DIACHEM

BORTAN, il nuovo biostimolante completamente vegetale di Diagro. Nuove evidenze su IV gamma”

LUIGI ZAMPELLA
Field Marketing Specialist Centre-South West

BIOSTIMOLANTI CONFERENCE

Diachem World, More Power to Ideas

chimiberg | DIAGRO | PIRECO | DIACHEM

SOLUZIONI INTEGRATE PER L'AGRICOLTURA

DIACHEM

chimiberg | DIAGRO

chimiberg	DIAGRO
Fungicidi	Fertirriganti
Insetticidi	Biostimolanti
Acaricidi	e fertilizzanti speciali
Erbicidi	Acceleratori di fotosintesi
Fitoregolatori	Fertilizzanti integrati
Vari	Prodotti speciali

Chimiberg and Diagro:
"perché proteggere e nutrire sono due facce della stessa medaglia"

PROTEGGERE E NUTRIRE SONO DUE FACCE DELLA STESSA MEDAGLIA

Agronutrienti

INDICE GENERALE PER CATEGORIA

DIAGRO

LINEA DIAGRO

FERTIRRIGANTI

BIOSTIMOLANTI E FERTILIZZANTI SPECIALI

ACCELERATORI DI FOTOSINTESI

FERTILIZZANTI INTEGRATI E INDUTTORI DI RESISTENZA

PRODOTTI SPECIALI

chimiberg® | DIAGRO®

marchi di DIACHEM S.p.A.


RICCO DI
ESTRATTI UMICI
E TANNINI
NOVITÀ
Bortan
CONCIME
ORGANICO
AZOTATO
DIAGRO
dell'uso leggere sempre l'etichetta e le informazioni sul prodotto.

BIOSTIMOLANTI E FERTILIZZANTI SPECIALI

- Concime organico azotato
- **Borlanda fluida** attivata con il 10% di estratti umici da ammendante vegetale semplice non compostato, naturalmente ricco in **tannini**
- Prontamente assimilabile per via radicale,
- La presenza di **polifenoli** permette di migliorare la struttura del suolo, ridurre i danni dovuti a eccessi di salinità, nonché favorire lo sviluppo della microflora utile (antagonisti microbici)
- Le proprietà complessanti del formulato promuovono la crescita dell'apparato radicale e l'assimilazione degli elementi nutritivi utili per le piante, generando anticipi ed aumento della resa per ettaro

LA SPERIMENTAZIONE

IV GAMMA

LATTUGHINO
(verde – rosso)

RUCOLA

LATTUGHINO – BORTAN

CROP: **Green Batavia – Red Batavia**

Variety: Falstaff - Copacabana

CRO: Sele Agroresearch – CREA-OFA

Location: Pontecagnano (SA)

Target: *Parametri morfometrici/Qualità/Stress ossidativo*

Sele Agroresearch Srl
Test Facility

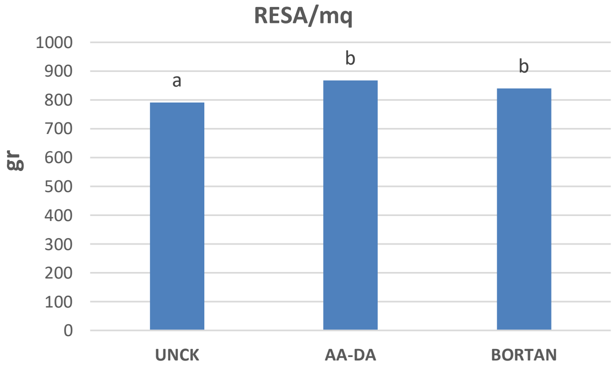
crea
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

TREATMENTS TABLE

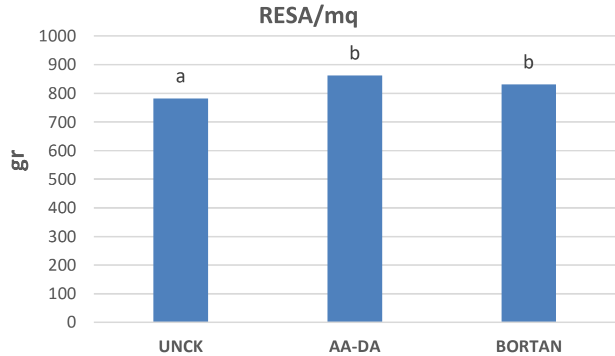
Treatments	Dose rate	Application code
UNTREATED CHECK	-	-
AADA	10 l/ha	A (20 gg post-semina)
BORTAN	10 l/ha	A (20 gg post-semina)

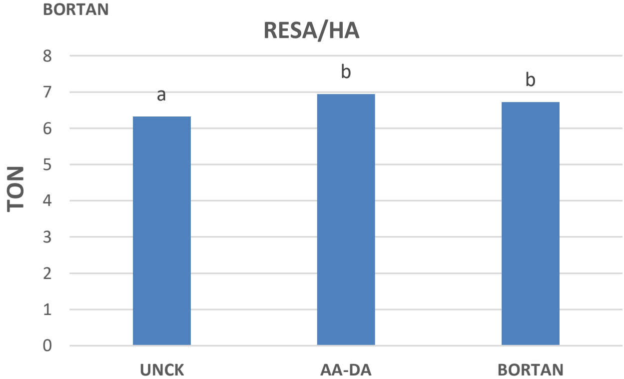
RESULTS

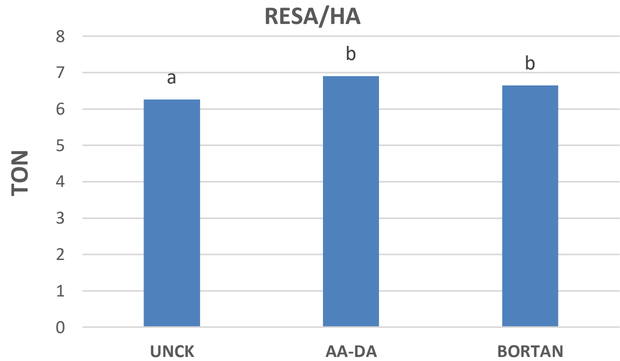
Dati Agronomici



ΔPLV ~ 1.000,00 €/ha

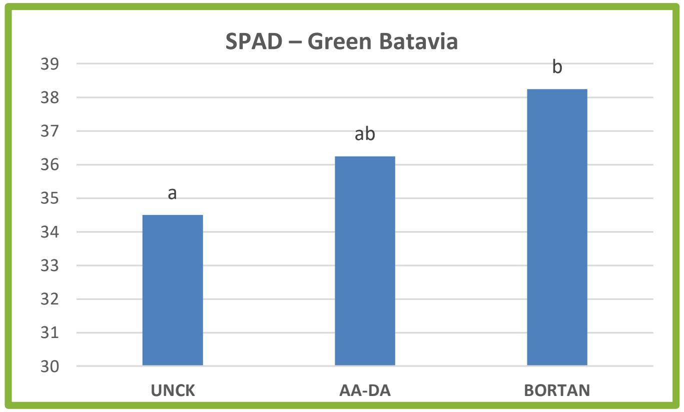


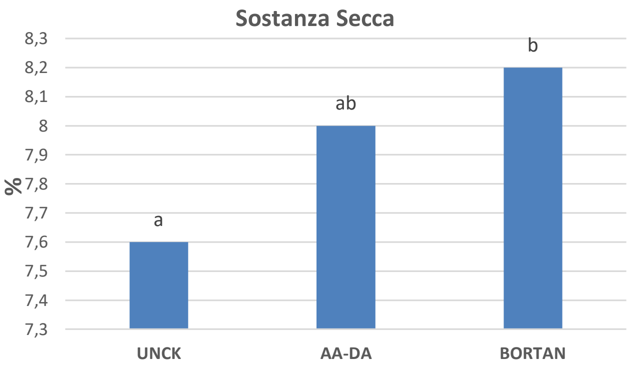


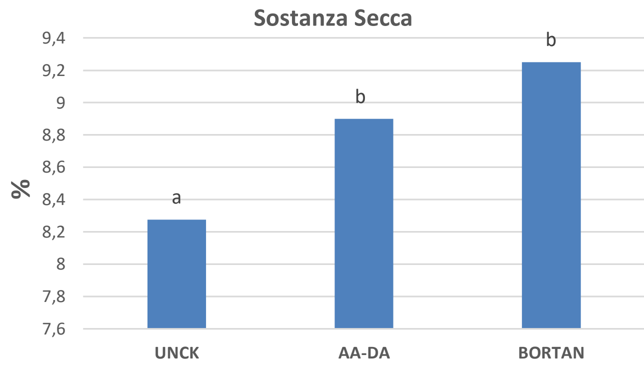


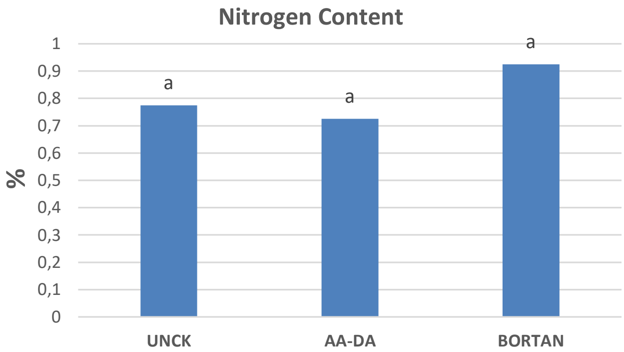
RESULTS

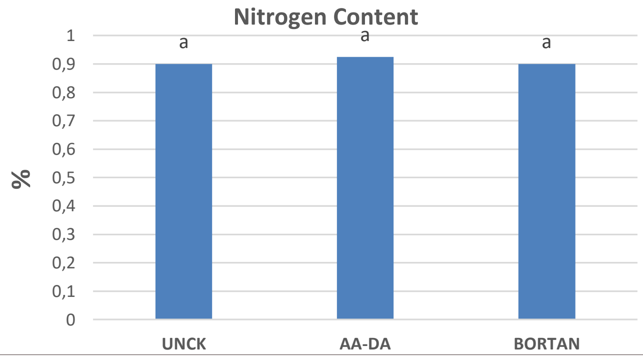
Dati Agronomici





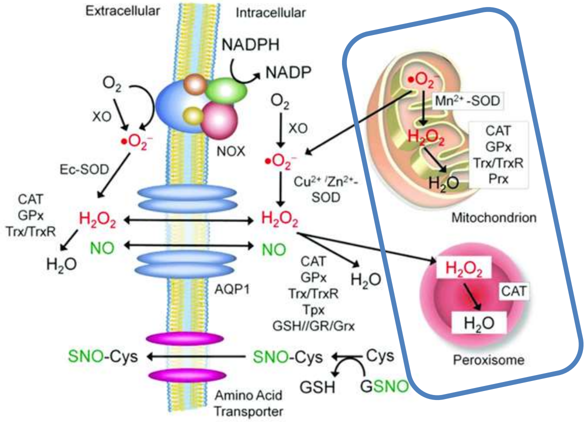


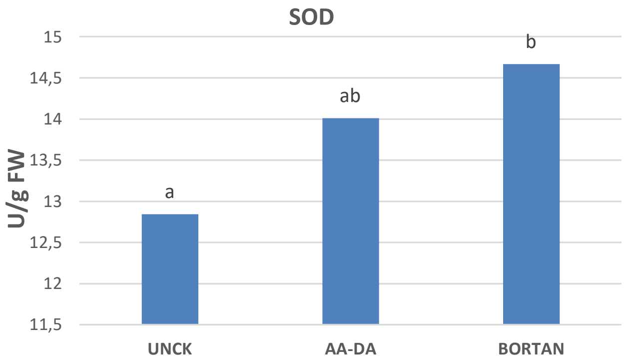


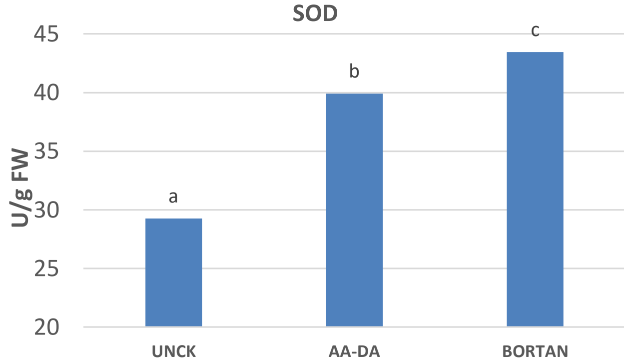


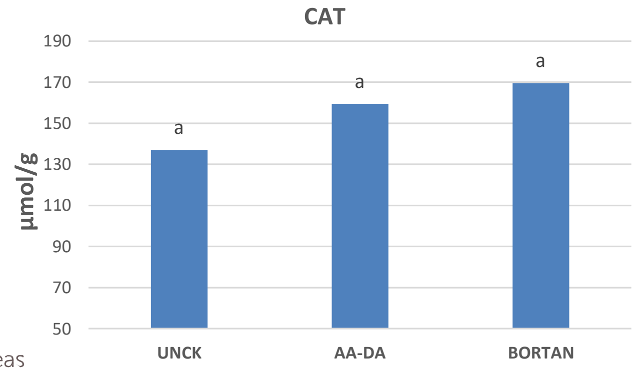
RESULTS

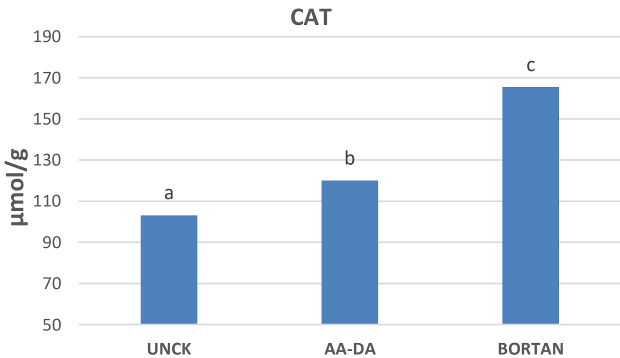
Stress Ossidativo











RUCOLA – BORTAN

CROP: **Rucola** (var. Pamela - Clause)

CRO: AGRIVIT – CREA-OFA – CNR-ISA

Location: Battipaglia (SA)

Target: *Parametri morfometrici/Qualità/VOC’s*

TREATMENTS TABLE

Treatments	Dose rate	Application code
UNTREATED CHECK	-	-
BORTAN	10 l/ha	A (10gg post-semina)

Harvest: 7gg DA-A

RUCOLA – BORTAN

plants

MDPI

Article

Influence of Plant-Based Biostimulant (BORTAN) on Qualitative and Aromatic Traits of Rocket Salad (*Diplotaxis tenuifolia* L.)

Livia Malorni [1,*], Rosaria Cozzolino [1,*], Anna Magri [2], Luigi Zampella [3] and Milena Petriccione [4]

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2 Department of Environmental, Biological and Pharmaceutical Sciences and Technologies (DiSTABiF), University of Campania Luigi Vanvitelli, Via Vivaldi 43, 81100 Caserta, Italy
3 Diachem S.p.A., Via Mozzanica 9/11, 24043 Caravaggio, Italy
4 Council for Agricultural Research and Economics (CREA), Research Center for Olive, Fruits, and Citrus Crops, Via Torrino 3, 81100 Caserta, Italy
* Correspondence: livia.malorni@isa.cnr.it (L.M.); rosaria.cozzolino@isa.cnr.it (R.C.)

Abstract: In this study, the influence of a new plant-based biostimulant (Bortan) on physiological and aromatic traits of rocket (*Diplotaxis tenuifolia* L. var. Pamela) was monitored by evaluating physico-chemical parameters (fresh and dry weight, leaf color and chlorophyll content) and biochemical traits (total phenolic compound (TP), total flavonoids (TF), ascorbic acid (AA) and antioxidant activity (AOX). Volatile profiles were also analyzed by headspace solid-phase microextraction coupled to gas chromatography–mass spectrometry, allowing the detection of 32 volatiles belonging to 5 chemical classes. Compared to the control, Bortan application enhanced leaf pigment content, including chlorophyll a, b and carotenoids (+10%, +16% and +28%, respectively) and increased TP (+34%), TF (+26%), AA (+19%) amonts and AOX value (+16%). Principal component analysis revealed a significant discrimination between the two samples. Specifically, treated samples were mainly associated with "green-leaf" volatiles, namely hexanal and 2-hexenal, 3-hexenal and 1-penten-3-one, while control rocket was directly correlated with several alcohols and to all isothiocyanates, associated with the sulfur-like odor of rocket. These findings can add further support, both for farmers and the agro-food industry, in choosing PBs as a new and sustainable practice in complementing enhanced yields with premium-quality produce. To confirm these preliminary data, further experiments are needed by enlarging the sample size, testing different concentrations of Bortan and/or using other food crops.

Keywords: *Diplotaxis tenuifolia* L.; plant-based biostimulant; sustainable horticulture; nutritional quality; volatile organic compounds (VOCs)

check for updates

Citation: Malorni, L.; Cozzolino, R.; Magri, A.; Zampella, L.; Petriccione, M. Influence of Plant-Based Biostimulant (BORTAN) on Qualitative and Aromatic Traits of Rocket Salad (*Diplotaxis tenuifolia* L.). *Plants* **2023**, *12*, 730. https://doi.org/10.3390/plants12040730

Academic Editors: Georgia Ouzounidou and Miltiadis V. Christopoulos

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isa

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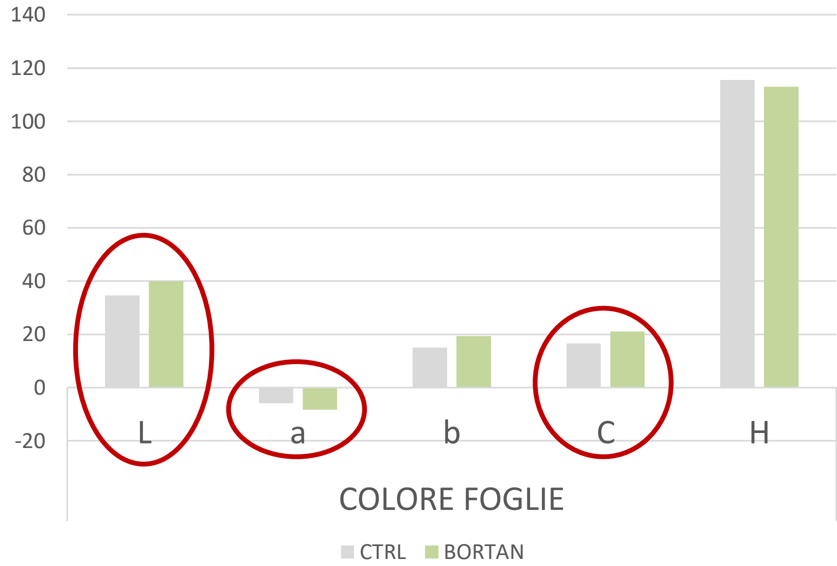
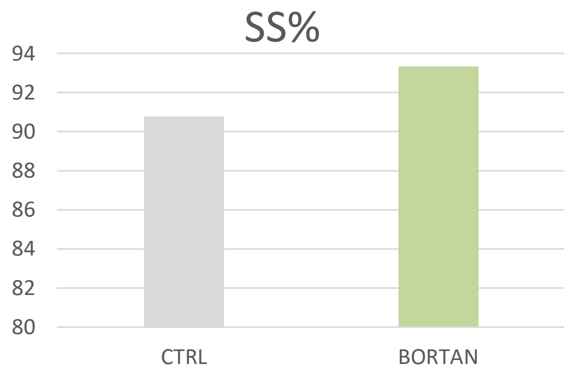
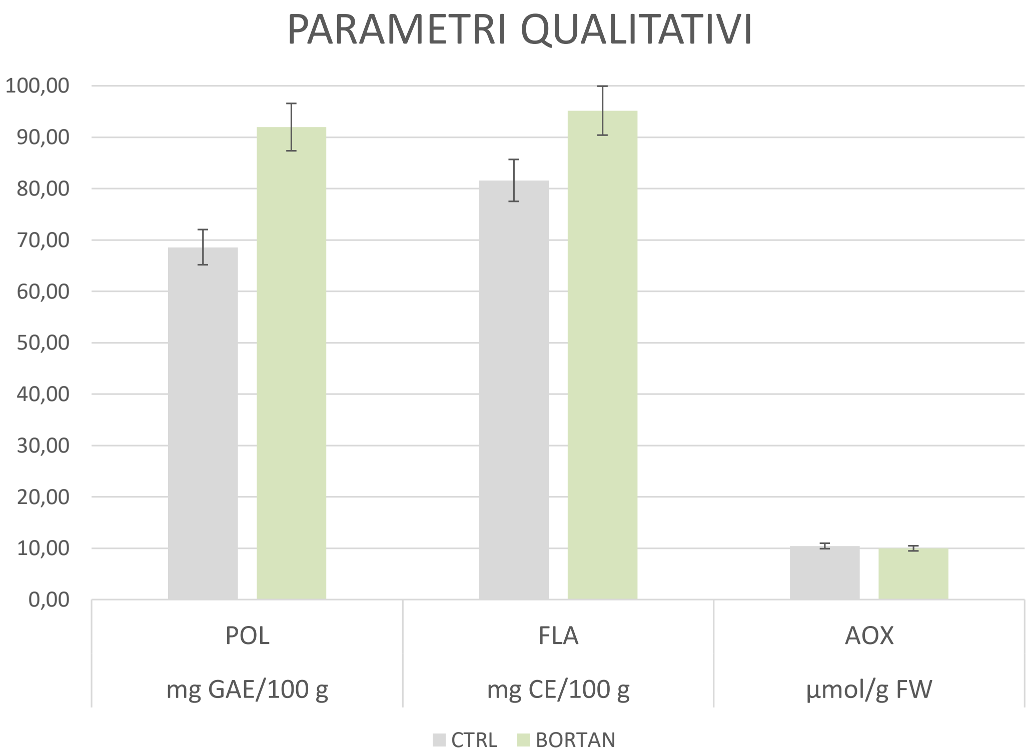
RESULTS

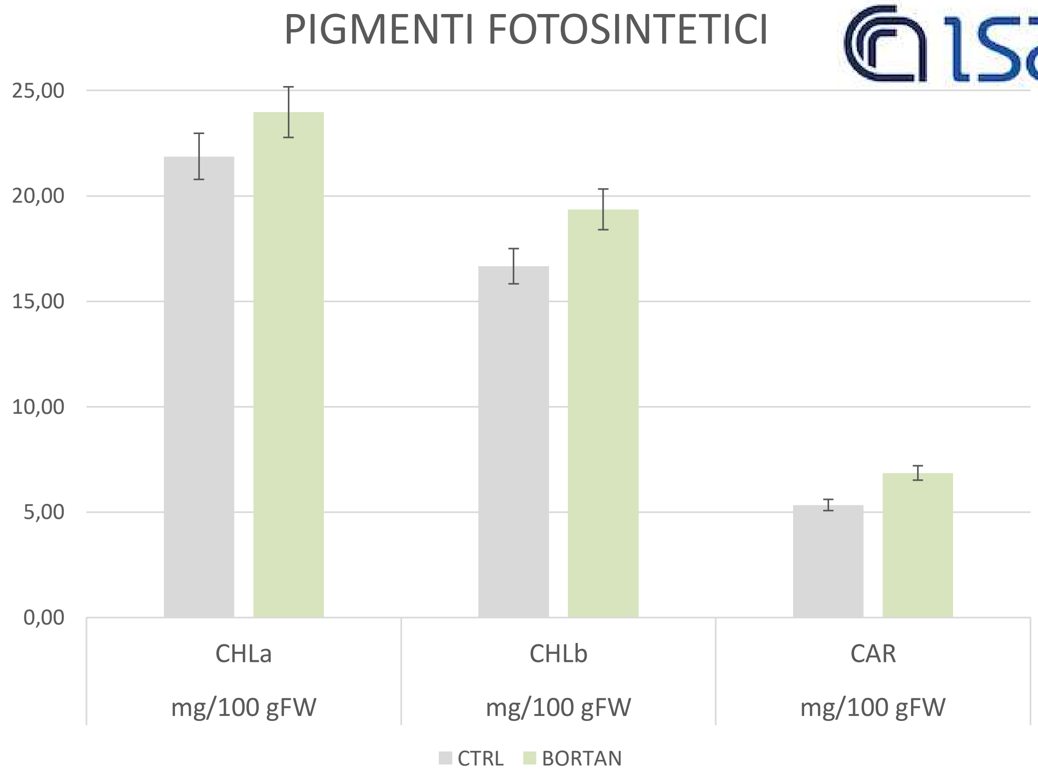




RESULTS



PARAMETRI QUALITATIVI
100,00
90,00
80,00
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
POL
mg GAE/100 g
FLA
mg CE/100 g
AOX
µmol/g FW
CTRL
BORTAN



PIGMENTI FOTOSINTETICI
25,00
20,00
15,00
10,00
5,00
0,00
CHLa
mg/100 gFW
CHLb
mg/100 gFW
CAR
mg/100 gFW
CTRL
BORTAN

RESULTS

Metabolites	Code	C_A	C_B	C_C	T_A	T_B	T_C
3-Pentanone	**K1**	2,82	2,80	2,95	4,06	4,08	4,07
1-Penten-3-one	**K2**	4,68	4,96	4,34	15,67	15,14	15,85
Hexanal	**K3**	11,70	11,61	11,04	13,82	14,48	14,85
3-Octanone	**K4**	7,36	7,74	7,28	15,41	15,59	15,24
6-Methyl-5-hepten-2-one	**K5**	3,35	3,30	3,25	0,00	0,00	0,00
cis-3-Hexanal	**Ald1**	6,16	6,44	6,76	57,13	59,29	59,50
2-Hexenal	**Ald2**	245,57	245,70	245,17	722,58	722,56	722,83
Octanal	**Ald3**	1,70	1,89	1,78	0,00	0,00	0,00
Nonanal	**Ald4**	6,77	6,87	6,84	1,02	1,05	1,48
2,4-Heptadienal	**Ald5**	0,60	0,60	0,66	2,73	2,49	2,55
Decanal	**Ald6**	7,90	7,79	7,90	10,08	10,08	10,08
1-Penten-3-ol	**Alc1**	18,50	18,39	18,68	48,68	48,74	48,92
cis-2-penten-1-ol	**Alc2**	0,00	0,00	0,00	21,69	21,34	21,76
1-Hexanol	**Alc3**	8,51	8,42	8,75	6,60	6,82	6,22
trans-3-Hexen-1-ol	**Alc4**	8,89	8,77	8,29	2,91	2,66	2,71
cis-3-Hexen-1-ol	**Alc5**	381,18	383,38	382,28	148,55	146,24	149,86
trans-2-Hexen-1-ol	**Alc6**	60,94	60,89	60,88	23,66	23,38	23,79
2,6-Dimethylcyclohexanol	**Alc7**	1,10	1,11	1,20	0,00	0,00	0,00
Terpinen-4-ol	**Alc8**	1,50	1,55	1,53	0,00	0,00	0,00
Methyl thiocyanate	**S1**	6,60	6,13	6,16	5,77	5,72	5,17
3-Butenyl isothiocyanate	**S2**	2,51	2,33	2,39	0,00	0,00	0,00
Pentyl isothiocyanate	**S3**	15,00	15,22	15,74	3,14	3,13	3,14
4-Methylpentyl isothiocyanate	**S4**	84,41	84,23	84,31	70,22	70,63	70,12
Hexyl isothiocyanate	**S5**	18,52	18,46	18,81	15,42	15,51	15,13
3-Methylthiopropyl isothiocyanate	**S6**	11,40	11,48	11,78	10,39	10,27	10,18
Benzyl isothiocyanate	**S7**	7,05	7,02	7,03	1,90	1,91	1,90
2-Ethylphenyl isothiocyanate	**S8**	4,50	4,53	4,56	2,29	2,12	2,22
2-Ethylfuran	**O1**	4,72	5,17	4,26	7,94	7,26	7,60
1-Pentene-3-ethyl-2-methyl	**O2**	5,72	5,56	5,10	12,27	12,11	12,50
cis-3-Hexen-1-ol acetate	**O3**	38,06	38,07	38,15	1,88	1,78	1,26
Anisole	**O4**	10,38	10,50	10,15	10,44	10,48	10,38
5-Methylhexanenitrile	**O5**	2,48	2,74	2,41	5,39	5,48	5,97

ALDEIDI: VOC's responsabili dell'**aroma (odore)** in rucola. Nella tesi con Bortan risultano ampiamente più alti

TIOCIANATI ORGANICI: Solforati responsabili del **gusto pungente** in rucola. In Bortan sono sempre più bassi ad indicare che il trattato è più dolce

RESULTS

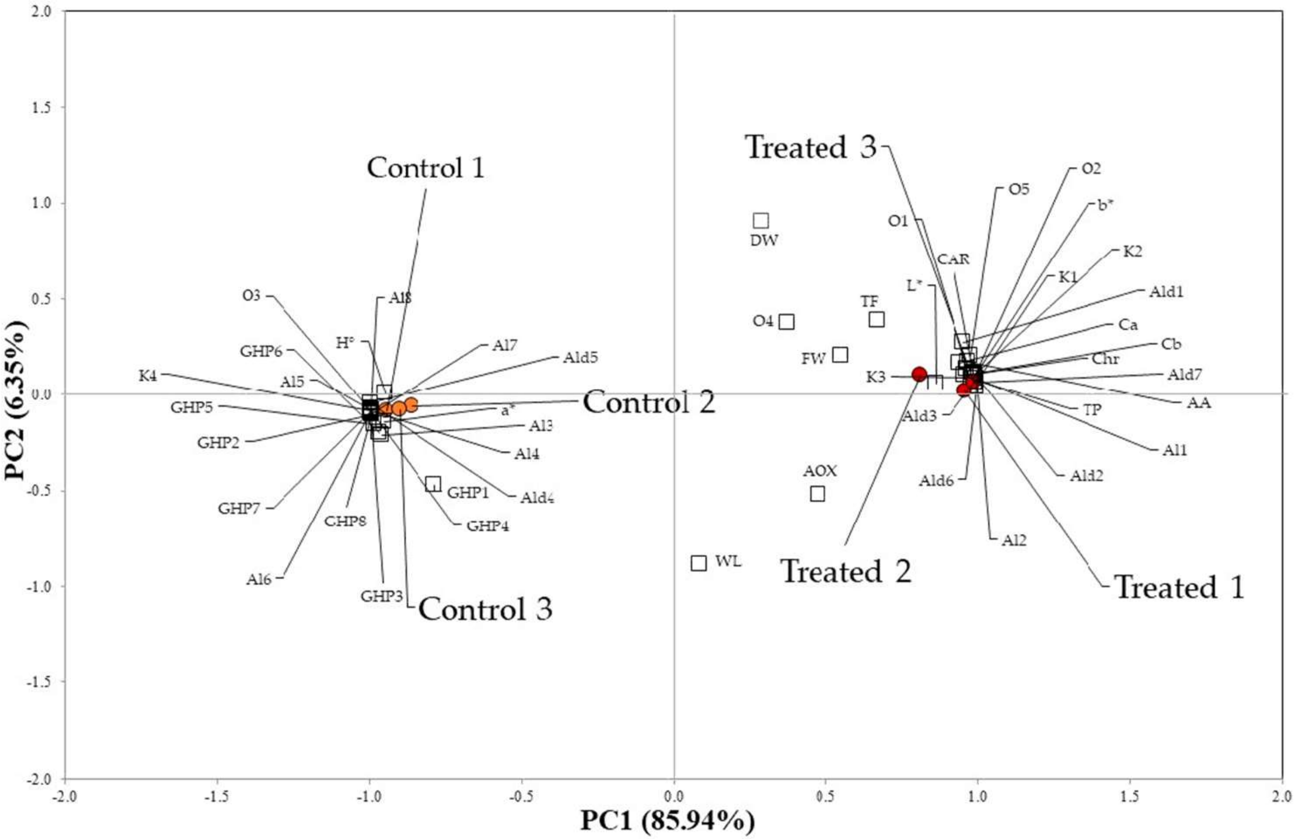


Figure 2. Principal component analysis performed on Ca, Cb, CAR, TP, TF, AA, AOX and on the semi-quantitative data (% RPA) of all VOCs detected in the rocket leaves treated with Bortan (Treated) and in the untreated samples (Control) (Codes are reported in the text and in Tables 1–3).

APPLICAZIONI

SETTORI DI IMPIEGO

COLTURA	DOSE	EPOCA D'INTERVENTO
Fragola e Colture Orticole (serra e pieno campo)	10-15 l/ha	In fertirrigazione con un volume non inferiore ai 20000 l/ha: dal trapianto/semina e nel corso della stagione da 2 a 4 interventi a distanza di 10-15 gg
Fruttiferi	10-15 l/ha	In fertirrigazione con un volume non inferiore ai 20000 l/ha: dalla ripresa vegetativa e nel corso della stagione a distanza di 15 gg, da 2 a 4 interventi

Prodotto originale DIACHEM

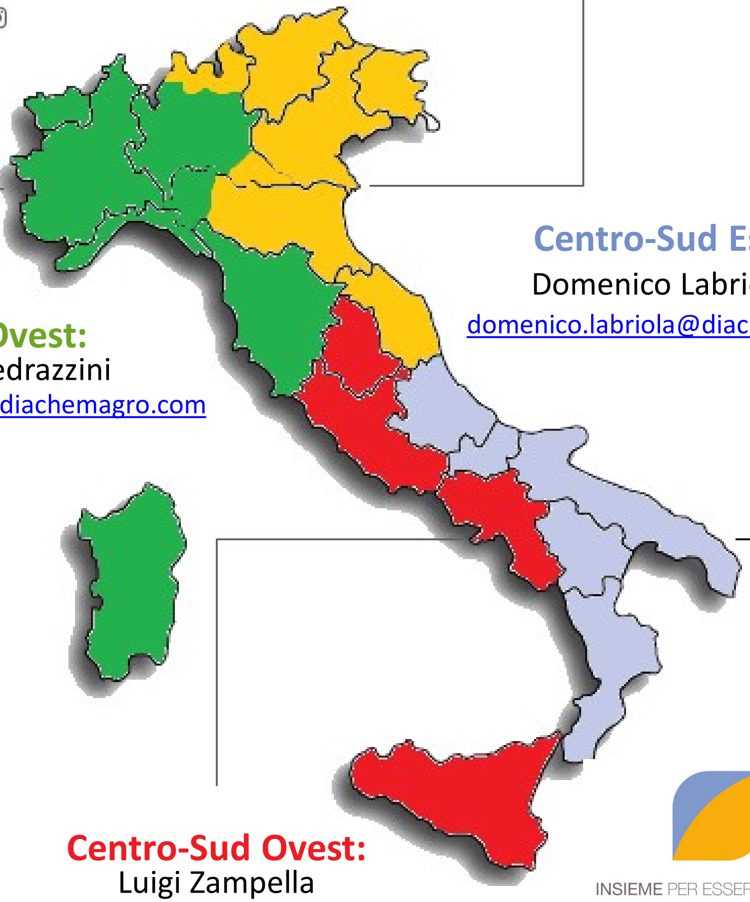
TANICA
10 kg

AVVERTENZE
Agitare bene prima dell'uso.

FIELD-MARKETING

DIACHEM

chimiberg DIAGRO



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INSIEME PER ESSERE PIÙ FORTI

Diachem World, More Power to Ideas

grazie per la cortese attenzione