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Bioavailability reduction with activated carbon amendment: comparison of field results and expected under optimal conditions

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A method to simultaneously determine reduction in PAH dissolved concentrations and bioaccessibility in carbon amended soils

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Impact of wood biochar on the biodegradation and bioavailability of naphthalene in soil

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Carbon amendments are being studied to be used as an in-situ remediation method for contaminated sediments. Most studies have focused on the efficiency of the added amendment in removal of contaminants and the chemical degradation of the contaminants. Few studies have been directed to follow the potential adverse effects of these amendments. The contaminated sites may have viable benthic community and therefore remediation actions can disturb the ecosystem. On the other hand, bioaccumulation in the food web results in a situation where the organisms in the higher trophic levels are at risk and/or they cannot be used for human consumption, which increases the remediation pressure. It is urgent to find the best method for remediation that can prevent the potential adverse effects of restoration measures needs to be evaluated. In this study, we assessed the effects of activated carbon and biochar in PCB contaminated sediments on feeding, growth and reproduction of an experimental organism Lumbriculus variegatus. We used coal based activated carbon and wood based biochar, which we mixed in separate experiments to the sediments. In addition, we tested if cleaning (hot water, solvent extraction) of activated carbon would affect the measured parameters. Activated carbon had sediment specific adverse effects on feeding and growth. The adverse effects of biochar were minor than those observed with comparable doses of activated carbon. The pre-treatment of the activated carbon by hot water or solvent extraction had only minor effects on the measured biological parameters. The ecological consequences inflicted by carbon amendments should be considered sediment specific.