

# The Antimicrobial Activity of Selected Silver Products

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and Richard Robison, PhD

The antimicrobial activity of a group of silver-based products was assessed by comparing their ability to kill MRSA (*methicillin-resistant staphylococcus aureus*). Silver has been used for decades for its known antimicrobial effects<sup>1-4</sup>. Since many silver-based products have made claims of superiority over other brands, two eminent oxidation therapy specialists, Dr. Dennis Harper and Dr. Robert Rowen, recognized the value of conducting an independent and unbiased study that would definitively assess the antimicrobial efficacy of several well-recognized silver products.

To this end, they contacted Dr. Richard Robison, a microbiologist with many years of experience in disinfection and infection control. The product identities were not disclosed prior to testing.

**Purpose:** The core purpose of every silver-based health product is to kill pathogenic microorganisms. In this initial study conducted at a major university laboratory, the kill rates of five silver-based products on a common and feared microorganism, MRSA; a deadly pathogen responsible for killing thousands of people each year worldwide, were determined.

**Methods:** Dr. Rowen and Dr. Harper acquired five silver-based products by purchase through normal retail channels. Harper's acquisitions were shipped to Dr. Rowen, who then blinded all five original bottles and randomly labeled each with letters A-E. Dr. Rowen alone kept key codes for identifying the products. He sent

the blinded products directly to the microbiology lab, marked simply with a letter A to E. Neither Dr. Harper nor Dr. Rowen was informed of the antimicrobial testing results. The test results were sent directly from the microbiology lab to George Gaboury, President of the San Francisco Tesla Institute, a grass roots organization which promotes the advancement and greater public awareness of science. After receiving the test results, Gaboury was independently sent the key codes by Dr. Rowen. Gaboury then matched the lab results to the specific products

of each test product was added to a 50 ml polypropylene sterile centrifuge tube. Tubes were equilibrated in a 20°C water bath. Then, 0.1 ml of the MRSA test suspension was added to each tube at time zero. After a two-minute contact time, 1 ml of this disinfectant/MRSA mixture was added to 9 ml of neutralizer solution. The tube was mixed thoroughly and allowed to sit for two minutes. The neutralized suspension was then serially diluted in 9 ml blanks of physiological saline solution (PSS). The number of viable organisms in selected dilution tubes

was assayed by membrane filtration. One ml aliquots were plated in triplicate. The membranes were washed with about 100 ml of sterile PSS and removed to Columbia Agar plates. The plates were incubated

at 37 °C for 24 and 48 hours. The number of colonies on each filter was counted, and log reduction and percent kill values for each product were computed. Titers of the MRSA test suspension were computed and appropriate neutralizer and sterility controls were performed.

**Results:** There was a highly significant difference between the five formulations, in their ability to kill MRSA in 2 minutes. Log reduction  $[-\log(S/S_0)]$ ; where S = concentration of viable organisms after the specified contact time; and S<sub>0</sub> = the initial concentration of viable organisms at time zero] and percent kill  $[(1-(S/S_0)) \times 100]$  values can be seen in Table 1. One silver product, ACS 200 Extra Strength was found to be approximately 4,000 times more

**ACS 200 Extra Strength was proven 4,000 to 1,000,000x more effective than competing silvers**

Test Solution	Product	Contact Time	Log Reduction (LR)	Percent Kill (PK)
Solution A	pH Structured Silver	2 min	2.74	99.82%
Solution B	Argentyn 23®	2 min	Approx. 0.28	Approx. 47.1%
Solution C	<b>ACS 200 Extra Strength</b>	<b>2 min</b>	<b>6.35</b>	<b>99.999955%</b>
Solution D	OXYSILVER®	2 min	Approx. 0.38	Approx. 58.3%
Solution E	ASAP®	2 min	Approx. 0.22	Approx. 39.7%

\*Largest number is best

A-E, in public at a scheduled meeting of the Tesla society. The actual lab test results were reported to the group by Gaboury in an unaltered format.

Each product was evaluated on the same day, by the same technician, using the same test organism suspension. A suspension test was used, similar to that described by March, et al.<sup>5</sup> Briefly, the test suspension was prepared by growing a 5 ml culture of Methicillin-resistant *Staphylococcus aureus* (MRSA) organisms, ATCC 43300, in Nutrient Broth at 37 °C for 24 hr. The 5 ml culture was pelleted by centrifugation, washed with five ml sterile 18 MΩ purified water, centrifuged again, and re-suspended in a final volume of one ml sterile purified water. This produced a suspension containing about 2.97 billion organisms/ml. A 9.9 ml aliquot

effective in antimicrobial activity than the second most effective silver-based product, PH Structured Silver, and approximately 1,000,000 times more powerful in antimicrobial activity than Argentyn 23, OXYSILVER and ASAP.

The complete study, including testing methods and results, can be requested by email and is attached as an appendix at the end of this report.

**Discussion:** Dennis Harper, D.C., N.D., and Founder of O3 Medical Services, specialist in ozone and vitamin treatment, stated: "ACS 200 Extra Strength could change the landscape in significantly strengthening antibiotics for fighting bacterial infections quickly and effectively. I was challenged by my fellow peers to find the best silver product, and up until now, no one had independently tested the comparative bacterial kill rates on a range of silver-based solutions. These results could pave the way for more effective patient treatment."

Dr. Rowen and Dr. Harper have taught at ACAM's oxidation workshop, where many questions arose regarding conflicting data from various silver companies. These questions led to performing this independent study. Dr. Rowen says, "Until now it was a difficult process sorting out information attached to various silver products. We (Harper and Rowen) consulted with Dr. Richard Robison (Professor of Microbiology) about designing a valid test. He advised "You are attempting to kill microorganisms with silver, so keep it simple with a standard kill test performed in an identical manner on the various products, a test which will demonstrate if the products actually do what you desire them to do.""

The kill rate effectiveness was assessed with a contact time of 2 minutes and the results are expressed as both log reductions and percent kill. For accuracy, plating on each dilution was performed in triplicate. For the layman, who might not understand the significance of logarithmic reduction; consider the Richter scale of earthquake

magnitude, which is expressed in a log format. A 7.0 earthquake is 10 times more powerful than a 6.0. A 6.0 earthquake is 1000 times more powerful than a 3.0. As revealed in this study, ACS 200 Extra Strength had a log reduction of 6.35, compared with that of the second best product at 2.74. ACS 200 Extra Strength had greater than 3.61 log kill over the closest competitor, representing a 4,000 times greater kill than PH Structured Silver. ACS 200 Extra Strength had a percent kill rate of 99.999955%, which was close to complete kill of the test suspension (over 20 million MRSA organisms) within 2 minutes.

How does this research affect you and me? Dr. Harper added, "We cannot make broad-stroke conclusions about any particular product based on the results of a single study, and believe it would be inappropriate to do so. In partnership, we will continue to fund further independent studies to reinforce the consistency of these truly amazing results. At the present, we have identified a highly effective silver-based solution which, when administered with antibiotics, should provide far superior patient outcomes. These test results are readily available to anyone who wants to contact me and find out more."

Dr. Rowen commented, "One must appreciate the log scale. Let's start with 2,970,000,000 (2.97 billion) organisms. The initial dilution caused by mixing the organism with the disinfectant, gives us 29.7 million organisms/ml at time zero. Exposure to the second best product caused a 2.74 log reduction (a 99.82% kill) in viable organisms, leaving over 10,000 living MRSA organisms. The product that caused a 6.35 log reduction (99.999955% kill) left less than 3 viable organisms. The other three products left over 2.5 million living MRSA organisms, in the given time period of exposure. This is simply too huge a difference to ignore, and begs that follow-up studies be conducted.

This may be a huge breakthrough in the management of infection, especially in

the light that silver is synergistic with oxidation therapy"

Dr. Rowen has been intensely involved as a clinician in oxidation therapy since 1986. He currently serves as ACAM's oxidation workshop chairman and teaches oxidation therapy seminars. He practices in Santa Rosa California. Dr. Harper has been practicing ozone therapy for many years and practices in Orofino, Idaho. He recently joined the ACAM oxidative workshop teaching staff.

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#### Notes:

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