



## Ionized Silver



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## HISTORY

Historically, silver was used to preserve food (as an antimicrobial agent) and has been known for centuries. Even in ancient times, the silver was used to purify water. The Venetians carried the water, wine and vinegar in silver containers, which properties allowed to preserve these liquids for a longer time.

It was during the nineteenth and twentieth centuries that silver salts and other silver compounds made of colloids and proteins emerged as antibiotics to treat various infections, and that until the Second World War, when they were gradually replaced by penicillin and other modern antibiotics.

The use of silver will reappear in the 1970s with silver-based preparations to treat some ulcers. Since then, all compounds of silver that have been developed have germicidal properties.

The ionized silver 5 ppm is produced in pure water. The concentration of 5 ppm provides a sufficiently strong, yet gentle effect. In the ionic form, silver is a very safe product, non-irritating, non-astringent and does not dry the skin or other tissues with which it is in contact.



## MECHANISM OF ACTION

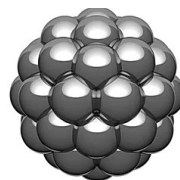
Since the 1980s, various research works both in vitro and in vivo have elucidated the mechanism of action of silver in the prevention of infection and repair of damaged tissues. It is the free silver ion ( $Ag^+$ ) that is responsible for this action.

It attacks the respiratory system and the genetic material of micro-organisms, resulting in the severe disrupts of their enzymatic functions, genetic information, protein synthesis and mechanisms of energy conservation. All of these changes lead to the destruction of the microbe. By reducing the number of microbes and the inflammatory process associated with their proliferation, the silver ion can improve the process of tissue repair by the immune system.

Nowadays, the use of silver in its various dosage forms may also be associated with dressings to treat burns, open wounds, ulcers, etc. The action of silver (by the release of  $Ag^+$  ion) effectively stops the microbial growth on these injuries.

Many other uses of silver have been characterized to date. Indeed, the silver is involved in the composition of invasive instruments such as catheters, some medical devices such as cement implants to replace bones, heart valves, surgical instruments, dental amalgams, and prostheses. Moreover, the silver ion is also used in water purification systems.

## IONIZED SILVER VS COLLOIDAL SILVER



We understand that silver as a biocide (antimicrobial) is due to the  $Ag^+$  ion. Any dosage form (drug) of silver must have the ability to release silver ions. A silver colloid is defined by microscopic metal particles dispersed in a liquid that is normally a purified water. These particles should release an  $Ag^+$  ion in order to be effective. The smaller the metal particles are (thus approaching the atom), the more effective they will be, since there would be less bonded atoms (prisoners) that prevent the release of the atom (one atom only per group is released, or the complete charge of the group represents only one positive charge).

Instead, if the particles are larger, fewer positive charges will be available in the liquid. For the same weight, an  $Ag^+$  atom solution has much more positive charge than the colloid. For example, a colloid silver made of 30 atoms will have one positive charge (or will release one silver atom at a time) while a solution of silver ion will have 30 atoms (with 30 positive charges that may attack 30 times more microbes at a time).

In summary, even if the silver is not considered as an essential metal ion to the physiological reactions of the body, this metal, in its ionic form at a low concentration, is practically non-toxic and works by helping the body to better defend itself against infections in general, and could be considered both as a powerful but gentle antimicrobial agent.



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