

The Anti-microbial Affects of Several Forms of Copper

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EXTENDED ABSTRACT

Copper has been used for centuries as a biocide. The ancient Greeks of 400 BCE recognized the effects of copper to purify drinking water. During the 1800's as U.S. pioneers expanded westward, they placed copper coins in wooden water casks to provide them with safe water during their journey.

Single-dwelling biological sand filters can be an effective and appropriate technology for treating drinking water in developing countries. Current literature suggests that the use of metallic biocides in these filters may reduce pathogen levels below those obtained through biosand filtration alone. A variety of unknowns exists about the use of metallic biocides in the biosand filters. For example, the most effective metallic biocide in this environment has not been identified.

The goal of this project was to test the effectiveness of three copper alloys to disinfect water contaminated with microbial content. The metals to be tested include: Copper (100%), Naval Brass 464 (Cu 60.0%, Zn 39.25%, Sn 0.75%), and Aluminum Bronze 954 (Cu 85%, Al 11%, Fe 4%). Water was collected from the Ocmulgee River. 100 mL aliquots were placed in sterilized containers with a known mass of metal. Critical variables tested included size of metal shaving, coliform concentration, and residence time. The effectiveness of the metals was also tested in the presence and absence of sand.

The knowledge gained from this experiment will be used to help better design biological sand filters during the Mercer on Mission Summer 2012 trip to Kenya.