# Time-resolved accumulation of essential and strategic elements in different bioenergy plants 

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Soils may represent a huge reservoir of elements with high economic value such as germanium (Ge), rare earth elements (REE), nickel (Ni), or cobalt (Co). Therefore, phytomining could be a promising alternative to conventional mining technologies. However, until today, only little is known about the time dependency of the accumulation of these elements in different plant tissues and related chemical properties of the rhizosphere. The aim of this study was to investigate concentrations of selected trace elements at different harvest dates in six different bioenergy crops (Lapinus albus, Fagopyrum esculentum, Brassica napus, Avena sativa, Phalaris arundinacea and Zea mays). Additionally, chemical changes in the rhizosphere where measured. In a greenhouse experiment, Lapinus albus, Fagopyrum esculentum, Brassica napus, Avena sativa, Phalaris arundinacea and Zea mays were cultivated in thirty-five fully randomized replications for each species. Seven plants of each species were harvested at ten days interval for a period of eight weeks. Concentrations of these elements were measured with ICP-MS. Additionally at selected dates, rhizosphere soils were collected and analyzed for major changes in chemical property such as pH , carboxylate concentrations as well as binding forms of trace elements by means of soil saturation extracts. The results of this study clearly shows a time dependency of trace element accumulation and this dependency varies between different species and elements.
This is an ongoing study which is carried out in preparation for a doctoral thesis in the Institute for Biosciences, Biology/Ecology Group of TU Bergakademie Freiberg, Germany.

