

Selenium and mercury species interactions in wheat plants

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Selenium is an essential micronutrient for humans, and the biofortification of crops with Se-rich fertilizers is an increasingly common practice in order to counteract the selenium deficiency that affects 500-1000 million people worldwide [1].

However, selenium biofortification could be hampered by the presence of heavy metals, such as mercury, in the soils of the agricultural lands. Metal uptake by plants is a well-known phenomenon occurring in contaminated sites, and due to the strong interaction between selenium and mercury [2], the application of selenium to the crops has been shown to enhance the uptake of mercury by wheat roots and its potential translocation to above ground tissues.

The reason for these effects is the formation of Hg-Se compounds [3], [4]. Our studies, performed by HPLC-ICP-MS and μ XAS, μ XRF and SR-FTIR at ALBA, ESRF and SSRL have shown how the usual metabolization and translocation of selenite and selenate into selenoamino acids in wheat plants is affected by the presence of inorganic mercury, by the formation of both mercury selenides and Se-Hg protein complexes.

[1] Combs (2001) *Br. J. Nutr.*, **85**, 517–547. [2] Luque-Garcia *et. al.* (2013) *Anal. Chim. Acta*, **801**, 1–13. [3] Khan & Wang (2009) *Environ Toxicol Chem.*, **28** 1567-1577. [4] McNear *et. al.* (2012) *Metallomics*, **4**, 267-276.

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