 3.** Total phenols in green and red lettuces. Bars represent mean + SD. Data were analysed by *t*-test (\**P* < 0.05).

**Fig. 4.** Carotenoids in begonia flowers. Bars represent mean + SD. Data were analysed by *t*-test (\**P* < 0.05). nd = not detected.

### Conclusions

The NTP influence on the antioxidant molecules of food crops has been highlighted, but its effect depends on the plant species, edible organ, and variety. Further investigation regarding the timing and intensity of NTP treatment are needed.

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### References:

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- Traversari *et al.* (2021). Combined effect of silicon and non-thermal plasma treatments on yield, mineral content, and nutraceutical proprieties of edible flowers of *Begonia cucullata*. *Plant Physiology and Biochemistry*, 166, 1014-1021.