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Transformation of iron-oxide extracts from mine water treatment sludge into bioavailable constituent additives to fertilizer

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A potential strategy to offset operational cost in mine water treatment process would be extracting iron-oxide from the sludge and developing different commercial viable products. Once potential viable product would be using iron from sludge as fertilizer additives because availability of iron to most plant species is expressed in increased chlorophyll product, which resulted in the deep green color of healthy plants, which were applicable in greening golf courses. Application of the slag “as-is” has very little influence in increasing the chlorophyll content in the grass. Thus, we extracted iron oxides from the sludge and conducted growth experiment using golf grass. The addition of extracts had no influence on the chlorophyll content of the grass or the overall growth. Chemical analysis and later the iron extracts revealed that the sludge from mine water treatment plants is predominantly iron, carbon and calcium, with minor content of magnesium. Further, the iron extracts were dominated by Fe^{3+} species, mostly not soluble in water. Plants mainly using Fe^{2+} species as nutrient, therefore, the paper and presentation will focus on development of cost-effective and green methods used to turn the extracted Fe^{3+} into bioavailable state and the development of the iron-rich fertilizer for greening golf-fields.

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