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Program and Abstract Book

P10 - Selenium, Nitrogen and Carbon remobilization study following litter decomposition during 10 months

1. Selenium chemistry and geochemistry
1.4 Relationships of selenium between soils, water, and vegetation
Keywords: isotope labelled biomass, litter, decomposition, speciation

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Introduction: In the soils, effective sink for Se, a significant part of Se is associated with the organic pool (Tolu *et al.*, 2014) but some organo-Se compounds still remains unidentified (Di Tullo *et al.*, 2015). Although the biogeochemical Se cycle is well documented and studied, the mobilization processes in this organic Se pool are still poorly understood as well as the biotic and abiotic factors controlling this mobilization and the temporal scale involved.

Method: We propose an original method that consists 1) in labelling a non-accumulator ryegrass with 4 isotopes ($^{78}Se^{IV}$, $^{82}Se^{VI}$, ^{15}N and ^{13}C) to study uptake, assimilation and speciation of selenite and selenate species in this plant and 2) in examining during 10 months the decomposition of this isotopically labelled biomass added to a grassland soil either as shoot litter or as root litter. This original method allows us to monitor selenium, carbon and nitrogen in the same fractions extracted from the first centimeters of soils, the residual litter and the new vegetation.

Result: Our work conclude that the rye-grass could develop the same strategies as hyperaccumulator plants to limit selenium toxicity: selenate transfer to the shoot compartment and production of methylated Se species considered as precursor compounds for Se volatilization (Versini *et al*., 2016).

Discussion: The second experimentation showed that the patterns of C and N releases differ from that of Se; the distributions of the tracers are low in the underlying horizons and the amounts of Se-MO pools depend on the litter sources but are almost constant during 10 months.

Selected references

Di Tullo P., et al. (2015). Stable isotope tracing: a powerful tool for selenium speciation and metabolic studies in not hyperaccumulator plants (ryegrass *Lolium Perenne L.*), *Analytical, Bioanalytical Chemistry* , 407, 30, 9029-9042

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