Technical Data Monograph

The Instrument Protection Properties of Prolystica® Ultra Concentrate Neutral Detergent and other Neutral 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

Prolystica® Ultra Concentrate Neutral Detergent 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 Prolystica Ultra Concentrate Neutral and five additional neutral products with Pakistani stainless steel scissors (floor grade).

Methods

Prolystica Ultra Concentrate Neutral Detergent (STERIS® Corporation), Asepti-Solid™ Neutral Detergent (Huntington® brand, Ecolab®), V. Mueller Instra-Clean Low Suds Detergent Concentrate (Cardinal Health), LiquiClean Detergent (The Ruhof Corporation), MetriWash™ instrument detergent concentrate (Metrex® Research Corporation) and SuperNova™ pH Neutral (Case Medical, Inc. ®) were tested for compatibility with Pakistani stainless steel scissors.

The scissors were allowed to soak in neutral detergent solutions at the highest label recommended use dilution in tap water for a period of five weeks at room temperature. The products were compared to tap water 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.
Table 1: Neutral Detergent Products evaluated during the Instrument Protection Study

<table>
<thead>
<tr>
<th>Product Name / Company</th>
<th>Label Conc. Ranges</th>
<th>Tested Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolystica® Ultra Concentrate Neutral Detergent (STERIS® Corporation)</td>
<td>1/40 - 1/10 oz/gal</td>
<td>1/10 oz/gal</td>
</tr>
<tr>
<td>Asepti-Solid™ Neutral Detergent (Huntington® brand, Ecolab®)</td>
<td>Not Applicable</td>
<td>1 oz/gal *equivalent</td>
</tr>
<tr>
<td>V. Mueller® Instra-Clean™ Low Suds Detergent Concentrate (Cardinal Health)</td>
<td>1/8 - 1/4 oz/gal</td>
<td>1/4 oz/gal</td>
</tr>
<tr>
<td>LiquiClean Detergent (The Ruhof Corporation)</td>
<td>1/2 - 1 oz/gal</td>
<td>1 oz/gal</td>
</tr>
<tr>
<td>MetriWash™ instrument detergent concentrate (Metrex® Research Corporation)</td>
<td>1/4 - 2 oz/gal</td>
<td>2 oz/gal</td>
</tr>
<tr>
<td>SuperNova™ pH Neutral (Case Medical, Inc.®)</td>
<td>1/10 - 1/4 oz/gal</td>
<td>1/4 oz/gal</td>
</tr>
</tbody>
</table>

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

Results

None of the competitive products, Asepti-Solid™ Neutral, V. Mueller® Instra-Clean™, LiquiClean, MetriWash™ and SuperNova™ pH Neutral, exhibited any instrument protection benefits. All scissors were visibly corroding within the first 15 hours of soak time.

Prolystica Ultra Concentrate Neutral Detergent 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.

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

Tap Water Control
V. Mueller® Intra-Clean™ Low Suds Detergent Concentrate [Cardinal]

LiquiClean Detergent [Ruhof]
MetriWash™ instrument detergent concentrate [Metrex]

SuperNova™ pH Neutral [Case Medical]
Conclusion

Evaluation of instrument protection is necessary since frequent exposure to detergents or water alone can lead to the 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.

Prolystica® Ultra Concentrate Neutral Detergent provided the most protection for the Pakistani stainless steel scissors at the recommended dose level tested. The overall appearance and visible condition of the scissors was remarkable compared to various competitive neutral products currently in the market.

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