Influence of a Biostimulant on Se-Enriching Wheat Plants

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As an essential trace element for humans and animals, dietary assimilable selenium mainly originates via the soil-plant system. Plants can transform inorganic Se species from the soil into organic Se (e.g, selenoaminoacids) as selenium forms for animal diets. On the other hand, the presence of Se produces stress for the plant and may hamper its normal development. In this work, a plant biostimulant, based on hybrid heteropolyoxometalates of Keggin structure mixed with humic acid, named Phyto-Fitness® (BIO Fitos, S.R.O., Czech Republic) has been applied either by foliar or by roots to wheat plants grown hydroponically. The aim of the study is first to assess the effect of this biostimulant counteracting the Se toxicity on the normal development of plants, and second, to evaluate a possible modification on the Se speciation in different plant tissues. For that purpose, plants were exposed to control conditions with no selenium, and with either selenite, selenate or a mixture of both Se species in both the presence or absence of the biostimulant.

Plants dry weight showed that the biostimulant root application significantly increased the plant biomass making it comparable to control plants. This result indicates the potential of this biostimulant against Se-induced stress in plant growth. X-ray absorption spectroscopy characterization allows us to identify organic selenium as the main component in both roots and shoots, especially in those exposed to selenite. Although, the application of plant biostimulant significantly affects the Se speciation in roots, Se speciation in shoots was only affected by the different Se treatments, being the biostimulant practically non affecting.