Colloidal Silver

History

Silver has been used as a medicine and preservative by many cultures throughout history. The Greeks used silver vessels for water and other liquids to keep them fresh. Silver was used by the Romans to preserve water in storage jars. During war campaigns Alexander the Great boiled and stored water in silver or bronze urns to reduce waterborne disease.

Silver was used as a medicine in the late 1800's and early 1900's. Silver, along with other metals was discovered to possess microbicidal properties but silver alone showed both strong microbicidal properties and low or no toxicity to humans. The colloidal state proved to be the most effective form because it lacked the caustic properties of salts (such as silver nitrate) and demonstrated a high level of activity with very low concentrations (oligodynamic). In 1881 silver nitrate was first used for the prevention of gonorrhea. In 1884, the German obstetrician F. Crede administered 1% silver nitrate to the eyes of newborn infants, virtually eliminating the incidence of disease-caused blindness in newborns. When antibiotics came into widespread use in the 1930s, the use of colloidal silver was dropped.

Today, colloidal silver is used in hospital and clinical settings as an antimicrobial agent for cuts and burns, in some hospital water systems, and in dental amalgams. It continues to be used in prevention of infection in the eyes of newborns. In Mexico, colloidal silver manufactured under the trade name Microdyn, is sold through supermarkets and pharmacies for use in restaurants, hotels, and homes to disinfect water for drinking or washing of food. Colloidal silver is also used in water systems of boats and airplanes. In the last decade, daily consumption of water containing small quantities of colloidal silver has become a popular alternative health treatment to prevent and cure diseases. U.S. regulatory agencies say that these claims of businesses that make colloidal silver, or sell home colloidal silver-making devices are undocumented and illegal.

What is colloidal silver

The colloidal silver used in the ceramic water filter is a stable solution of macromolecules (submicroscopic) of positively charged silver suspended in distilled water and proteins. The size of a particle of colloidal silver is .005 to .015 or smaller than a virus.

The colloidal silver used in making filters is a high concentration so protein binders are used to keep the silver from separating from the water. Protein binders for colloidal silver include such things as xanthium gum, which is used in baking and many food products.

Pure silver (Ag) in its elemental form is positively charged. Colloidal silver is Ag is made through electrical activation (electrolysis) using a silver rod or wire and an electrical source to create microscopic positively charged particles (cations) in the water. In water the Ag combines with oxygen to form AgO. Since "likes" repel, the particles try to maintain the same distance from each other, resulting in a homogenous dispersed solution.

Inactivation of Bacteria by Colloidal Silver

Bacteria are single-celled living organisms. They need nutrients and other things to survive and reproduce. It is through chemical reactions called metabolism that nutrients and oxygen (in the case of aerobic bacteria) are changed into energy for life processes. Enzymes produced by an organism regulate the rate of metabolism. For example the enzymes in lactobacillus (the friendly bacteria used to make cheese from milk) determine the rate at which the bacteria turns milk into cheese. Enzymes are the biological directors. They keep things in control and balance.

One way of disinfection by colloidal silver is that the silver reacts to inactivate the sulfahydryl or thiol network of enzymes in bacteria. E.coli is inactivated by a very small quantity of silver. Another mechanism is that colloidal silver attaches itself to the cellular membranes of bacteria causing the cells to increase in size and cytoplasmic content. The cell membrane and outer cell layers develop abnormalities and result in the death of the cell.

Safety of Colloidal Silver in the Body

Silver is considered a non-toxic material. The World Health Organization (WHO) list ten grams per life-time as the amount that can be taken "without risk to health." Silver nitrate is the most toxic form of silver. The colloidal form of silver which is used by Microdyn is even less harmful. The only negative health effect of silver is Argyria, a rare condition in which the skin and/or hair becomes blue-gray. This condition is associated with long-term treatment with silver salt solutions. Aside from discoloration, this condition does not cause any danger.

"The concentration of silver in water filtered with the PFP filter does not exceed, or even approach, the OSM and USEPA standards. The ingestion of water filtered using the "PFP" filter does not pose a human health risk of argyria due to silver contamination."
Alethia Investigation

The WHO states that "the liver plays a decisive role in silver excretion, most of which is absorbed and excreted with the bile in the feces…In humans, under normal conditions of daily silver exposure, retention rates (of silver) between 0 and 10% have been observed." The guideline used for water is 100ug/L in finished filtered water. Silver samples from filters collected in rural Nicaragua and analyzed at the Massachusetts Institute of Technology (MIT) Toxicon laboratory did not even approach this limit. Only two of twenty-four samples had a level that could be detected. Based on all U.S. regulations, the colloidal silver impregnated water filter is a legal product to distribute and use in the U.S. (*Alethia Investigation*)

Effects of Chlorine on Colloidal Silver

A chlorine atom (Cl) has an incomplete outer electron shell. Simply speaking chlorine is always a hungry thief atom and whenever it can it will take an electron from something else. When chlorine is in water, it takes an extra electron from whatever it can and becomes a negatively charged chloride Cl-. The "ide" means there is one extra electron. Positively charged molecules are attracted to negatively charged molecules. So colloidal silver Ag+ and Cl- are attracted to each other and combine to form an AgCl molecule in the water.

Silver combined with oxygen from water (AgO), is more effective than AgCl for inactivating bacteria. AgCl is less soluble in water than AgO, so less of it will be present in the "water" (inactivating bacteria) in the filter, and will remain stuck to the clay. Small amounts of AgO are lost from the filter over time but we do not know how much. Testing has shown the effective life expectancy of the filter to be at least forty months.

Putting chlorinated water through the filter will not destroy the silver but it will react to change the silver to a form that is less effective as a microbicide. It is not yet known how greatly the concentration of chlorine and the period of exposure affects the ability of the colloidal silver in the filter to kill bacteria. It is not recommended to use the filter with chlorinated water.