

Time dependence of the bioassociation behavior of U(VI) and Eu(III) with *Brassica napus* cells

J. JESSAT^{1*}, S. SACHS¹, H. MOLL¹, R. STEUDTNER¹,
F. BOK¹ AND T. STUMPF¹

¹Helmholtz-Zentrum Dresden-Rossendorf, Institute of Resource Ecology, Bautzner Landstraße 400, 01328 Dresden, Germany (*correspondence: j.jessat@hzdr.de)

For both the remediation of contaminated sites and the safety assessment of nuclear waste repositories detailed knowledge about the transfer of radionuclides (RN) into the food chain is of central concern. The association of RN with plants and their interaction with released metabolites influences whose fate in the environment. We studied the time and concentration dependent bioassociation of U(VI) and Eu(III) as an analogue for trivalent actinides with *Brassica napus* cells. The aim was to determine the effect of both heavy metals on the cell viability and the influence of the cell metabolism on the speciation and bioavailability of both metals. Due to the exposure of the cells with Eu(III) and U(VI) a time and concentration dependent bioassociation behavior was observed. At 200 μM U(VI) a multistage bioassociation process occurred resulting in a detachment of bioassociated U(VI) back into the medium. This change in the U(VI) speciation in the medium was observed by time-resolved laser-induced fluorescence spectroscopy. The occurrence of three different U(VI) species in the medium over the exposure time (Fig. 1) indicates the release of plant cell metabolites, that can act as ligands for U(VI) complexation and may impact its transfer in the environment. Model calculations for the speciation of U(VI) in the initial medium were performed on basis of the literature [1]. In order to identify possible plant cell metabolites, experiments on the enrichment and chromatographic separation of metabolites were carried out. In addition, the U(VI) complexation by relevant metabolites was studied.

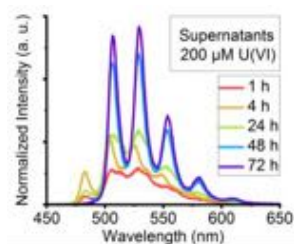


Figure 1. Change in the U(VI) speciation in the supernatant over the time.

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