

# BOOK OF ABSTRACTS

## 3rd International Conference on Plant Biology (22nd SPSS Meeting)



9-12 JUNE 2018  
BELGRADE

**Serbian Plant Physiology Society**

**Institute for Biological Research "Siniša Stanković", University of Belgrade**

**Faculty of Biology, University of Belgrade**

**3<sup>rd</sup> International Conference  
on Plant Biology  
(22<sup>nd</sup> SPPS Meeting)**



9-12 June 2018, Belgrade

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To assess the extent to which the steady presence of sodium chloride in relatively low concentrations (0.1–1.2 g L<sup>-1</sup>) affects plants, an experiment was set in semi-controlled conditions of a greenhouse. Safflower (*Carthamus tinctorius* L., Asteraceae), coriander (*Coriandrum sativum* L., Apiaceae) and oilseed rape (*Brassica napus* L., Brassicaceae) were grown in water cultures, on half-strength Hoagland's nutrient solution, to which NaCl was added 2 weeks after planting. Plant growth, ash content, accumulation and distribution of Na in relation to K and Ca were analyzed 3 weeks following the beginning of the treatment.

The percentage of ash significantly increased in roots of safflower, leaves, stems and roots of coriander and leaves and stems of oilseed rape, whereas the percentage of dry matter significantly declined in coriander and oilseed rape. Concentration of Na increased in all plants and organs, to different extents. Ratios of concentrations Na/K, Na/Ca and (Na+K)/Ca increased in all species; K/Ca significantly increased in roots of safflower and coriander and declined in leaves of coriander. Even though dry weight of plants did not significantly change in the presence of NaCl at applied concentrations, significant changes in their composition were evident.

**Keywords:** salt stress, elemental composition, safflower, coriander, oilseed rape

## Total antioxidant activity in wheat and pea seedlings treated with uncoated and polysaccharide coated CeO<sub>2</sub> nanoparticles

PP2-23

Ivana Milenković<sup>1</sup>, Manuel Algarra<sup>2</sup>, Slađana Spasić<sup>1</sup>, Aleksandra Mitrović<sup>1</sup>, Vladimir Bešković<sup>3</sup>, Ksenija Radotić<sup>1</sup>  
(ivana.milenkovic@imsi.rs)

<sup>1</sup> Department of Life Sciences, Institute for Multidisciplinary Research, University of Belgrade, Belgrade; Serbia

<sup>2</sup> Department of Inorganic Chemistry, Faculty of Sciences, University of Málaga, Málaga; Spain

<sup>3</sup> Department of Biochemistry, Faculty of Chemistry, University of Belgrade, Belgrade; Serbia

CeO<sub>2</sub> nanoparticles (nCeO<sub>2</sub>) are popular because of the unique redox property-transition between oxidation states (Ce<sup>3+</sup> and Ce<sup>4+</sup>). Their tendency for agglomeration has led many researchers to coat nCeO<sub>2</sub> with different polymers, but little is known about the impact of coated nanoparticles on plant metabolism. Increased nCeO<sub>2</sub> application enhances risk for the environment due to their accumulation in soil, air and water. Metal toxicity causes abiotic stress and leads to overproduction of reactive oxygen species (ROS), damaging important biological molecules in plants.

In this research, we performed a three-week treatment of seedlings of two agricultural plants in hydroponics with 200 mg L<sup>-1</sup> of uncoated and glucose-, levan- and pullulan coated nCeO<sub>2</sub> (G-CeO<sub>2</sub>, L-CeO<sub>2</sub> and P-CeO<sub>2</sub>). Our aim was to study the effect of nanoparticle coating on Ce uptake, and on changes in total antioxidant activity (TAA), the indicator of oxidative stress in monocotyledonous and dicotyledonous crop species. Concentration of Ce in shoots of treated seedlings was determined using ICP-OES.

The uptake of Ce differed in the treated plant species. Coating of nCeO<sub>2</sub> increased Ce uptake in pea, but decreased in wheat. However, Ce content was 20-fold higher in wheat compared to pea plants, regardless of the nanoparticle coating. Extremely high Ce content measured in wheat coincided with the decrease in TAA. On the other hand, low Ce content measured in pea coincided with no changes in TAA.

Presented results suggest the difference in nCeO<sub>2</sub> uptake and its physiological effects between monocotyledonous and dicotyledonous plant species, but further research is necessary.

**Keywords:** coating, CeO<sub>2</sub>, nanoparticle, plant, stress