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Screening of plants of different species and functional groups for phytomining of rare earth elements in soil

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To significantly contribute to the available information on potentials of different plants species for use in phytomining of Rare Earth Elements (REEs), a screening experiment was conducted to directly compare at once 8 plant species belonging to two functional groups (herbs and grasses), grown on a soil with high REEs concentrations. The plants were grown for 10 weeks on potted soils, each containing 2kg of soil. The plants evaluated are *Fagopyrum esculentum*, *Cannabis sativa*, *Brassica napus* and *Sinapis alba* for the herbaceous species and *Sorghum bicolor*, *Zea mays*, *Avena sativa* and *Festuca arundinacea* for the grass species. Concentrations of the four REEs namely Cerium (Ce), Lanthanum (La), Neodymium (Nd) and Yttrium (Y) and amount/content of each REE contained in the species investigated were determined and the data obtained were subjected to the statistical analysis Multivariate Analysis of Variance to identify differences that exist between species, within and between functional groups. Results show that the differences observed in amount of each of the REEs phytomined by the different grass species are statistically insignificant. Contrastingly, significant differences exist between the concentrations and content of each of the REEs between the herbaceous species, with *F. esculentum* significantly showing higher potential for use in phytomining compared to the rest of the herbaceous species. Results from statistical comparison of all species shows that *F. esculentum* is the candidate that showed more potential for use in phytomining, with *C. sativa* also being the next specie with high potential for phytomining aside from *F. esculentum* when compared to the rest of the species investigated. Functional groups were compared, and results showed that the herbaceous specie have a significantly higher potential for use in phytomining of REEs compared to grass species. Results from this experiment contributes to existing knowledge on potentials of different plant species for use in phytomining and suggest possible candidates in comparison to others, for use in experiments that seek to improve the chances of using plants as an eco-friendly alternative to conventional mining of rare earth elements in commercial quantities.