

A History on the 'REALITY' that is Colloidal Silver

(Includes: guidelines on production and handling)

Preamble:

A cup of coffee with milk and sugar is not coffee, but coffee, milk and sugar in a proportional relationship. Likewise, colloidal silver containing silver ions and unwanted contaminants cannot be seen as relatively pure colloidal silver for the same reason. Neither should colloidal silver be referred to as particles, when in reality it is made up of atomic clusters, suspended in an aqueous media such as water. True silver particles do exist but rather as bulk silver that has been pulverised and is in effect still metallic silver. It may well be that both colloidal silver and ionic silver possess antiseptic properties, but only tests conducted on either form separately, will apportion the extent of those antiseptic properties individually.

INTRODUCTION TO COLLOIDAL SILVER

My first introduction into the realm of colloidal silver was in 2008 and a subsequent visit to a local university and meeting a small number of scientists engaged in researching this material. It was during that initial period that I realised how little scientific knowledge existed on this material and appropriate ways of testing its properties. Appalling was my immediate response when all the testing consisted of a pH measurements, inductance testing and the use of a Mass Spectrophotometer for concentration and not being able to tell apart the separate ionic and colloidal silver content. These wanting conditions were enough to set me on a journey to find out what I could what constituted colloidal silver.

I quickly learned that no one really knew what colloidal silver is as there was no standard to its characteristics and to its method of production. This varied as wide and diverse as trying to count the stars and galaxies in the night sky. Not wishing to follow in the footsteps of those before me and many alongside of me, I became more and more determined to come up with independent solutions.

First I tackled the base material 'WATER'. I realised that pure water in a deionised form or as a distilled product displayed substantial high insulating properties, making it difficult if not impossible for current to flow between two electrodes. After a variety of electrical tests, using voltage potentials and current levels, it proved conclusively that with a voltage potential of 300 volts DC, a current of 500 micro ampere/hour would flow. Later, by doubling the voltage potential to 600 volts DC, as much a 1500 micro ampere/hour would flow. That is a three-fold increase in current flow. Obviously voltage potential and current flow are intimately related. But now, what next? Depending on the number of hours current is flowing and the quantity of water (in litres), it can theoretically be calculated what the final concentration in mg/litre will be. *Refer to Michael Faraday's Second Law of Electrolysis.* And now the next step: the actual photo-electrics.

I read in an amateur astronomer telescope article, that the silver on the parabolic reflecting mirror in telescopes was absorbing the colour of blue stars more so than other colours of the spectrum. That gave me a thought: why was silver reflecting 97% of the entire visible spectrum but missing

out on the remaining 3%. More research provided the answer: Silver has a reflective index and a high absorption at 420nm (violet light). However this created a further problem: water absorbs most of the electromagnetic energy from radio waves to ultraviolet. How can I work with that? After some further study I noticed to my amazement that almost at the same frequency/wavelength range where silver absorbs light, water becomes almost completely transparent. This meant that the water would provide no hindrance to that wavelength of light. Problem solved, but making it mandatory to use photons at around 420nm to collide with hydrated electrons in the water and provide the necessary energy to escape the confinement of the water molecules to re-enter the silver ions to produce neutral silver. Since longer wavelengths of light would cause thermal agitation, the chance of aggregation into larger clusters was of real concern. From that moment on I realised that in order to produce consistent batches of colloidal silver, I needed to control the irradiation, the voltage potential, control the current level, the quality of the silver and the water and above all the ambient temperature. Later a test proved that a tripling of the temperature from 10 degrees Centigrade to 33 degrees centigrade produce clusters three times the size from below 10nm to well above 40nm in size respectively.

Most colloidal silver other than the way it should be produced (controlled electro-photochemistry) is generally unstable. Thus the need for monochromatic light (single wavelength) under controlled refrigerated condition in otherwise total darkness produces a highly stable product that theoretically can last many years. In order to maintain this consistency and repeatability of the material, post storage and handling should include refrigeration at a moderately low temperature identical as the safe storage of food and medications such as insulin.

CONCLUSION AND GUIDELINES:

- 1. Keep colloidal silver refrigerated like you would with all food, drinks, meat and medications.**
- 2. Do not shake overly and keep away from bright light where ever and whenever possible. Long-term storage so far has shown that the smaller the colloidal clusters are, the less they are likely to be influenced by adverse conditions.**
- 3. Use small poly-styrene eskies packed with a frozen ice pack for transport between one facility and another.**
- 4. Avoid the use of so-called capping agents as a stabilizer or a preservative, it makes the colloidal silver less or totally ineffective.**
- 5. Colloidal silver is a silver metal derivative and is wholly an inorganic material, not to be confused as a conventional medicine and used together with antibiotic as an alleged "double whammy" against pathogens.**
- 6. The production of electro-photochemical colloidal silver turns metallic silver into ionic silver and back to a neutral metasilver with different properties as compared to the original silver metal. Local Plasmon Resonances and the virtual polaritons that are created as well as quantum confined electrons that may cause blue shifts by their release are some of the properties not yet found in metallic silver. Colloidal clusters of silver, commonly known as Nanosilver of a size at 10nm and smaller are considered to be responding in a quantum physics manner and no longer subject to the normal classical physical effects as we know it. Not only is the original silver changed but so is the water that surrounds it or in which it is suspended. For that reason it may prove futile to dilute colloidal silver to a specific concentration, as the water that is added will be of a different composition than the water that forms part of the colloidal silver. Rather the strategy would be to**

actually produce the required concentration as close to a minimum inhibitory concentration (MIC) as thought necessary.

7. Quick assertive testing of unknown samples can be done by simple means, the most common of which are:

a. The use of Laser diode pointers. Since the size of the suspended silver clusters will determine if specific frequencies (wavelengths) can be reflected, a red Laser diode pointer can be used on large clusters, green on smaller clusters and blue (violet) at 405nm on the very small (invisible) clusters.

b. The use of a white light LED torch and two linear polarizing filters. Hold one of the linear polarizing filters in the left hand with the torch shining through the filter and the colloidal silver sample and hold the second polarizing filter, called the polarizer in the right hand and look through it (in the dark) to view the white light scattering. Rotate slowly until a point is reached where the scattering is suddenly less intense. Now you are watching the light scattering from just the silver. The earlier light scattering would have been both the silver and contaminants together. This can easily be quantified with a photometer or simply a photo-electric cell, a photodiode or even a light dependent resistor feeding into a multimeter input.

8. Research is ongoing and a multifaceted hypothesis is trying to determine if:

a. Irradiated wavelength used will determine cluster size.

b. Manipulation of colloidal silver may effect cluster shape and size. More complex manipulation may make a specification more targeted toward a specific pathogen rather than an indiscriminate killing of other species as well.

c. At present the killing factor may be electrical in nature, either on its own or in combination of some aspect of Einstein's photo-electric effect.

All of the aforementioned 'unknowns' will be hopefully dealt with in the not too distant future.

8. Protocols for colloidal silver: These presently do not exist as there is neither an official description as to what constitutes colloidal silver, nor an official International or National STANDARD. What we do know is that colloidal silver consists of neutral atomic silver clusters produced from ionic silver and reduced by violet and Ultra-violet light. Being hydrophobic and suspended in water and controlled by interfacial charges. Based on the following characteristics of colloidal silver, we need to design a special protocol for this material especially:

a. Colloidal silver is a metallic silver derivative, but any similarity whilst in this suspended state and bulk metallic silver cannot be assumed.

b. Nano metre sized colloidal silver from 10nm downwards does not behave like bulk metallic is subject to Classical Physics in the Macro world, but instead shows signs of Quantum Physics, such as listed as follows:

* Local Plasmon resonances and the creation of polaritons, a virtual particle

* Containing Quantum confined electrons.

* Atomic silver at the 2nm scale is able to bond with carbon atoms and become permanently magnetic, when bulk silver is known as diamagnetic and thus not magnetic at all, not even paramagnetic.

*** A single neutral silver atoms cannot stay neutral but briefly converting back to an ionic state unless bonding with other silver atoms, starting with forming dimers (two atom bonding)**

*** Although often referred to as an inorganic antibiotic, it is anything but and should not be understood as a medicine and subject to quantity. Instead it is more of a surgical tool, instrument or a nano-sized electrifier, killing bacteria with its outer (valence) electrons the most likely means.**

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Post Scriptum:

I have used common sense and rational thought in order to figure out what works and what does not in order to produce a high quality colloidal silver. I tend to be radical and dealing in Black and White, avoiding in between concepts such as *'Fuzzy Logic'*. I can only relate to what I know, turning my back on what I do not know.