

NOVEMBER 30 - DECEMBER 03. 2015

TORINO, ITALY

# BOOK OF ABSTRACTS

## European 16th Meeting on Environmental Chemistry



EMIEC16

EMIEC16

CNT97SA1YQ L2698-60001

Book of Abstracts

**“16<sup>th</sup> European Meeting on Environmental Chemistry”**

November 30<sup>th</sup> – December 3<sup>rd</sup> 2015

Torino, ITALY

ISBN: 978-88-941168-0-9

Editors: Maria Concetta Bruzzoniti and Davide Vione / Department of Chemistry,  
University of Torino, ITALY

Printing: Agit Mariogros, Beinasco (TO), ITALY

Design: Luca Rivoira / Department of Chemistry, University of Torino, ITALY

Disclaimer

This book was carefully produced from the author's own submission. Minor formal modifications were made, which in no way interfere with their scientific content. The final printing model was established by the editor according to previous template. Nevertheless, we do not warrant the information contained therein to be free of error. Readers are advised to keep in mind that statement, data, illustrations, procedural details or other items may inadvertently be inaccurate.

No part of this document may be reproduced in any form or by any means without written permissions of the editors.

## TABLE OF PRESENTATIONS

ORAL PRESENTATIONS .....	2
INVITED SPEAKERS .....	3
METHODS FOR ENVIRONMENTAL ANALYSIS .....	8
ATMOSPHERIC SCIENCES .....	25
CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS.....	38
FOOD AND AGRICULTURE.....	45
GREEN CHEMISTRY AND SUSTAINABLE USE OF RESOURCES.....	52
PHOTOCHEMISTRY AND PHOTOCATALYSIS .....	52
SOIL, SEDIMENTS AND REMEDIATION .....	69
WATER TREATMENT AND ITS IMPLICATIONS .....	79
POSTER PRESENTATIONS .....	91
METHODS FOR ENVIRONMENTAL ANALYSIS .....	92
ATMOSPHERIC SCIENCES .....	99
CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS.....	105
FOOD AND AGRICULTURE.....	120
GEOLOGY.....	129
GREEN CHEMISTRY AND SUSTAINABLE USE OF RESOURCES.....	132
PHOTOCHEMISTRY AND PHOTOCATALYSIS .....	139
QSAR.....	145
SOIL, SEDIMENTS AND REMEDIATION .....	147
WATER TREATMENT AND ITS IMPLICATIONS .....	156
ANALYTICAL INDEX.....	170

## The response of lettuce to environmental stresses is cultivar specific: role of phenolic acids and flavonoids

<sup>1</sup>Usue Pérez-López, <sup>1</sup>Jon Miranda-Apodaca, <sup>1</sup>Amaia Mena-Petite, <sup>1</sup>Alberto Muñoz-Rueda,  
<sup>2</sup>Cristina Sgherri, <sup>2</sup>Mike Quartacci

<sup>1</sup>*Department of Plant Biology and Ecology - Faculty of Science and Technology, University of the Basque Country (Spain);* <sup>2</sup>*Department of Agriculture, University of Pisa, Food and Environment (Italy)*

usue.perez@ehu.eus

There is an increasing interest for the inclusion of fresh fruits and vegetables in the human diet, mainly due to the health benefits associated with their consumption. Several epidemiological studies have revealed that diets rich in fruits and vegetables are associated with a reduced risk of cardiovascular diseases and various types of cancer. These beneficial effects are believed to be due to phytochemicals such as phenolic compounds, which can protect the key biological constituents of the cell. Having defense functions, their concentrations can increase when plants are subjected to environmental stresses. This practice represents a great potential for enhancing the health promoting properties of food products. The aim of this work was to study the changes in the composition of phenolic acids and flavonoids in two differently pigmented lettuce cvs when submitted to high light (700 PAR) or elevated CO<sub>2</sub> (700 ppm) or to a combination of both. The two cvs were very different for the contents and composition in phenolic acids and flavonoids, with the red one showing the higher values. In response to both high light and elevated CO<sub>2</sub>, total flavonoids and phenolic acids increased mainly due to increases in quercetin, quercetin-3-O-glucuronide, chicoric acid and chlorogenic acid, these changes being cv. specific. Cyanidin also reached a higher value in the red cv. following stress. When high light was applied together with elevated CO<sub>2</sub>, flavonoids of the green cv. were subjected to a much higher increase than when high light or elevated CO<sub>2</sub> were applied separately. The red cv. showed a different trend with elevated CO<sub>2</sub> not having a positive effect on the amounts of phenolic acids. These results suggest that the application of high light or elevated CO<sub>2</sub>, alone or in combination, can induce the production of some phenolics increasing the health benefits of plant products such as lettuce. As each treatment alters in a distinct way the composition of phenolics and each phenolic compound has different nutraceutical properties, the choice of the treatment can be done on the base of the desirable compound to be enhanced.

**Acknowledgements.** This research was financially supported by the following grants: EHUA14/19, and GRUPO Gobierno Vasco-IT577-13.