

Title Antioxidative and growth-promoting effect of selenium on senescing lettuce
Author Tailin Xue, Helinä Hartikainen and Vieno Piironen
Citation Plant and Soil 237 (1): 55-61. 2001.
Keywords antioxidant; GSH-Px; lettuce; selenium; senescence; SOD; tocopherol

Abstract

In human and animal cells, Se plays an essential role in antioxidation and exerts an antiaging function but it is toxic at high dietary intake. To increase its intake in forage and foodstuffs, Se fertilization is adopted in some countries where soils are low in bioavailable Se, even though higher plants are regarded not to require Se. To test its ability to counteract senescence-related oxidative stress in higher plants, a pot experiment was carried out with lettuce (*Lactuca sativa*) cultivated with increasing amounts of H₂SeO₄. The yields harvested 7 or 14 weeks after sowing revealed that a low Se dosage (0.1 mg kg⁻¹ soil) stimulated the growth of senescing seedlings (dry weight yield by 14%) despite a decreased chlorophyll concentration. The growth-promoting function was related to diminished lipid peroxidation. In young and senescing plants, the antioxidative effect of Se was associated with the increased activity of glutathione peroxidase (GSH-Px). In the senescing plants, the added Se strengthened the antioxidative capacity also by preventing the reduction of tocopherol concentration and by enhancing superoxide dismutase (SOD) activity. When no Se was added, tocopherols and SOD activity diminished during plant senescence. The higher Se dosage (1.0 mg kg⁻¹ soil) was toxic and reduced the yield of young plants. In the senescing plants, it diminished the dry weight yield but not the fresh weight yield.