Removal of Heavy Metals from Water Using Zea mays Stover

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Heavy metals are increasingly found in drinking water worldwide from road, mining, agriculture and factory runoff. The heavy metals arsenic, cadmium, copper and lead are carcinogenic and cause organ, nervous system and developmental damage. Different parts of corn stover, what remains after grain harvesting, both when carbonized and non-carbonized can be used as an affordable filtration of heavy metals from water. Corn stalks, leaves, husks and cobs were dried and separated. Half of the corn stover was then carbonized at 553 degrees Celsius in a pottery kiln. Both the carbonized and non-carbonized corn stover were ground into fine powder and 500 mg of each were poured into 20 ml syringes. A solution of 3 L of de-ionized water with 15 ml of each standard solution (1000 ppm) of As, Cd, Cu and Pb were poured through each syringe of stover. A t-test was performed with the alternative hypothesis being that the sample averages were less than the control averages and with a level of significance of 0.01. The most efficient in the removal of As were the dried stalks, for Cd the carbonized cobs, and for Cu and Pb the carbonized husks. Copper and lead were significantly reduced by all forms of the corn stover except by dried husks and leaves. Corn cobs both when dried and carbonized significantly reduced all four heavy metals. Corn stover when dried or burnt at high temperatures can be used to efficiently remove heavy metals for both large commercial use or in developing areas globally as an affordable and replaceable filter.

Awards Won:

Fourth Award of $500