

Comparative Efficacy of Hand Rubs Containing Alcohol or Quaternary Ammonium Compounds

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ABSTRACT

Background/Objectives

Hand hygiene is critical for reducing pathogen transmission and alcohol-based hand rubs (ABHRs) are recommended and used as the primary means of hand hygiene in healthcare. However, quaternary ammonium compound-based hand rubs (QBHR) have been used in certain settings when ingestion or flammability are concerns. The objective of this study was to compare the efficacy of ABHR and QBHR formulations.

Methods

Four commercially available handrubs were tested: Product A (70% ethanol gel), Product B (0.13% benzalkonium chloride foam), Product C (0.2% benzethonium chloride gel), and Product D (0.13% benzalkonium chloride foam). Products A, B, and C were evaluated according to ASTM E1174 at a 2 ml dose. Products A and D were evaluated according to ASTM E2755 at a 1.5 ml dose. All products were evaluated after a single application and after multiple applications. Log reductions from baseline were calculated for each product and analyzed for statistical differences.

Results

Only Product A met Health Canada requirements for a ≥ 3 log reduction using E1174, and log reductions for Product A were statistically superior to those for Products B and C. When evaluated using E2755, Products A and D achieved log reductions of 2.34 and 1.70, respectively, after 1 application, and of 4.37 and 1.28, respectively, after 11 applications. Log reductions for Product A were statistically superior to those for Product D.

Conclusions

Because QBHR failed to meet Health Canada efficacy requirements and were statistically inferior to ABHR, QBHR should only be used on a limited basis if at all.

METHODS

Test Products

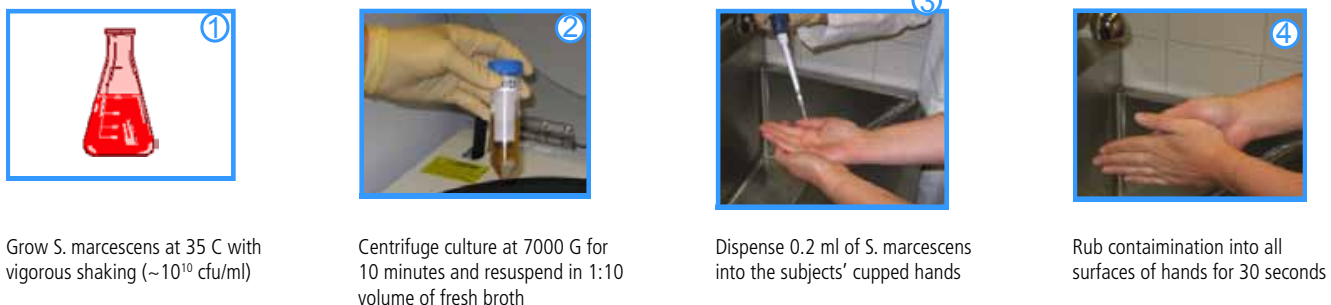
Product Code	Active Ingredient	Product Format
Product A	70% ethanol	gel
Product B	0.13% benzalkonium chloride	foam
Product C	0.20% benzalkonium chloride	gel
Product D	0.13% benzalkonium chloride	foam

Figure 1. Steps for E 1174



Products A, B, and C tested at a volume of 2 ml, rubbed in until dry

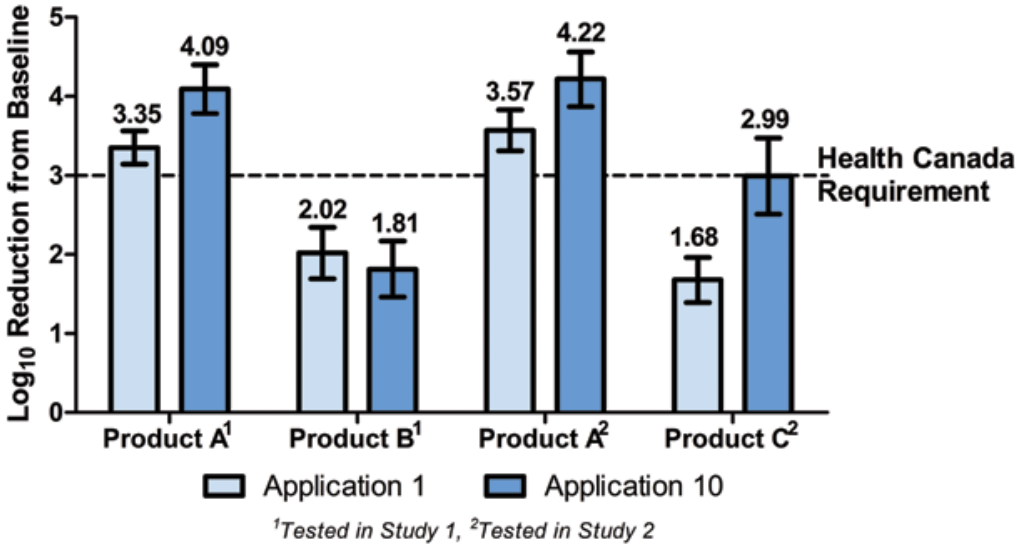
Figure 2. Steps for E 2755



Products A and D tested at a volume of 1.5 ml, rubbed in until dry

RESULTS

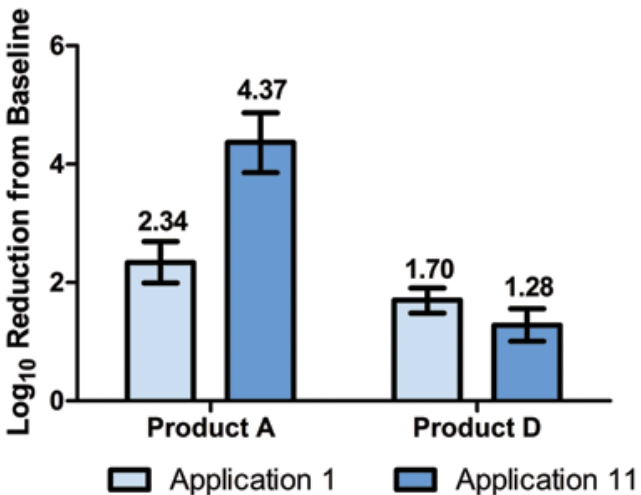
Figure 3: E 1174 Results (2 ml dose)



- Only the alcohol hand rub met Health Canada requirements¹ for a 3 log reduction
- Product A with 70% ethanol was statistically superior to Products B and C at applications 1 and 10

1. Health Canada Guidance Document Human-Use Antiseptic Drugs, November 2009.

Figure 4: E 2755 Results (1.5 ml dose)



- Product A with 70% ethanol was statistically superior to Product D at applications 1 and 11

SUMMARY & CONCLUSIONS

- The 70% ethanol ABHR, Product A, was the only product to meet Health Canada requirements for antiseptic drugs used in healthcare.
- The ABHR was statistically superior to all 3 quaternary ammonium based hand rubs tested after both a single use and multiple uses, using 2 different test methods
- These results help support PIDAC recommendations to only use 70-90% ABHR in hospital settings and to not use quaternary ammonium compounds in healthcare settings
- If you choose to use a quaternary ammonium compound based hand rub in your facility you should do so cautiously as the antimicrobial efficacy of the product may not be sufficient

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