Supporting information for

In search of phytoremediation candidates: Eu(III) bioassociation and root exudation in hydroponically grown plants.

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Hoagland medium composition

**Table S1.** Composition of the modified full-strength Hoagland medium used for plant cultivation and the phosphate-reduced Hoagland medium used for bioassociation experiments [1]. Chemicals were readily used as purchased. Before use, the medium was adjusted to pH = 5.5 ± 0.1 and autoclaved to avoid any biological contamination.

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| --- | --- | --- |
| **Chemical** | **Concentration in full-strength medium (µM)** | **Concentration in phosphate-reduced medium (µM)** |
| KNO3 | 1001 | 1001 |
| Ca(NO3)2 ∙4 H2O | 300 | 300 |
| MgSO4 ∙ 7 H2O | 199 | 199 |
| KH2PO4 | 100 | 1 |
| FeSO4 ∙ 7 H2O | 2 | 2 |
| Na2EDTA ∙ 2 H2O | 1 | 1 |
| H3BO3 | 5 | 5 |
| MnCl2 ∙ 4 H2O | 1 | 1 |
| CuSO4 ∙ 5 H2O | 0.03 | 0.03 |
| Na2MoO4 ∙ 2 H2O | 0.06 | 0.06 |
| ZnSO4 ∙ 7 H2O | 0.08 | 0.08 |

Bioassociated Eu(III) in root, stem and leave



***Figure S1.*** Quantification of bioassociated Eu(III) in root, stem and leave after 96 h exposure of plant roots of (**a**) M. sativa, (**b**L. corniculatus and (**c**) L. usitatissimum with initial concentrations of 200, 20 and 2 µM Eu(III) in the liquid medium. Bars represent the mean and error bars the standard deviation of four biological replicates.

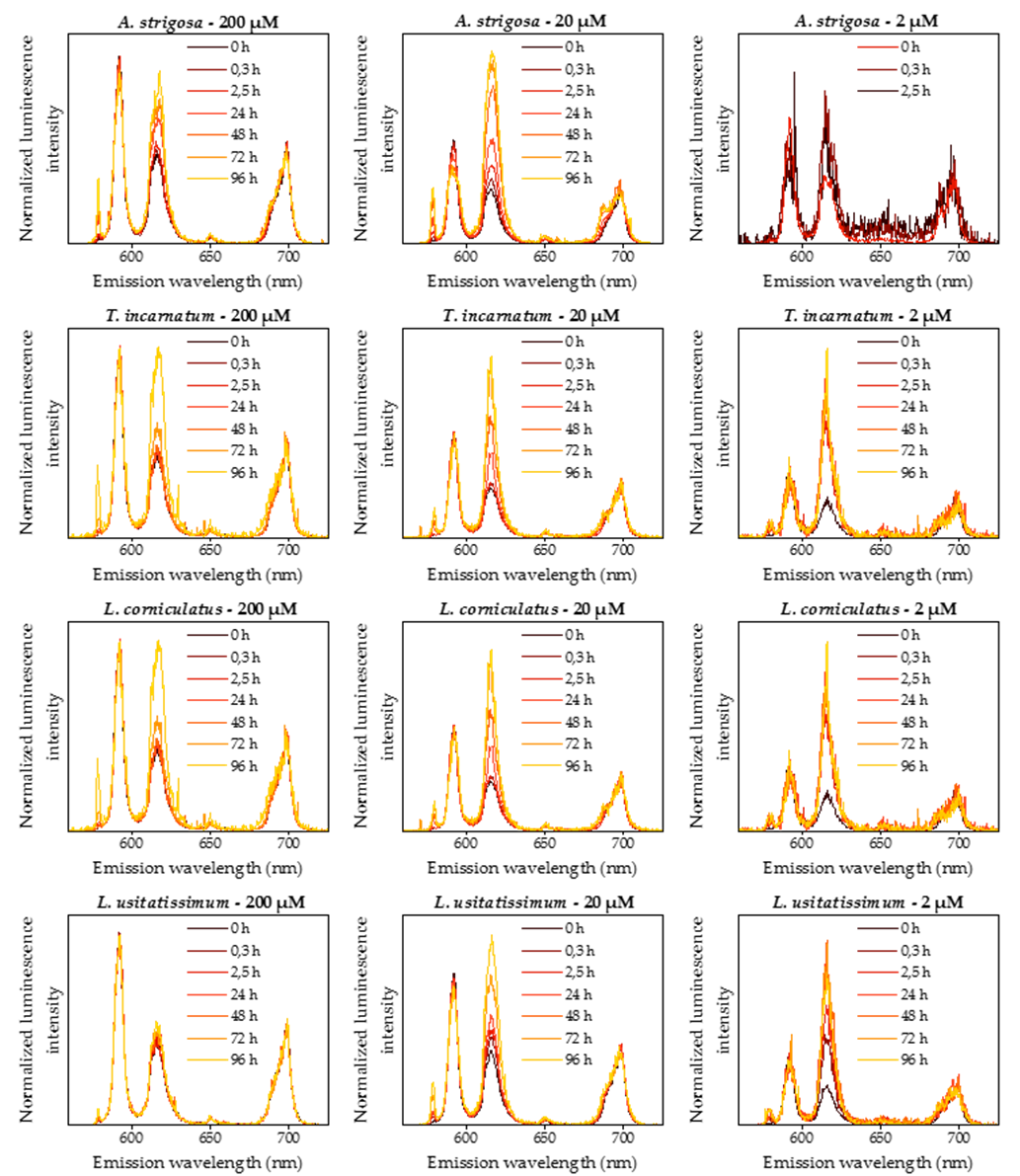
Pictures of hydroponically grown plants

A close-up of several plants

Description automatically generated

***Figure S2.*** Photographic images of hydroponically grown plants. (**a**) A. strigosa, (**b**) M. sativa, (**c**) L. usitatissimum, (**d**) T. incarnatum, (**e**) L. corniculatus.

Luminescence spectra of liquid media



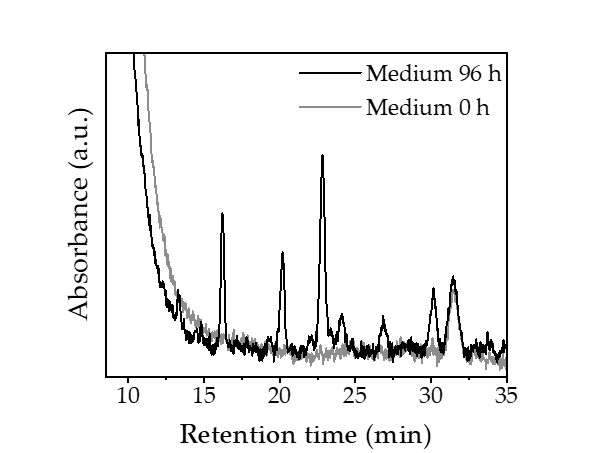
***Figure S3.*** Normalized luminescence spectra of liquid media throughout the bioassociation experiments with A. strigosa, T. incarnatum, L. corniculatus, L. usitatissimum (**top to bottom**) exposed to 200, 20 and 2 µM Eu(III) (**left to right**). For A. strigosa, 2µM, luminescence spectra became too noisy with time, hence only the first three spectra are shown.

Thermodynamic modelling of Eu(III) speciation in the liquid medium



***Figure S4.*** Calculated Eu(III) speciation in low phosphate Hoagland medium (1 µM P) in dependence of the pH value for **(a)** 200µM Eu(III); **(b)** 20 µM Eu(III) and **(c)** 2 µM Eu(III).

Chromatogram of liquid medium



***Figure S5.*** Chromatogram of liquid medium before (0 h) and after (96 h) contact with roots of A. strigosa.

References

1. Hoagland, D.R.; Arnon, D.I. The Water-Culture Method for Growing Plants without Soil. *Circular. California Agricultural Experiment Station* **1950**, *347*.