

Amending metal contaminated mine soil with biochars to sequester metals and improve plant growth cover

ABSTRACT

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There are numerous mine spoil sites in the U.S. Pacific Northwest that contain highly acidic, heavy metal-laden soils, which limits establishment of a soil-stabilizing plant cover. Biochars may be a suitable soil amendment to reduce toxic metals, improve soil fertility, soil water holding and microbial characteristics, thereby allowing for improved plant cover. We obtained mine spoil soil from the Formosa Mine site near Riddle, OR and conducted an experiment evaluating a biochars' ability at improving plant growth. Biochar produced from gasified dairy manure bedding was added at 0, 1, 2 and 3% by weight to pots containing the spoil. Lime, poultry manure and inorganic fertilizer were also added to increase soil pH and nutrient levels. Three different crops (rye grass, wheat, and white clover) were planted in the mixtures and crop above- and below-ground biomass was determined. Preliminary results showed that soil fertility characteristics were greatly improved, however, there was minimal gain in plant biomass due to the biochar. The broad taxonomic classification of microbial communities and soil metal extractions are being conducted to ascertain if this biochar has impacted these additional soil quality characteristics.