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(22nd SPPS Meeting)

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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^{-1}) 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_2 nanoparticles

PP2-23

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CeO_2 nanoparticles ($nCeO_2$) are popular because of the unique redox property-transition between oxidation states (Ce^{3+} and Ce^{4+}). Their tendency for agglomeration has led many researchers to coat $nCeO_2$ with different polymers, but little is known about the impact of coated nanoparticles on plant metabolism. Increased $nCeO_2$ 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^{-1} of uncoated and glucose-, levan- and pullulan coated $nCeO_2$ (G-CeO_2, L-CeO_2 and P-CeO_2). 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 $nCeO_2$ 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 $nCeO_2$ uptake and its physiological effects between monocotyledonous and dicotyledonous plant species, but further research is necessary.

Keywords: coating, CeO2, nanoparticle, plant, stress