TITLE: EFFICACY OF CERAMIC CANDLE FILTER IN THE REMOVAL OF BACTERIA AND ENTEROPARASITES

AUTHORS: SANTOS, F. M. S.[1]; VASCONCELOS, U.[2]; CALAZANS, G.M.T.[1]

INSTITUTION: 1. Universidade Federal de Pernambuco – UFPE, Recife, PE (Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife - PE, 50670-901) – Brasil; 2. Universidade Federal da Paraíba – UFPB, João Pessoa, PB (Cidade Universitária, s/n - Castelo Branco III, João Pessoa - PB, 58051-900) – Brasil.

ABSTRACT

The concern about unsafe drinking water has promoted a host of household water treatments. Ceramic filtration has been documented as the most efficient solution in order to provide safe drinking water. This study aims to evaluate the efficacy of a ceramic candle filter (CCF) in the removal of bacteria (*Escherichia coli, Pseudomonas aeruginosa* and total heterotrophic) and enteroparasites. The experiment evaluated three conditions in 3 L of contaminated water: (1) *Pseudomonas aeruginosa* (ATCC 27853), (2) a combination of *P. aeruginosa* (ATCC 27853) and *Escherichia coli* (ATCC 25922), and (3) a suspension of enteroparasites (*Ascaris lumbricoides* eggs, *Trichuris trichiura* eggs, *Taenia sp* eggs, *Ancylostoma sp* eggs, *Blastocystous sp* cysts, *Giardia sp* cysts, *Entamoeba coli* cysts, and *Entamoeba histolytica* cysts). A control without contamination was also tested for comparison. Bacterial suspensions were prepared with a concentration around 10^3cells/mL. The enteroparasite suspension was prepared by adding 10 mL of 4% formalin containing helminths and protozoa from faeces samples. The experiments were performed around 26ºC. Measurements were carried out as follows: Fluorocult Broth (*E. coli*), Asparagine and Acetamide Broths (*P. aeruginosa*) and the pour plate method (total heterotrophic bacteria). The detection of enteroparasites was performed by a combination of Faust and Hoffman methods. The experiments were carried out for a period of eight days, with two samples collected every eight hours. The results showed a 100% reduction of *P. aeruginosa* after ninth and fifth filtration, respectively. In addition, 99% of *E. coli* was decreased after the first filtration. However, there was a gradual increase of heterotrophic bacteria, suggesting that the filters were not efficient for capturing bacteria less than 0.5 μm in diameter (size of the porosity 0.5-4.0 μm). In addition, enteroparasites were not detected in the filtered water, which indicated their complete removal during filtration since the porosity of the candle was able to retain 100% of cysts and eggs having an average size of 40 μm. In conclusion, CCF is an effective method for providing a quality safe drinking water regarding transmissible forms of enteroparasites and pathogenic bacteria. Moreover, CCF is an affordable and culturally acceptable solution, which ensures that it will be sustainable, particularly for low-income communities where there is limited access to safe water, sanitation and healthcare.

Key words: drinking water, *Pseudomonas aeruginosa*, *Escherichia coli*, parasitology, ceramic water filtration

Development Agencies: CNPq