Fungal interaction with and accumulation of vanadium

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Vanadium (V) is a valuable strategic metal and widely used in steel, rechargeable hydride batteries, vanadium redox battery and pigment, et al. Many basidiomycetes have been found the biosorption ability of heavy metals, but there are few researches concerning the interaction between fungi and V. To better understand the potential for recovery and remediation of V by fungi, we investigated the tolerance and accumulation efficiency of four basidiomycota fungi (*Amanita muscaria*, *Armillaria cepistipes*, *Xerocomus badius* and *Bjerkandera adusta*) to a series of V compounds and vanadiferous titanomagnetite slag.

The diametric growths of *A. muscaria*, *A. cepistipes* and *X. badius* on the petri dish were significantly limited when the V concentration increased. Compared to other three species, *A. muscaria* was very sensitive to the V molecular structure as soluble V(4+) and V(5+) were more strict to its diametric growth than V oxides and slag. Only *A.* muscaria and X. badius showed significant relationship between fungal diameters and biomass at 0.01 level. It suggested that the fungal tolerance is not always coincident with biosorption ability of V. All the speicies accumulated V at every concentration and compounds, and the fungal V concentration increased with the increasing V content in media. All species performed higher accumulation efficiency of soluble V(4+) than soluble V(5+). Furthermore, *X. badius* showed the stronger biosorption ability (~6 ppm) than other three species. The results also showed that *X. badius* was able to recover V from vanadiferous titanomagnetite slag, while the V accumulation ability of *A. muscaria* was impeded by the slag. Overall, both fungal tolerance and accumulation abiltiy should be considered for the V recovery and remediation. The multiple compounds in the mining wastes could also affect the fungal sorption effeciency.