Qualitative responses of rocket varieties to biostimulants application

Giulia Franzoni[1], Sara Vignati[1], Davide Guffanti[1], Francesco Elia Florio[1], Marco Gibin[2], Alice Petrini[1], Carla Colombani[1], Giacomo Cocetta[1], Antonio Ferrante[1]
[1]*Department of Agricultural and Environmental Sciences – Production, Landscape, Agroenergy, Università degli Studi di Milano, Italy*
[2] *Experimental farm "A. Menozzi" Cascina Baciocca Cornaredo. Università degli Studi di Milano, Italy*

Contact: alice.petrini@unimi.it

Introduction

Nutritional quality and health benefit of vegetables are often related to the accumulation of biological active substances like secondary metabolites and phytonutrients. Numerous scientific evidences demonstrated the positive impact of plant biostimulants on different product quality traits (Bulgari et al., 2019). Rocket salad includes two important genera, Diplotaxis and Eruca, particularly appreciated for their peculiar flavour and the relevant content of diverse phytochemicals (Bell and Wagstaff, 2019). This work aims to investigate the effect of two commercial biostimulant products on some quality traits in two cultivars of *Eruca sativa* Mill. and *Diplotaxis tenuifolia* (L.) DC.

Materials & Methods

Location & Season	Cultivation system	Determinations	Species	Biostimulant products
Cornaredo, Milan (Italy) Summer 2021 (June – July)	Field (plastic tunnel greenhouse)	NFI, Flavonol (*in vivo* MPM-100) Sucrose, Nitrate (Spectrophotometric)	*Diplotaxis tenuifolia* (L.) DC (D1 –D2) *Eruca sativa* (Mill.) (E1-E2)	Megafol® 0.3 mL/L Actiwave® 3 mL/L

Results

Flavonol content was higher in Eruca cultivars than in Diplotaxis cultivars (Tab. 1); in particular, the values ranged between 0.80 and 1.03 (F660nm / F325nm) and between 0.50 and 0.82 (F660nm / F325nm), respectively. Moreover, different trends were observed in response to the biostimulants applications. D2 plants treated with Actiwave® showed a higher content of flavonol than D2 control, whereas Megafol® treatment did not induced any changes in the same cultivar. On the contrary, D1 plants treated with Megafol® had a high level of flavonol if compared with D1 plants treated with Actiwave®.

Tab. 1 Flavonol content measured in vivo in rocket leaves

Species/Cultivar	Flavonol content (F660nm / F325nm)[a]		
	Control	Actiwave®	Megafol®
Diplotaxis tenuifolia			
D1	0.64 ± 0.045abB	0.50 ± 0.013bC	0.67 ± 0.040aB
D2	0.58 ± 0.053bB	0.82 ± 0.049aB	0.71 ± 0.038abB
Eruca sativa			
E1	0.87 ± 0.052aA	0.88 ± 0.029aAB	0.80 ± 0.043aB
E2	0.98 ± 0.027aA	1.03 ± 0.038aA	0.97 ± 0.033aA

[a] Values are means ± SE (n=6). Different lowercase letters indicate significant differences within cultivars, different uppercase letters indicate significant differences within treatments, according to the Tukey post-hoc test ($p \leq 0.05$).

Fig. 1 Pictures or rocket during cultivation

The levels of sucrose ranged between 150.6 and 248.9 mg kg^{-1} FW in Diplotaxis cultivars and between 107.7 and 232.1 mg kg^{-1} FW in Eruca cultivars (Tab. 2). All rocket cultivars had similar concentration of sucrose, regardless the biostimulant application. A significant decrease was observed only in E1 plants treated with Megafol®. This might be due to a translocation or a rapid metabolization of the sugar inside plants after the treatment. Figure 2 shows the NFI of rocket species/cultivars calculated from flavonols and chlorophyll content measured *in vivo* at harvest. The NFI was higher in Diplotaxis cultivars than in Eruca cultivars; Moreover, the four cultivars showed different trends in response to biostimulants applications.

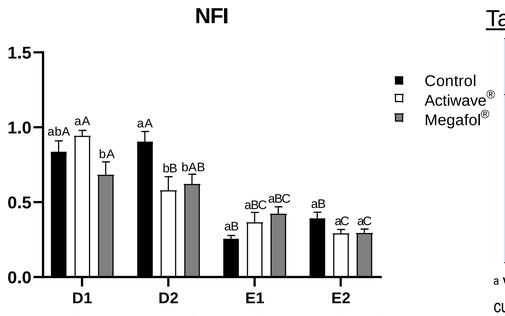

Fig. 2 Nitrogen flavonol index (NFI)

Tab. 2 Sucrose concentration in rocket leaves

Species/Cultivar	Sucrose (mg kg^{-1})[a]		
	Control	Actiwave®	Megafol®
Diplotaxis tenuifolia			
D1	198.7 ± 29aA	150.6 ± 11aA	158.5 ± 17aA
D2	175.2 ± 5aA	248.9 ± 31aA	184.1 ± 21aA
Eruca sativa			
E1	221.7 ± 33aA	171.1 ± 4abA	107.7 ± 32bA
E2	232.1 ± 32aA	158.9 ± 29aA	167.9 ± 32aA

[a] Values are means ± SE (n=3). Different lowercase letters indicate significant differences within cultivars, different uppercase letters indicate significant differences within treatments, according to the Tukey post-hoc test ($p \leq 0.05$).

Conclusions and perspectives

Results revealed a variability in the quality traits depending on the combined effect of biostimulants application and genetic background. The present data will be integrated with additional analyses in order to better understand the responses observed in Diplotaxis and Eruca cultivars after the biostimulants applications. Further investigations will help to clarify the results obtained in the present experiment and to find which biostimulant product is better for the specific varieties.

References: Bell and Wagstaff, (2019) Food Chemistry: X 1, 100002; Bulgari et al. (2019) Agronomy 9, 306;

Acknowledgements : This experiment has been supported by the project "MIND FoodS HUB" (https://www.mindfoodshub.com)

IHC 2022 ANGERS – FRANCE

MIND FoodS HUB