CDC Guidelines for Hand Hygiene

“When evaluating hand hygiene products for potential use in healthcare facilities, administrators or product-selection committees must consider factors that can affect the overall efficacy of such products, including the relative efficacy of antiseptic agents against various pathogens and acceptance of hand hygiene products by personnel.” – CDC, 2002

“(An Antiseptic product should be) broad-spectrum, fast-acting, and if possible, persistent.” – FDA, 1994

<table>
<thead>
<tr>
<th>Fast-Acting</th>
<th>Broad-Spectrum</th>
<th>Acceptance</th>
<th>Persistence</th>
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“Fast-Acting”

Zylast is the only non-alcohol sanitizer to ever show equivalent or superior immediate kill to alcohol sanitizers. Zylast has met or exceeded results for alcohol sanitizers in both the FDA Time-Kill Testing¹ and European standards for hand sanitizers.²

Zylast has been tested against the 25 different, FDA-specified bacteria in Time-Kill testing, and demonstrated effect within 15 seconds against both gram-positive and -negative bacteria.¹

“Persistent”

“An antiseptic containing preparation designed for frequent use...broad-spectrum, fast-acting, and if possible, persistent....Alcohols are rapidly germicidal when applied to the skin, but they have no appreciable persistent (i.e., residual) activity.”

– CDC Guideline for Hand Hygiene in Healthcare Settings, 2002

Experts in the field, including the FDA Tentative Final Monograph and the CDC Hand Hygiene Guidelines, emphasize the importance of a product with persistent efficacy. Alcohol sanitizers have no persistent activity – as soon as they dry, the hands can immediately become recontaminated.

In testing on human skin, Zylast was shown to kill more than 99.9% of transient bacteria (E. coli) at 20 minutes, 1 hour, and even 6 hours after application.³ Zylast provides persistent activity, recognized as an important component of a hand hygiene product by the CDC Guidelines.

<table>
<thead>
<tr>
<th></th>
<th>61% ethanol (Avagard D)</th>
<th>Zylast (0.2% BZT)</th>
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</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>99.1%</td>
<td>99.997%</td>
</tr>
<tr>
<td>S. epidermis</td>
<td>&gt;99.9%</td>
<td>99.996%</td>
</tr>
<tr>
<td>K. pneumonia</td>
<td>&gt;99.9%</td>
<td>99.999%</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>&gt;99.9%</td>
<td>99.999%</td>
</tr>
<tr>
<td>E. coli</td>
<td>&gt;99.9%</td>
<td>99.999%</td>
</tr>
<tr>
<td>S. pneumonia</td>
<td>&gt;99.9%</td>
<td>99.999%</td>
</tr>
<tr>
<td>S. pyogenes</td>
<td>98.0%</td>
<td>99.999%</td>
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</tbody>
</table>

Zylast meets or exceeds the fast-acting efficacy of an alcohol-based sanitizer against bacteria.

Persistent Efficacy on Skin

- 99.9%

- Zylast Lotion

- Alcohol
Both traditional alcohol sanitisers and Zylast are effective against a broad spectrum of bacteria, but alcohol is relatively ineffective against many viruses. In the largest hand hygiene study ever conducted, sponsored by the CDC, medical facilities that rely on alcohol were shown to have six times the Norovirus outbreaks of facilities that did not rely on alcohol sanitizers. In contrast, Zylast kills 99.97% of the Norovirus surrogate on contact, and has been shown to reduce Norovirus-associated illness in a medical facility by 28%.

Acceptance by Personnel

“Because HCWs <health care workers> may wash their hands....as many as 30 times per shift, the tendency of products to cause skin irritation and dryness is a substantial factor that influences acceptance, and ultimate usage”

— CDC Guideline for Hand Hygiene in Healthcare Settings, 2002

Studies show very low compliance (40-50%) with hand hygiene protocols, and the largest reason is skin irritation associated with current products. Alcohol sanitizers work by dehydrating the bacteria – unfortunately, they do the same to the skin. The CDC Guidelines report that at least 25% of healthcare workers have contact dermatitis from their current products, and 85% have reported painful, cracked skin during their careers.

Zylast is different, without the drying nature of alcohol sanitizers. The active ingredient, BZT, actually increases skin moisture.

When a traditional alcohol sanitizer was replaced with the Zylast Antiseptic Lotion, healthcare workers reported a 46% improvement in overall hand feel, along with significant improvements in moisture level, skin appearance, integrity, and feel. When measured, Zylast either maintains or improves compliance with hand hygiene protocols.

8. Evaluation of the Zylast products in hospital settings, a controlled, cross-over clinical trial, 2014-2016