

TITLE: THE USE OF ACTIVATED CARBON MODIFIED WITH SILVER (Ag) AND COPPER OXIDE (CuO) NANOPARTICLES FOR INACTIVATION Escherichia coli IN THE WATER FOR HUMAN

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## ABSTRACT

The water quality can be compromised due to a number of factors such as inadequate maintenance, monitoring of water treatment systems, service interruptions and piping failures. Resulting in poor quality drinking water standards, which cause consumers to take risks with waterborne diseases, even from treated water sources. The main indicator of the sanitary quality of drinking water are coliforms, particularly Escherichia coli. On the search for alternative technologies, the aim of this study was the application of activated carbon impregnated with silver and copper (Ag 0.06% Cu 1%) in order to increase the bactericidal effect due to synergism between the two metals. Activated carbon impregnated with metals was produced in pilot system by physical-chemical processes and applied in gravitational household filters for water purification. All filters with activated carbon were evaluated for bacterial removal efficiency of Escherichia coli. These activated carbons were characterized structurally through analysis of X-ray diffraction (XRD), and texturally by measurement of specific surface area and porosity (SBET, volume and pore diameter). In addition, morphological analysis will be performed by scanning electron microscopy (SEM) and transmission electron microscope (TEM). The chemical states and the amount of elements in the materials were analyzed by X-ray photoelectron spectroscopy (XPS). The results showed that impregnation of silver and copper metals on the activated carbon increased the bacteria removal efficiency from water, the initial removal was 1.23 log without time of 1 hour and final of 3.34 log in the time of 5 hours. All modified activated carbon showed superior bacteriological efficiency compared to the activated carbon without modification. Gravitational household filters with modified activated carbon using pre-vacuum and subsequent vacuum impregnation with silver and copper, have shown great potential in the microbiological removal from water intended for human consumption, obtaining drinking water quality assured.

Keywords: Activated carbon. Impregnation. Silver. Copper. Drinkingwater