

SILVER - *Nature's Water Purifier*

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Silver's Importance to Health

Feb 27, 1997

In a world concerned with the spreading of virus and disease, silver is increasingly being tapped for its bactericidal properties and used in treatments for conditions ranging from severe burns to Legionnaires Disease.

While silver's importance as a bactericide has been documented only since the late 1800s, its use in purification has been known throughout the ages. Early records indicate that the Phoenicians, for example, used silver vessels to keep water, wine and vinegar pure during their long voyages. In America, pioneers moving west put silver and copper coins in their water barrels to keep it clean.

In fact, "born with a silver spoon in his mouth" is not a reference to wealth, but to health. In the early 18th century, babies who were fed with silver spoons were healthier than those fed with spoons made from other metals, and silver pacifiers found wide use in America because of their beneficial health effects.

Helping to Stop Legionnaire's Disease

In response to major outbreaks of Legionnaire's Disease in the United Kingdom during the 1980s, the British government has undertaken studies on the use of silver in water purification. The disease is named after *Legionella pneumophila*, an aquatic organism which is widespread in small quantities within natural water sources. The bacteria presents few problems in naturally-flowing water, but man-made environments such as cooling towers and hot and cold water services provide conditions for it to multiply and spread. Infection is caused by inhaling airborne droplets of particles containing viable legionella, small enough to travel deep into the lungs and be deposited in the alveoli.

Recent research compared silver-copper ionization with the use of high temperatures to destroy bacteria. Contaminated cold water re infected the hot water system even when temperatures in hot water heaters reached as high as 60 degrees Centigrade. But experiments showed that even at lower water temperatures, ionization of soft water with silver and copper ions was effective against the bacteria.

"Ionization showed better results." said Nigel Pavey principal research engineer for BSRIA Water Services Technology Centre in Berkshire. And to make certain its benefits are widespread, "there should be more emphasis on copper-silver ionization in legislation,' he said.

Importance in Burn Therapy

Silver also has had a significant impact on the treatment of burns. Twenty years ago it was common for the wounds of severely burned patients to become infected, which delayed healing and sometimes led to death. Today silver sulfadiazine is used by hospitals worldwide to kill bacteria allowing the body time to restore the area naturally. Sulfadiazine is a known antibacterial agent. Combined with silver, studies show it is at least 50 times more active than other antibacterial agents. Silvadene now is the most widely used topical treatment for burn therapy. Other silver compounds also are being developed for use wherever silver sulfadiazine proves ineffective.

Keeping Plastic Clean

Widespread concerns that viruses can survive in body fluids deposited on plastic consumer products such as telephones prompted the Institute for Microbial Diseases in Osaka, Japan to develop a new silver complex that can be applied for lasting sanitary protection. The product is marketed under the name Amenitop, and has been shown to reduce the infection of certain viruses which have been linked to AIDS. The system consists of silica gel microspheres containing a silver thiosulfate complex. The silica gel coatings allow a gradual release of the silver compound onto the surface, providing long lasting bactericidal action.

Promoting Skin Growth

Silver also has been successfully used to grow new skin on accident victims, including the restoration of fingertips with the original fingerprint. Individuals whose wounds are so severe they lose tissue below the skin often never fully recover, left with only a thin layer of skin without the original nerve structure. This inferior skin layer results in abnormal sensations and intolerance to cold. Skin grafts cover the wounds but do not restore the functions of the area.

In a treatment developed by Mountain Medical Specialties of Lakemont, GA, a silver-coated fabric is used to cover the wound. A miniature battery is connected to the fabric to begin a flow of silver ions to encourage normal skin growth and eliminate bacteria which generally prevents complete regeneration of the skin and nerve function. This method has actually restored the natural skin patterns and sensations in the palms of hands.

Purifying Water

Silver-based water purification units for the home have been in use in Europe for more than 50 years. [Royal Doulton ceramic candles combine silver](#) within the ceramic during manufacturing to take advantage of the outstanding bacterial disinfecting properties of silver. These units meet the National Sanitation Foundation Standards covering bacteriostatic efficacy, the [reduction of lead, copper and particulates and the reduction of taste and odor](#). They also have the approval of the US Environmental Protection Agency as a bactericidal unit.

Eliminating Harmful Bacteria

Tests by researchers at the University of Florida's Institute of Food and Agricultural Sciences show that silver and copper ions added to oyster tanks destroy harmful bacteria in the water without affecting the oysters. Once oysters are harvested from the ocean, they are cleaned in "depuration" tanks which are prone to bacteria infiltration. Silver ions added to the water destroy bacteria and copper ions kill fungus, making an inexpensive and environmentally friendly combination for keeping oyster tanks clean. "Silver and copper ionization is the perfect solution," says Richard Ganim, president of Superior Aqua Enterprises in Sarasota, Florida.

"The applications for ionization are almost endless," Ganim said. Currently ionization is used by chicken farmers to reduce bacteria and fungus without affecting the health of the chickens. "We think this system will also work for citrus growers" who routinely spray their trees with chemicals.

Keeping Oxygen Handling Safe

In hospitals throughout the world, silver makes the handling of pure oxygen safer. Oxygen at high pressure in liquid form is very hazardous because some materials ignite or begin harmful chain reactions when they come in contact with it.

Limiting sparks during oxygen production is of critical importance. Because silver will not ignite, even at its melting point, the oxygen compressor design code issued by the Industrial Gas Council in Brussels, requires that wherever contact between metals occurs, one of the facing metals must be silver and the other a high-nickel alloy. This combination provides the lowest probability of sparking during high-speed compressor operation. The seals in compressor and pumping equipment are also silver to minimize any possibility of friction which could ignite a fire. Oxygen pump seals must be manufactured to extremely close tolerances, and the silver also allows fine machining,

Protecting Eyes

One out of every seven pairs of prescription glasses sold in the United States incorporates silver to protect patients' eyes from sunlight. Silver halide crystals, melted into glass for sunglasses, change clear glass from 85 percent visible light transmission to 22 percent transmission in less than 60 seconds, a change that is endlessly reversible.

Helping People With Allergies

For individuals who are allergic to detergents, reusable laundry disks are providing a solution to their problem. The disks are made of "activated" ceramic material with metallic elements - silver and copper - inside. When the disks are placed in the washing machine along with the clothes and water, the silver and copper releases electrons which in turn produce ionized oxygen helping to break up dirt and organic compounds. The disks are sold under the name "Clean Power Plus" and are used three at a time for about 300 loads.

For more information on any of these medical uses of silver, please contact Christy Rosche at The Silver Institute (202) 835-0185

Silver - Preventing Outbreaks of Legionnaire's Disease

Silver Copper System Works Better than High Temperatures to Destroy Deadly Bacteria

Report by: The Silver Institute - Silver News - Feb/Mar 97

Following major outbreaks of Legionellosis (Legionnaire's Disease) in the United Kingdom in the late 1980's the government came out with safety guidelines for cooling towers which all but eliminated the problem. Now, however the government has turned its attention to hot and cold service which now accounts for a significant number of identified cases of Legionnaire's disease in the UK

Silver is playing a key role in efforts to prevent these deadly outbreaks. With funding from the government and private industry the building and services research and information association (BSRIA) has completed a two year research project to compare the effectiveness of using silver and copper ionization against the storage of water at high temperatures to destroy the bacteria.

"Ionization showed better results" says Nigel Pavey, Principal Research Engineer for BSRIA. For example, contaminated cold water re-infected the hot water system even when temperatures in hot water heaters reached as high as 60 degrees Centigrade. Experiments showed that even at lower water temperatures, ionization of soft water with silver and copper ions was effective against legionella. In showers and hot and cold faucets, ionization was effective against the bacteria if silver concentration was around 40 micrograms per liter.

Hard water presented a problem however. The electrodes used for ionization frequently scaled up and the high level of dissolved solids in the water took the silver ions out of the solution. When silver ionization levels could be kept up using scaling controls, the technique was effective.

BSRIA's findings were published in Ionization Water Treatment for Hot and Cold Water Services available from BSRIA. For more information fax BSRIA at 44-1344-487575

Silver - Reliable Alternatives to Chlorine

Silver Water Purification Systems Offer Reliable Alternative to Chlorine

Report by: The Silver Institute - Silver News -

Laguna Niguel, CA (March 25, 1997) - Silver based water purification systems offer the most reliable and cost effective alternative to chlorine, a chemical that is increasingly coming under fire for the carcinogenic by products it leaves in water, according to David Eaton, secretary of The Institute of Water Ionization Technologies in the United Kingdom and technical director of Roseland Hydronics PLC.

Speaking at the annual meeting of The Gold & Silver Institutes in Laguna, Niguel, CA. this week Eaton said progressively restrictive legislation is confronting the use of

chemicals, especially chlorine, which for nearly a century. has been the primary medium for water disinfection.

With increasing pollution, utilities are forced to put far more chlorine into the supply chain, Eaton explained. The chemical reaction that oxidizes impurities when chlorine is added, also forms carcinogenic byproducts. "Of course these same byproducts have been generated by chlorination for a long time but never in the quantities that are now being seen," he said.

Silver offers a healthy alternative. The metal has long been known for its biocidal properties, Eaton noted. The Ancient Phoenicians, who stored wine in silver urns to preserve it, provide one of the earliest recorded examples of the metal's use for water purification.

Applying modern technology to this old fashioned principle, The Institute of Water Ionization Technologies has developed silver ion generators for municipal water supplies. The market for silver ionized swimming pool systems has expanded significantly in the US and overseas, Eaton said. But in Britain, silver ionization is being developed for mainstream water systems. Machines used to clean primary water must be much larger and more powerful than small swimming pool units, and require accurate control mechanisms to ensure that levels of silver are maintained and kept within drinking water standards.

Eaton discussed a recent project funded by the UK Department of the Environment to study the control of Legionnaires disease by using silver ions. The disease is named after *Legionella pneumophila*, an organism that is widespread in small quantities within natural water sources. The bacteria becomes lethal at a water temperature of 95 degrees F and can be killed at temperatures between 135 and 140 degrees F.

Of three tests, silver/copper ions in soft water produced the best results. The copper ion disrupted the enzyme structures of the cell allowing the silver ion to penetrate inside where it rapidly killed the cell's life support system. US regulations allow a silver level of 100 ppb in drinking water, but a silver level of only 20 ppb kills *Legionella*.

A new European Union Drinking Water Standard in draft form has removed any upper limit for silver in drinking water following the World Health Organization's Guidelines for Drinking Water Quality which States, "It is unnecessary to recommend any health-based guideline for silver as it is not hazardous to human health."

Eaton said silver ion generators currently are being used in intensive care and heart transplant units of hospitals, and for poultry processing, engineering, brewing, cooling towers and swimming pools.

The sale of silver based ionizers is beginning to take off in the UK and there are promising growth markets in the Scandinavia, Germany, and the Far East. We calculate that requirements for silver globally will increase to about two million ounces annually within five years.

For the complete text of Eaton's speech, contact The Silver Institute, (202) 835-0185. For more information contact the Institute of Water Ionization Technologies, 01621869255 (fax) 01621868211.

Research Quotes:

Thanks to eye-opening research, silver is emerging as a wonder of modern medicine. An antibiotic kills perhaps a half dozen different disease organisms but silver kills some 650. Moreover, silver is virtually non-toxic. Dr. Harry Margraf of St. Louis, a pioneering silver researcher, says: "Silver is the best all around germ fighter we have."[\[1\]](#)

The value of silver in medicine, and as a purifier has been acknowledged for centuries. Egyptians implanted silver plates into skulls with surgery. In Ancient Greece and Rome, people used silver containers to keep liquids fresh. When settlers moved across the American West, they would purify a container of water by putting a silver dollar in it overnight. Towards the end of the 19th century, other medicinal uses for silver were developed including the use of silver and mercury in filling cavities, and the dropping of a silver filtrate solution into the eyes of newborn babies to prevent blindness due to infection.[\[2\]](#)

Scores of independent tests have shown that silver promptly kills bacteria in water and maintains water purity over long periods of time.[\[3\]](#)

Russian scientists working on water recycling and purification problems for the Soviet space program have decided on silver as the best long term sanitation agent. Researching the problems of water shortage over periods of several months, as well as purification for immediate use, they determined that ionized silver provides the safest and longest lasting method of transforming polluted waste into potable water.[\[4\]](#)

After testing 23 methods of purifying water, NASA has also chosen silver as the purifying agent on the Space Shuttle program.[\[5\]](#)[\[6\]](#)

Silver was used to provide shuttle crews with pure water for drinking, air conditioning, food preparation and other operations. By establishing 100 parts of silver per billion parts of water NASA will totally eliminate the need for chlorine! The most dramatic purification tests occurred in 1976 in a 20,000 gallon swimming pool in Nebraska. There was no disinfectant of any kind in the water. Fifty gallons of municipal sewage waste water was put into the pool. That produced a dangerous concentration of 7,000 E coli cells per 100 millilitre [half a cup] of water. Contents of the pool were then pumped through a tank containing alternating anodic and cathodic silver electrodes for disinfection. Within three hours the pool was entirely free of E. coli and the water contained only 3.2 parts of silver per billion parts of water.[\[7\]](#)

The Allegheny County Health Department in Pennsylvania conducted tests in a 152,000 gallon pool which previously had been disinfected by a 50 pounds per day chlorinator. The system was replaced by a silver system for the swimming pool season of 1974 and 1975. The County Health Department took up to 50 daily samples and found that silver ions remained in the pool at the low steady rate of 20 parts per billion. The water remained free of bacteria throughout the two seasons. In contrast,

65 water samples from 30 other pools having a concentration of 700 parts per billion of available chlorine showed a mean of 1.3 pseudomonas and 7.3 staph cells per millilitre of water.[8]

The impact of silver technology continues to grow. More than half of the American soft drink bottling companies, numerous shipping lines and a host of other enterprises in 70 countries, use silver to sterilize water. These and many other examples of the expanding use of silver in water purification have been documented by Dr. Fred Zobist and presented to the Silver Institute in Washington, D.C.

Footnotes:

1. Jim Powell, "Our Mightiest Germ Fighter"; Science Digest, March 1978
2. Dr. Harry Margraf, "The Story of Silver in Medicine"; Gold & Silver Newsletter, September 1974
3. "Tests Show Silver Best Water Purifier"; The Silver Institute Letter, December 1976
4. "Silver Clears Up Polluted Water"; The Silver Institute Letter, July/August, 1973
5. Jim Powell, "Our Mightiest Germ Fighter"; Science Digest, March 1978
6. "Winged-Ferry to Shuttle Between Earth and Space"; The Silver Institute Letter March 1976
7. "Silver Guards Good Health!"; The Silver Institute Letter, May 1975
8. "Silver Carbon Filter Purifies Swimming Pool"; The Silver Institute Letter, May 1973

Links to Silver Institute News Letters within this site:

1. [Vol 3, Number 5, May 73](#) - Silver Carbon Filter Purifies Swimming Pool
2. [Vol 3, Number 5, May 73](#) - Silver Cleans Up Polluted Water
3. [Vol 5, Number 5, May 75](#) - Silver Guards Good Health
4. [Vol 5, Number 5, May 75](#) - German Purifies Swimming Pool with Silver
5. [Vol 6, Number 3, Mar 76](#) - Winged Ferry to Shuttle between Earth and Space
6. [Vol 6, Number 11, Dec 76](#) - Test Show Silver Best Water Purifier

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