



Contribution of wastes and biochar amendment to the sorption capacity of heavy metals by a minesoil

Rubén Forján, Verónica Asensio, Flora A. Vega, Luisa Andrade, and Emma F. Covelo
Department of Plant Biology and Soil Science, University of Vigo, Spain (rforjan@uvigo.es)

The use of wastes as soil amendments is a technique applied to reduce the available concentration of heavy metals in polluted sites (Pérez-de-Mora et al., 2005). However, the used wastes sometimes have high concentration of metals such as Cu, Pb, and Zn. Therefore, the sorption capacity of the amendments is important to understand its behavior in soil.

The settling pond soil in a mine (S) located at Touro (Spain) was amended with a mixture of sewage sludges, sludges from an aluminum plant, ash, food industry wastes, sands from a wastewater treatment plant and biochar (A). The present study was performed to determine the influence of the addition of the amendment (A) in the sorption capacity of Cu, Pb, and Zn of the studied soil (S). The amendment (A) and the soil (S) were mixed (SA) at 20, 40, 60% and then introduced into glass vessels. The amendment A and S the soil at 100% were also introduced in glass vials as control samples. Mixtures and controls were incubated to field capacity for one month. To evaluate the sorption capacity of the soil and the mixtures soil-amendment, sorption isotherms were constructed using multiple-metal solutions of Cu, Pb and Zn nitrates (0.03, 0.05, 0.08, 0.1 and 0.5 mmol L⁻¹) containing 0.01 M NaNO₃ as background electrolyte (Vega et al., 2009). The overall capacity of the soil to sorb Cu, Pb y Zn was evaluated as the slope Kr (Vega et al., 2008).

The sorption capacity of the amendment (A) is higher than the soil (S) for the three studied elements, which reflects that this amendment has a binding capacity of Cu, Pb and Zn higher than soil (S) (P < 0.05). The soil-amendment mixtures (SA) in all proportions used, except 20% for Zn, also showed higher sorption capacity than the soil (S). The amended soil has higher sorption capacity of Cu, Pb and Zn than the soil without amending (P < 0.05). The element preferably sorbed by SA in the proportions 20, 40 and 60% is Pb and the least sorbed is Zn. The amendment without mixing with the soil (A) sorbed element is preferably Pb and Cu is the least sorbed (P < 0.05).

References

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