

Technical Data Monograph

The Instrument Protection Properties
of Prolystica[®] Ultra Concentrate Enzymatic Detergent
and other Enzymatic Products

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Background

Surgical instruments and equipment are a substantial investment for any hospital. It is also one that is continuous with the introduction of ever-changing specialized and customized pieces. Reprocessing instruments in an efficient manner is crucial to maintaining optimum throughput within the sterile processing department. However, processing can also be the source of hidden costs driven by poor cleaning and lack of instrument protection can reduce functionality and necessitate instrument replacement before the end of their useful life.

The chemistry used as part of the cleaning process can have a significant impact on the quality of surgical instruments and equipment. While it is important that a cleaning chemistry be compatible with the metal and plastic materials used in the manufacture of these instruments and not negatively impact them, a cleaning chemistry should also protect against the damaging effects of water. Water is a common solvent used in the cleaning of soils and comprises 98% of the dilution make-up for a cleaning chemistry in the sterile processing area. Representing most of the liquid volume utilized to drive the mechanical action within a washer/disinfector, water is certainly an inexpensive and convenient resource. Unfortunately, water itself can be a highly corrosive force. Water can contain a number of chemical contaminants that have the potential to negatively impact the functionality and useful life of surgical instruments. Common metals such as calcium, copper, iron and zinc can deposit on instruments, leading to visible stains. Once these metals have deposited on the surface, they can lead to corrosion of the instrument surface. Even high-quality water containing few or no contaminants can be highly corrosive to metal surfaces. Instrument corrosion reduces the efficiency of the instrument, causes excessive wear and leads to expensive repair and replacement costs. Additionally, with hospitals faced with processing loaner sets of instruments on a regular basis, the need to minimize such instrument damage becomes even more critical. The use of a cleaning chemistry that affords protection from the damaging effects of water can optimize instrument reprocessing.

Optimized cleaning using a chemistry formulated to provide instrument protection greatly extends the useful life of surgical instruments by maintaining top functionality and performance. It allows for processing to occur in a highly efficient manner, as well as reducing the need for additional reprocessing. Since corrosion can harbor and protect microorganisms from the sterilization process, controlling instrument corrosion aids in eliminating microbial contamination and helps ensure staff and patient safety.

Purpose

Polystica® Ultra Concentrate Enzymatic Cleaner is a highly concentrated, liquid detergent designed for use in automatic washers/disinfectors. The purpose of this study was to compare the instrument protection of Polystica Ultra Concentrate Enzymatic Cleaner and three additional enzymatic products with German stainless steel scissors.

Methods

Polystica Ultra Concentrate Enzymatic Cleaner (STERIS® Corporation), Asepti-Solid™ Enzyme (Huntington® brand, Ecolab®), Asepti-zyme™ Instrument Presoak and Cleaner (Huntington® brand, Ecolab®), V. Mueller® Dual Enzy-Clean® Low Suds Enzymatic Pre-Soak and Detergent (Cardinal Health), Endozime® AW PLUS (The Ruhof Corporation) and EmPower® dual enzymatic detergent (Metrex® Research Corporation) were tested for compatibility with German stainless steel scissors.

Table 1: Enzymatic Products evaluated during the Instrument Protection Study

Product Name / Company	Label Conc. Ranges	Tested Concentration
Polystica® Ultra Concentrate Enzymatic Cleaner (STERIS® Corporation)	1/40 - 1/10 oz/gal	1/10 oz/gal
Asepti-Solid™ Enzyme (Huntington® brand, Ecolab®)	Not Applicable	1 oz/gal *equivalent
Asepti-Zyme™ Instrument Presoak and Cleaner (Huntington®, Ecolab Professional Products)	1/4 – 1 oz/gal	1 oz/gal
V. Mueller® Dual Enzy-Clean® Low Suds Enzymatic Pre-Soak and Detergent (Cardinal Health)	1/8 oz/gal	1/8 oz/gal
Endozime® AW PLUS (The Ruhof Corporation)	1/2 oz/gal	1/2 oz/gal
EmPower® dual enzymatic detergent (Metrex® Research Corporation)	1/2 - 1 oz/gal	1 oz/gal

*Dissolved manually according to the stated claim that two 2.5 lb. bricks are equivalent to 15 gallons of a traditional detergent.

The scissors were allowed to soak in solutions at the highest label recommend use dilution in tapwater for a period of five weeks at room temperature. The products were compared to tap water that was used as a negative control. The scissors were visually observed at 24 hours, 48 hours, one week, three weeks, and five weeks for changes in: appearance, color, dulling, solution appearance, container residues and the overall integrity (protection) of the stainless steel from the damaging effects of water. Observations were recorded in a laboratory notebook. Pictures were taken at each time point and before and after a deionized water rinse at the five week time point.

Results

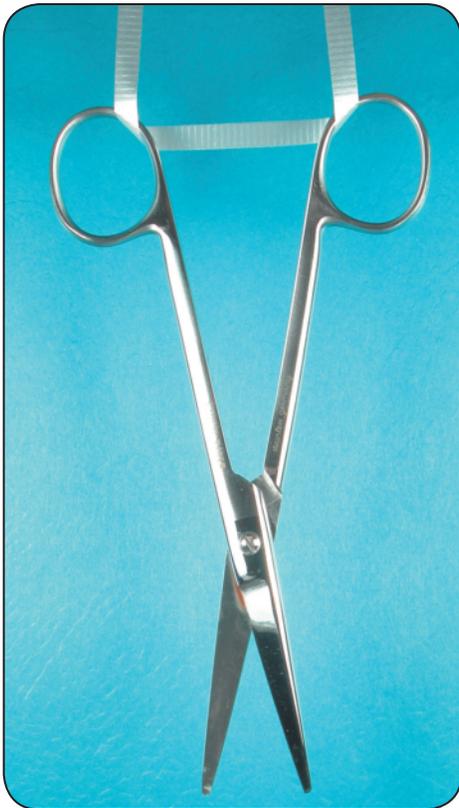
Asepti-Solid™ Enzyme did not afford any instrument protection to the scissors in tap water. Corrosion was noticed in tap water after less than three days of soak time.

None of the remaining four products, Asepti-Zyme™, V. Mueller® Dual Enzy-Clean®, Endozime® AW Plus and EmPower®, exhibited any instrument protection benefits. All scissors were visibly discolored, corroded with rust and/or dull patches by the end of the five week test period.

Polystica Ultra Concentrate Enzymatic Cleaner exhibited superb instrument protection ability. There were no visible signs of rust or discoloration on the scissors after soaking in the product dilution for five weeks. Additionally, the test solution remained clear for the entire duration of the test.

The physical appearance of the scissors after five weeks exposure was documented in the following photographs:

Tap Water Control



Polystica® Ultra Concentrate Enzymatic Cleaner (STERIS)

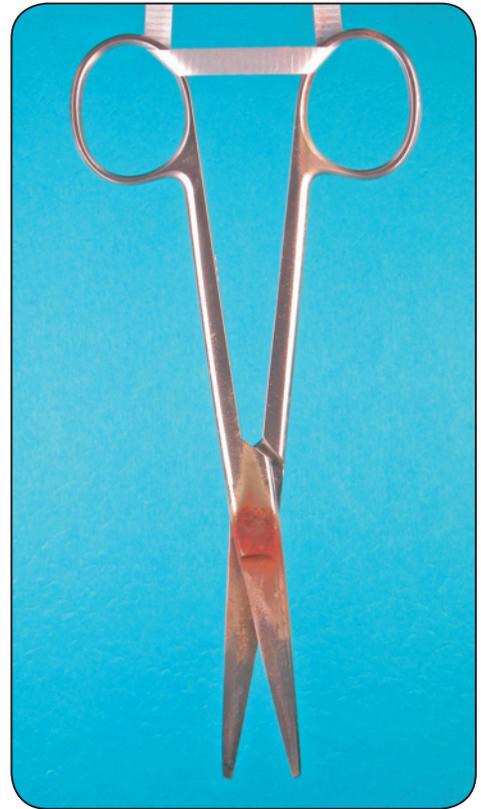


Asepti-Solid™ Enzyme (Ecolab)

Front



Back



Asepti-Zyme™ Instrument Presoak and Cleaner (Ecolab)

Front



Back



V. Mueller® Dual Enzy-Clean® (Cardinal)

Front



Back



Endozime® AW PLUS (Ruhof)

Front



Back

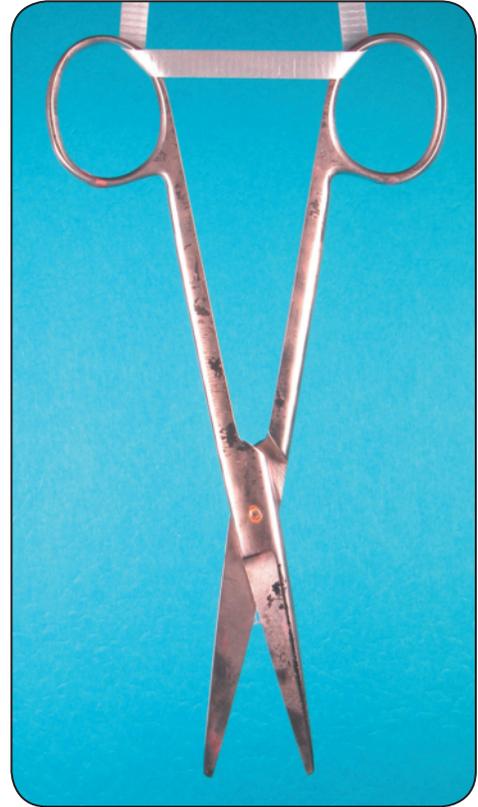


EmPower® dual enzymatic detergent (Metrex)

Front



Back



Conclusion

Evaluation of instrument protection is necessary since frequent exposure to detergents or water alone can lead to deterioration of surgical instruments during the cleaning process. The test results reveal whether or not damage to the integrity of the metal substrate occurs when exposed to the detergents over a period of time.

The data for the instrument protection summarized in this report represents continuous exposure at room temperature for five weeks to use-dilutions of Prolystica Ultra Concentrate Enzymatic Cleaner, five competitive products and a tap water control. Under the described test conditions, Prolystica Ultra Concentrate Enzymatic Cleaner provided the most protection for the German stainless steel scissors at the recommended dose level tested. The overall appearance and visible condition of the scissors was remarkable compared to various competitive products currently in the market.

References: Research and Development Notebook numbers:
6282; 20-21, 2325, 30-96; 6333; 1-4

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