The Implementation of Silver Nanoparticle Water Filtration Incorporating Ultraviolet Sterilization

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In the 1900s silver was used extensively as an antimicrobial agent. When antibiotics were developed they became very popular and silver as an anti-bactericide decreased (Alexander, 2009). This research is re-evaluating the use of silver as an antimicrobial agent because of antibiotic-resistant strains of bacteria. Ultraviolet sterilization was previously incorporated into the filtration method. Water contaminated with E. coli was filtered in a plastic container with silver nanoparticles while being agitated to resemble a fully functioning filtration system. Two separate experiments were conducted sampling agitated water at 20-minute intervals and another sampled at 5-minute intervals. Additional experiments were conducted exposing the contaminated water to the ultraviolet light in two different sample sets; one being simultaneous with the nanoparticle filtration and the other directly after 60 minutes of nanoparticle filtration. The results showed that the amount of E. coli eradicated in every sample taken was up to 100%. In conclusion, silver nanoparticle filtration with the incorporation of ultraviolet sterilization in a real-life prototype will extensively eradicate the amount of E. coli from contaminated water if continuously agitated. These results made it evident that the agitation of the water is key to the filtration process so that silver nanoparticles may come in contact with the E. coli in the contaminated water sample. The contaminated water must remain in contact with the silver nanoparticles for at least 15 to 20 minutes to ensure that proper filtration is achieved. The results of this experiment also made it clear that UV sterilization is not a necessary component of this filtration, but it serves as a precautionary method to ensure clean water.

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