

Cost Action TD 1304
Zinc-Net - The Cost Action for Zinc Biology

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Sofia, Bulgaria, 22-23 March 2016



**Dietary supplements vs food biofortification and the
gut microbiome:**

human and animal health outcomes

Abstracts



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Short biography

Professional history

Oct 2015-today. Associate Professor in Agricultural Chemistry and Plant Biotechnology. University of Basilicata, Italy. **May-Oct 2015.** Fulbright Research Scholar grant. University of California, Davis, CA, USA. **Dec 2008-Oct 2015.** Assistant Professor in Agricultural Chemistry and Plant Biotechnology. University of Basilicata. **Feb 2004-Jan 2008.** Postdoctoral Researcher. University of Basilicata. **Jul-Oct 2002.** Marie Curie Fellowship. Institute of Molecular Biology and Biotechnology, Heraklion, Greece. **Jul 2000-Sep 2001.** Researcher. National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Matera, Italy. **Mar-Jun 2000.** European MURST research grant. Experimental Institute of Cereal Growing (CRA-CER), Foggia, Italy.

Research fields: a) Plant biochemistry and physiology, particularly under abiotic stress conditions; b) Soil chemistry/microbiology and soil sustainable management; c) Food quality and secondary metabolites.

Scientific interests: a) Response of plants to soil metals and treatment of metal-contaminated soils; b) Quality and fertility of the soil in sustainable agro-ecosystems; c) Response of crops to abiotic and biotic stresses; d) Molecular aspects of food quality and improvement of plant material.

He is author of more than 50 papers and chapters in international and national books and Journals. He is Editor-in-Chief of the International Journal of Plant Biology, Member of the Editorial Board of Acta Agriculturae Scandinavica, Section B - Soil & Plant Science, and external referee for peer-reviewed international Journals.

Short institution presentation

The University of Basilicata (Italian: Università degli Studi della Basilicata) is an Italian public research university located in Potenza and Matera (Italy). It was founded in 1982 and is organized in six Schools and Departments, with Courses in Agricultural Science, Engineering, Humanities, Mathematics, Physics and Natural Sciences, Economics, and Pharmacy.

The School of Agricultural, Forestry, Food and Environmental Sciences of the University of Basilicata is a leading provider of high quality scientific research relevant to plant-based agriculture and forestry, food production with the aim of achieving improvements in rural and agricultural economies that are financially, environmentally and socially sustainable.

Growth parameters, hormonal balance and thiol-peptide compound metabolism in *Arabidopsis thaliana* seedlings growing under excess zinc

Session 1 – P1

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ABSTRACT

To date, almost no information is available in roots and shoots of the model plant *Arabidopsis thaliana* (L.) Heynh. about the hierarchic relationship between metal accumulation, phytohormone levels, and glutathione/phytochelatin content, and how this relation affects root and shoot development. For this purpose, specific concentrations of zinc, alone or in triple combination with cadmium and copper, were supplied for two weeks to seedlings growing in a hydroponic system and using Petri dishes with a gradient of distances between germinating seeds and metal-contaminated agarized medium. Zinc accumulation was determined by anodic stripping voltammetry in plant tissues and digested agar samples, and a significant competition in metal uptake was observed. Microscopic and high-resolution scanning analyses revealed that root morphology was affected by metal exposure, with increases in root system total length and surface mainly due to the higher branching and number of lateral roots, accompanied by higher average root diameter. The confocal microscopy analysis of auxin accumulation and influx in the cells by the use of transgenic *Arabidopsis* lines (DR5:GUS, LAX3:GUS and AUX1:GUS) and the mass spectrometry of plant tissues revealed significant changes in auxin levels and accumulation in the seedling exposed to zinc alone or in combination. Real time quantitative PCR analysis of some genes involved in auxin and cytokinin synthesis showed on average a metal up-regulated transcription. The production of thiol-peptides was induced by zinc alone or in combination, but the expression of the genes involved in thiol-peptide synthesis was not stimulated by the metals, suggesting a full post-transcriptional control. Results show that the Cd/Cu/Zn-induced changes in root morphology are caused by a hormonal unbalance, mainly governed by the auxin/cytokinin ratio. The remodeling of the root architecture in response to zinc could be a pollution 'escaping strategy' aimed at seeking metal-free areas. The methods used and the results obtained by this model plant could be transferred to species with bioremediation or agronomic importance.

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