

Investigation of the Effects of Consumer Market Lotions versus Professional Grade Lotions in Combination with Alcohol Hand Antiseptics: A Comparative Study of Skin Health Effects and Glove Compatibility

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BACKGROUND/OBJECTIVES

Hand skin health is extremely important to maintain, especially for healthcare workers who rely on this essential barrier to infection. Skin that is compromised is not only vulnerable to the infectious substances that are prevalent in a healthcare setting, but also painful to those affected, as well as being a deterrent to proper hand hygiene.

Hospitals must maintain some control over the products used in their facilities for the protection of patients, staff and visitors. The use of commercial brands of lotion is no exception, as these products may compromise patient care. While most products in the consumer market are quality products, manufactured with quality standards and provide acceptable skin health benefits, the formulations and the packages are not necessarily designed for multiple users within a healthcare institution. Latex and chlorhexidine gluconate compatibility are not considered as key features in a product for the general public, and implications of product contamination are not as severe with an expected single user in a healthy population.

Comparative dermatological studies were performed to determine the relative effects on skin of use of an alcohol hand antiseptic: (a) without lotion, (b) with use of a professional grade lotion developed for the healthcare market, or (c) 2 popular consumer market brands. Glove compatibility was also determined for both latex and nitrile gloves.

METHODS

Dermatological Compatibility Testing: A randomized, double blind, five-day Leg Controlled Application Test (LCAT) was performed by Hill Top Research, Inc. (Winnipeg, Manitoba), for Ecolab, Inc., (St. Paul, Minnesota); the relative effectiveness of a professional, healthcare grade lotion (HC Lotion), and two consumer market lotions (Consumer Lotion A and Consumer Lotion B) was assessed, when used in combination with a commercially available alcohol-based, non-aerosol foam hand antiseptic (NAFHS), which in previous studies was seen to be drying to the skin.

Study Design: 36 subjects who met study criteria and gave signed informed consent were enrolled in the study.

Test Procedures:

5 day conditioning period (unscented Dove bar); 4 total test sites: 4 on one leg
 9 sessions of test article application (NAFHS) over 5 days (2 treatments/session, 3-5 hours between sessions)
 After the final application of NAFHS each day, 3 of the 4 sites were treated with a single application of one of the lotions
 First 4 days: two sessions/day Final day: one session only

Test articles quantities and application:

NAFHS: 15µl dispensed directly onto finger cot
 Lotion products: 20µl dispensed directly onto finger cot

Application: Test articles were rubbed onto test sites for approximately 30 sec. or until dry. NAFHS Treatment was repeated after 8-15 minute drying period.

Assessments:

Visual: Erythema and Dryness were assessed by a trained grader, twice daily.

Skin barrier integrity: Transepidermal Water Loss (TEWL): Evaporimeter model EPI/EP2 (Servomed, AB, Sweden); Baseline values assessed prior to treatment, and three hours after the final treatment on day 5.

Glove Compatibility:

Materials:

Professional Healthcare Lotion:

(1) Endure® Revitalizing Skin Lotion (Fragrance Free)

Consumer Market Lotions:

- (obtained at retail stores in Feb 2007, in the St. Paul, MN area)
- (2) Bath and Body Works Glove Me Tender®
- (3) Bath and Body Works Warm Vanilla Sugar® Body Cream
- (4) Bath and Body Works Warm Vanilla Sugar® Body Lotion
- (5) Eucerin® Dry Skin Therapy Original Moisturizing Creme
- (6) Keri® Original Moisture Therapy Soothing Formula
- (7) Curel® Ultra Healing Intensive Moisture Lotion
- (8) Untreated reference glove

Gloves:

Latex gloves: Kimberly-Clark SafeSkin Powder-Free Latex Exam Gloves
 Nitrile gloves: SafeSkin Purple Nitrile Sterile Powder-Free Exam Gloves

Test Procedures:

Test products were dispensed into the fingertips of gloves. The filled gloves were then massaged to distribute product evenly over the interior surface of the gloves. The gloves were then sealed by tying off the open end. The sealed gloves were placed in a climate controlled chamber (Temp = 50°C) for 1 week.

Evaluation of Glove compatibility:

After removal from the testing chamber, gloves were compared visually to a reference (untreated) glove of the same material and size. Color changes and distortion of the treated gloves were noted, and documented through digital photographs.

Treated gloves were then manually compressed, and the gloves examined to determine if any pinhole leaks were present after prolonged exposure to the products.

Figure 1: Trans-Epidermal Water Loss: Skin Barrier Integrity

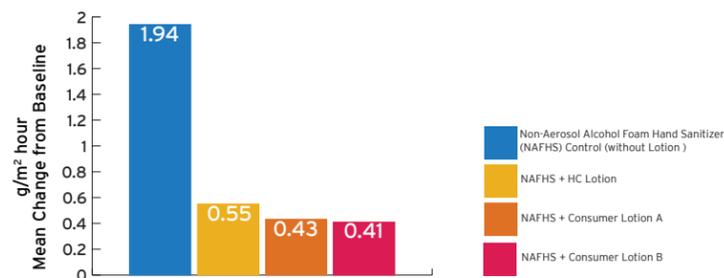


Figure 2: Visual Dryness

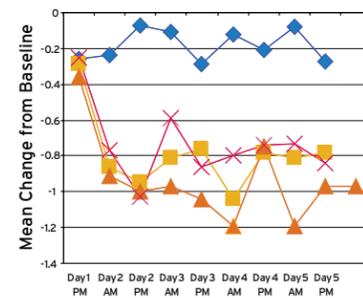


Figure 3: Visual Redness (Erythema)

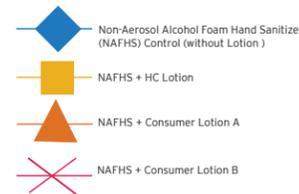
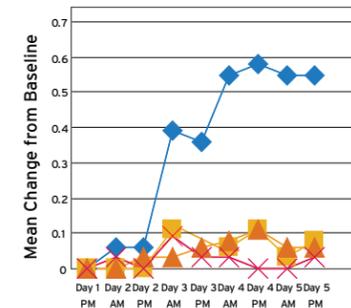


Figure 4: Latex gloves after one week's exposure to lotions at 50°C



Figure 5: Latex Glove Lotion 2 compared to untreated reference glove



Figure 7: Nitrile gloves after one week's exposure to lotions at 50°C



Figure 6: Latex Glove Lotion 5 compared to untreated reference glove



RESULTS

The Professional Healthcare Lotion and some of the consumer market lotions showed good compatibility with both the latex and nitrile gloves (see photos). Some of the consumer lotions, particularly two of the Bath & Body Works® products (lotions 2 & 3), caused serious discoloration of both glove materials. The Eucerin® product (lotion 5) caused extreme distortion of the latex gloves. This is likely due to the high content of petrolatum in that product.

CONCLUSIONS:

The results of the LCAT study support that lotion use dramatically improves skin condition (visual redness and visual dryness) as well as lessens the detrimental effects of frequent hand hygiene on the skin's barrier function (TEWL). Both the professional healthcare lotion and the two consumer market lotions showed good benefits to skin condition, even with infrequent use (once per day).

In terms of glove compatibility, the results for the various lotions ranged widely, indicating the importance of using a product that has been tested and proven to be glove compatible.

The results indicate that although consumer market lotions can show beneficial effects on skin condition, for healthcare settings, it is safer and better for the healthcare workers to be supplied with products that have been evaluated and demonstrated glove and CHG compatibility, in addition to improving skin condition.