

Can biochar serve as a low cost sorbent for soil and water remediation?

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While activated carbon is used in a wide range of water industry applications including water treatment and remediation, the high cost limits its use in many situations. There is growing interest in the potential use of alternative low-cost sorbents to remove a range of contaminants from water and soil. Due to their high specific surface area, microporous nature, and active surface chemistry, chars have been found to be effective in removing a range of contaminants from water and soil. Some biochars have been found to exhibit comparable sorption capacity for organic compounds to commercially available activated carbons. Our work on a range of organic compounds (herbicides, insecticides, pharmaceuticals) in biochar amended soils have demonstrated the extraordinary capacity of biochars to reduce the bioavailability of organic contaminants. Similarly the growing body of literature on this topic shows the effectiveness of biochars in removing a range of organic contaminants from water. The effectiveness of biochars depends on the chemistry of the organic compound as well as the properties of biochars (surface area, internal porosity, pH etc). However, it has been demonstrated that even very water soluble contaminants (e.g. 2,4-D herbicide) can be removed from water by biochars, with some biochars showing removal rates comparable to that of activated carbons. While the costs of biochars and activated carbons vary depending on source and method of production of sorbents, the comparative costs of biochars is considered to be lower than that of activated carbons by an order of magnitude. However, a number of engineering and other considerations will determine the ultimate cost-effectiveness of biochars. This presentation will provide an overview of the effectiveness of biochars in removing organic contaminants from water and soil and discuss the potential utility of biochars as low cost sorbents.