

EFFECTIVENESS AND RESIDUAL ACTIVITY

Alcohol-based hand sanitizers stop working the instant they dry. The leading manufacturer of alcohol-based hand sanitizers claims that their product kills 99.99% of most common germs that may cause disease in as little as 15 seconds. Alcohol-based hand sanitizers dry in 8-10 seconds, and fall below the efficacious concentration of alcohol in seconds. It has been reported that alcohol-based hand sanitizers offer no residual protection, and that if your hands feel dry after rubbing them together for 15 seconds, an insufficient volume of alcohol gel was likely applied. Benzalkonium chloride-based hand sanitizer dries fast, but 10-15 seconds slower than alcohol-based hand sanitizers allowing more than the minimum contact time for complete efficacious coverage, including under fingernails. Additionally, benzalkonium chloride-based hand sanitizers deliver 2 to 4 hours of residual protection.

Published studies report that benzalkonium chloride-based hand sanitizers demonstrated greater sustained antibacterial activity than gelled alcohol-based hand sanitizers that actually became less effective with repeated use and made the skin dirtier, not cleaner due to removal of protective natural skin oils and entrapment of dead skin cells by the polymer thickeners used in the gelled alcohol-based products. (*AORN Journal*, (68 August 1998), p. 239-251).

Testing a New Alcohol-Free Hand Sanitizer to Combat Infection, *AORN Journal*, (68 August 1998), p. 239-251

Abstract - Universal precautions require that perioperative health care personnel wash their hands before and after all patient contact. Time constraints, however, can make adhering to universal precautions, including proper hand washing, difficult. Some perioperative health care workers, therefore, routinely use rinse-free hand sanitizers to supplement normal hand washing. This study evaluated immediate and persistent antimicrobial effectiveness of two alcohol-containing hand sanitizers and a novel surfactant allantoin, benzalkonium chloride (SAB) hand sanitizer using a federally approved effectiveness protocol. Results Indicate that all three products were equally effective after a single application. After repeated use, the alcohol-containing sanitizers did not meet federal performance standards, and the alcohol-free sanitizer did. These properties and others Illustrated in this article indicate that the nonflammable, alcohol-free SAB hand sanitizer Is the-most favorable of the rinse-free hand sanitizer formulas for normal hand washing. *AORN J* 68(August 1998) 239-251.

In the referenced study to simulate repeated usage, alcohol-based and alcohol-free benzalkonium chloride-based hand sanitizers were compared. In the study, subject's hands were repeatedly inoculated with bacteria followed by application of hand sanitizer, then evaluated for antimicrobial effectiveness. The antimicrobial efficacy of the alcohol-based hand sanitizer showed a markedly decreased antimicrobial efficacy with subsequent contamination and decontamination cycles, whereas the alcohol-free benzalkonium chloride-based hand sanitizer showed a steady increase in antibacterial efficacy.

In addition to these objective results, subjects were asked to subjectively evaluate the condition of their hands after the completion of the test protocol. 47% of the subjects who had completed the test protocol with the alcohol-based hand sanitizer reported palmar pain or discomfort, and tended to indicate some discomfort in palmar surfaces for one to several days after the test. In contrast, none of the subjects that used the alcohol-free benzalkonium chloride-based formula reported any pain or discomfort of their hands after completing the test protocol.

In summary:

- Benzalkonium chloride-based hand sanitizers had a greater sustained antibacterial activity than alcohol-based hand sanitizers.
- Alcohol-based hand sanitizers became less effective with repeated use and irritated the hands of subjects.
- Benzalkonium chloride-based hand sanitizers became more effective without irritation after repeated use.

References

DL Dyer, AL Shinder & FS Shinder (2000). Alcohol-free instant hand sanitizer reduces illness absenteeism. *Family Medicine*, 32(9), 633-638;CG

White, FS Shinder, AL Shinder & DL Dyer (2001). Reduction of Illness Absenteeism in Elementary Schools Using an Alcohol-free Instant Hand Sanitizer. *The Journal of School Nursing*, 17(5), 258-265.

Testing a New Alcohol-Free Hand Sanitizer to Combat Infection (*AORN Journal*, (68 August 1998), p. 239-251)

Marples, RR, & Towers, AG (1979). A laboratory model for the investigation of contact transfer of microorganisms. *The Journal of Hygiene*, 82(2), 237-248.

Dyer, DL, Gerenraich, KB, & Wadhams, PS (1998). Testing a new, alcohol-free sanitizer to combat infection. *Association of Operating Room Nurses Journal*, 68(2), 239-251.