

# **The Safety of Using Silver Solutions and the Risk of Argyria**

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## **Introduction**

Humanity has had a love affair with silver for thousands of years. Historically the precious metal was used in medicine, eating utensils, plates, cups, food containers, jewelry, money/coins, clothes, building materials, and as a disinfectant for water and human infection. Silver has historically touched almost every facet of life for those who could afford it. Now, after thousands of years of study and magnificent gains in knowledge, science and technology, silver is still used for medicine, eating utensils, plates, cups, food containers, jewelry, money/coins, clothes, building materials, and as a disinfectant. It remains an important part of our lives because of the extensively proven safety and utility of the metal.

Silver metal is naturally antimicrobial (killing harmful bacteria, yeast, fungus, virus), and yet has no negative effect on human tissue when used in reasonable amounts. It has a natural anti-inflammatory action which reduces pain and promotes natural healing. Silver is extensively used in medicine today. Currently, there are over 80 FDA approved silver based products and more are being approved monthly. Silver is the number one treatment for burns in U.S. burn centers, being administered in the form of gels and creams. New silver coated catheters are used because they stop the urinary tract infections that were commonplace with the old ones. New testing is producing silver heart valves that bacteria cannot damage. To protect us from food poisoning, silver particles are now being put in cutting boards, table tops, surface disinfectants, and refrigerators. Silver is now widely used in clothing, not only for the military, but for the sportsman and businessman. It is woven and impregnated into the fabric to kill bacteria that cause body odor, and even to fix that smell that comes from your son's basketball shoes. It is being used on and in foods, as a decoration and disinfectant. Because of its high conductivity, silver or silver alloys are used in almost every electrical connection in your house, from your toaster to your shaver, computer, hot water heater, car, coffee maker, and even your cell phone. New applications are being engineered daily and include numerous areas in the dental and medical field. A new peer review paper will show that it is likely that a new silver liquid may save your life in the event of an H5-N1 bird flu pandemic. It is safe to say that silver is used almost every day by every man, woman, or child in the civilized world.

## **Can Silver Cause Heavy Metal Poisoning Or Toxic Nephropathy?**

Many doctors, scientists, and now news men, have as of late, been claiming that silver is a problem because it is a heavy metal, and as such can poison the body. The problem is not with the silver but with the misinformed and inadequate knowledge of the people speaking about things they know little about. The real answer is that silver is not toxic when used at reasonable levels and quantities! Any substance, even water, in excessive amounts can be fatal. Toxic nephropathy or heavy metal poisoning is defined as, "Any functional or morphologic change in the kidney produced by an ingested, injected, inhaled, or absorbed drug, chemical, or biological agent." The MERCK Manual is sometimes referred to as the "Scientific Bible Of Diagnosis And Therapy" by many scientists and doctors. Silver is the only heavy metal not listed in the manual for causing heavy metal poisoning, because it does not cause it. (See MERCK manual (17th Edition, Pg 1880, table 226-1, third item listed, for the full list of heavy metals that cause toxic nephropathy). In a recent peer - review paper "Ultradilute Ag-Aquasols with extraordinary bactericidal properties: the role of the system Ag-O-H<sub>2</sub>O." (Materials Research Innovations, vol. 11, no. 1, (2007) pages 3-18) on the subject of the safety of consuming metallic silver, the paper states (page 1, first paragraph of the introduction), "A recent paper by Das et al. Provides the remarkable datum that some 275,000 kg [(605,000 pounds)] of edible metallic silver foil are consumed every year (in food) in India. No known adverse health effects have ever been recorded. This epidemiological evidence that silver as a metal is not toxic in any way needs no further comment. Further support for the obvious safety of consuming metallic silver (Ag<sub>0</sub>) is in the worldwide consumption of (so called) silver colloids, often made at home in primitive electrochemical cells by probably some millions of citizens, again with no ill effects." It is estimated that the Indian tradition of eating candy and cakes wrapped in metallic silver foil (eaten foil and all) came from their historically gained knowledge that in their warm, moist climate with little refrigeration of foods, eating the silver-covered candy and cakes after meals would kill the bacteria consumed with the food, before it had a chance to do damage to their body systems. In other words, the people of India have proven over the last thousand years that eating or consuming large amounts of metallic silver has no negative effect on the body or body systems.

## **What Is Argyria?**

What is Argyria and will I get it if I use silver products? These are two very common questions. They are important because each of us needs to know that any product we are using or giving to our families is safe, and will at the least do no harm to them.

Silver products alone are generally non-toxic and have no negative side effects, if used in reasonable amounts. However, the extreme misuse of some silver salt compounds may cause a condition called argyria. Argyria has no known negative side effects except

that it causes a greying or blueing of the skin color. The condition is non-toxic and only cosmetic in nature.

## **What Causes Argyria?**

Put simply, argyria can result if there is so much chemical or ionic silver in the body at one time that the body cannot wash it out fast enough through both the urinary and fecal tract systems. In order to get rid of this excess silver, the body just walls it off in the cells. In most cases the discoloration is permanent. It is the equivalent of getting a tattoo by misusing silver products in an extreme way. The condition is very rare, even in people who consume large amounts of ionic or chemical silver products.

Argyria has resulted from the extreme misuse of very strong silver solutions usually consisting of silver salts, including silver nitrate, silver arsphenamine, silver chloride and possibly silver iodide. These products were sold until about 1975 under various labels with solutions containing levels of silver ranging from 5-30%. That means that these FDA - type products were used at levels as high as 50,000-300,000 ppm (parts per million)(Federal Register, FDA-21CFR Part 310, pg. 53685). That is the equivalent of 5,000 to 30,000 times more silver than is used in most silver supplement products sold today, which would be from 10-30 ppm depending on the use. Argyria has also been known to rarely result from the extreme misuse of some home-brew products (home made- usually small machine "€" battery produced products) where they are consumed daily in large quantities (8-24 ounces daily over years of time).

## **Minimum Amount Of Silver Intake Known To Cause Argyria Historically**

The minimum amount of silver ever known to cause argyria in adults from the use of any silver compound (including salts) is 900 mg of silver taken orally in one year. In order to reach this level of silver intake, an individual would have to consume at least 380 - 8 oz. bottles of a 10 PPM silver product within a year. Testing suggests that an average adult dosage of about ½ to 1 teaspoon taken one to three times daily, is usually sufficient to cause a generally helpful effect in connection with the human immune system. This means that an individual would have to consume over 50 times the normal adult dosage every day for a year, to even reach the lowest level ever known to cause argyria. It should be noted that EPA standards for the amount of silver that can be safely consumed in drinking water is about an ounce per day (EPA RED document page 2, 4th paragraph). It is also important to note that even during the years from 1918 to 1940 when silver was a government approved antibiotic alternative of sorts, and millions of people using these very strong (high content) silver products,

there were only about 7-12 people a year who developed generalized Argyria. Remember in those days, antibiotics did not exist, and if the choice was to have a very remote chance of turning grey or to be dead, most people would choose grey. After all, dead is a really bad, permanent side effect.

## **Only Ionic Or Chemical Forms Of Silver Can Cause Argyria**

A new peer-review report from Pennsylvania State University was just released after years of studying a number of colloidal silver and silver aquasol products purchased from the U.S. market. The paper was authored by Professor Rustum Roy, along with seven other professors and scientists from leading universities. The report is titled, "Ultradilute Ag-Aquasols with extraordinary bactericidal properties: the role of the system Ag-O-H<sub>2</sub>O." (Materials Research Innovations, vol. 11, no. 1, (2007) pages 3-18). On the subject of ionic vs metallic silver for human use, the report states (page 2, fourth paragraph): "In spite of this enormous range of data, it is extraordinary that no major effort has been made to confirm and expand on the role of metallic silver in human health - especially in light of its huge advantage in lack of side effects. (Ingestion of excessive amounts of ionic (soluble) silver, not metallic solid particles is reported to have resulted in a very rare condition labeled argyria, an (irreversible?) darkening of the skin. No one has died of this condition. The safety of metallic silver sols is firmly established by the data cited above.)" In other words the skin condition called argyria is only caused by chemical or ionic forms of silver, not by metallic silver or metallic silver nano-particle products.

## **Silver Washes Out Of The System Quickly**

According to the EPA IRIS Report on silver (Integrated Risk Information Systems, 5th page, 1st paragraph) it states that a number of tests were completed to test the absorption and retention of ingested silver in a number of animals, including primates (we are primates). In its conclusion, the test work indicated that between 90-99% of ingested silver was excreted on the second day after ingestion, and greater than 99% was excreted in less than a week. So, in other words, almost all of the ingested silver was out of the body in only two days, and most of the rest was out of the body in a week. They found that silver does not build up in the system.

## **No Comparison Between The New And Old Products**

The new patented and engineered nano-silver products have been proven to kill bacteria at levels of between 0.10-5 ppm, and since the old silver products ranged between 50,000-300,000 ppm, there is really no comparison. These new products are

effective with concentrations of 5,000 '€“ 30,000 times less silver in the solution. Better technology, which produces a more useful (bacteria lethal) engineered silver nano particle, would seem to be the difference. Because these silver products effectively kill bacteria using substantially lower levels of silver, the risk of any possible side effects has been all but eliminated.

## **Home-Brew Products**

Many people say that they do not need to buy commercial silver products because they have a little machine at home that will make it for pennies per gallon. Would they also yank willow bark off of a tree and chew it when they have a headache? Willow bark is used to make aspirin. The point is that when they make that product in their house, they have no idea what they are making or drinking. It could have one part per million silver or 10,000 parts per million. There is really no way to know with any assurance, unless you tested each and every batch of product that was made, using an AA (atomic absorption) or equivalent type of machine. An AA machine can measure silver levels in liquid in parts per million or even parts per billion. Tests show that home-brew machines produce products that vary dramatically with each batch of product made., One batch could be 3 ppm silver, the next might be 300 ppm. This is true even if the same water, the same silver, and the same machine are used to produce it.

There is no simple way to accurately control or measure the product that is made in the home made silver product machines. Recent tests on a number of those small "home-brew"€ machines have shown that the product that they make is usually of very poor quality. Also it was found that the home-brew products are made up of mostly ionic or soluble silver particles, not metallic particles. There are also a number of other minor problems associated with these machines. The first problem is that many of the particles that these machines make are usually too big to enter into the human system, and thus are mostly ineffective. The second problem is that because the products are so ineffective, the people who use them usually have to drink a lot of the product to get a positive reaction. Third, the increased amount of home-brew product needed to get a good reaction can be way above what a person should drink by government guidelines. When people drink large amounts of heavy or loaded home-brew silver products, they potentially expose themselves to the condition called argyria. Even among the hundreds of thousands of home brew product makers, the argyria condition is very rare. The news media seems to love to find one or two of them every year or so and put them on the air as some sort of freak show.

## **The Safety Of Medicinal Silver Use Compared To Modern Antibiotics**

In an EPA report on drinking water (report ECAO-CIN-026 revised Jan.1991- Section VI, pages VI-1) states that silver has been used therapeutically for centuries. Two doctors in the report who were injecting silver into people stated, (Hill and Pillsbury 1939, page VI-2) 'The ordinary clinical use of silver compounds practically never gives rise to any gross untoward effect other than argyria.' The paper also states (bottom of page VI-11), "There is no evidence that argyria alone is associated with any adverse effects other than the pigmentation." In other words, the only potential side effect from the extreme misuse of medicinal or supplement silver products, is the rare condition called argyria. In comparison, antibiotics currently being used by the medical community, are estimated to kill over 100,000 people annually as a negative side effect (JAMA December 2000, Barbra Starfield). The 100,000 people dead number only includes cases where antibiotics were used correctly, the number would be much larger if it included those given by mistake, or in bad combination.

## **Conclusion**

There is no question about the safety and non-toxicity of using silver in its many human uses. It has been safely used in almost every facet of human life for thousands of years. It is the only heavy metal that does not cause heavy metal poisoning. It is one of the most broad-spectrum, safe, and effective human disinfectant and healing agents that exists. According to the EPA, who is in charge of defining safe levels of any mineral in water which is used for ingestion or drinking, the oral consumption of small amounts of silver in water on a daily basis poses no significant degree of risk. Unless an individual were consistently consuming (every day for over a year) over 50 times the recommended daily dosage of a 10-30 ppm product, there would be literally no possibility of that individual contracting the non-toxic condition called argyria. Those people who use hundreds or even thousands of times the recommended daily dosages run a risk of turning their skin grey, but even then the condition is very rare. There has been no reported deaths from the medicinal use of silver, in comparison antibiotics kill an estimated 100,000 plus people annually.