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EFFECTIVENESS OF MICROBAT (STERIGARD) HAND RUB AND MICROGUARD (STERIGARD) HAND DISINFECTANT FROM IMAGO & GETTER FOR REDUCTION OF INFECTION IN ANY FACILITY

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ABSTRACT

The Centres for Disease Control and Prevention, the World Health Organization, and other health experts promote hand hygiene as the most important hygiene measure in preventing the spread of infection from any facility. Alcohol-based hand sanitizers are widely used for achieving hand hygiene. The use of hand sanitizer and disinfects result sustained improvement in hand-hygiene compliance, coinciding with a reduction of many resistant and prone infections. The study aimed at determining the efficacy of Microbat (Sterigard) hand rub and Microguard (Sterigard) Hand disinfectant by ASTM E2755 method which included 6 different volunteers for the test procedure. The results showed more than log 4 reduction for bacteria, yeast and molds. This proves the efficacy of both Microbat (Sterigard) hand rub and Microguard (Sterigard) Hand disinfection and should be considered for regular usage for achieving aseptic environment.

Keywords: Hand Hygiene, Alcohol-based hand sanitizer, Infection control, Aseptic environment

INTRODUCTION

As globally said "A Clean Hand is a Caring Hand", Hands are considered to be the primary source of transmitting microbes and causing infections to individuals in any facility [1]. Diseases which are easily transferred such as communicable diseases can be prevented by maintaining personal as well as hand hygiene. It is very well known that hand hygiene is crucial to prevent and minimize infections especially in healthcare facility [2]. For maintaining hand hygiene, hand sanitizers like, alcohol hand sanitizers are increasingly being used as disinfectants over hand washing with soap and water, due to better efficacy [3].

Hand sanitizers significantly increase the chance of maintaining the hands clean and aseptic which helps in reducing the infection risk. Hand sanitizers are very effective in reducing households illnesses [4] skin infections respiratory and tract infections [5] in preventing microbial environment from elementary schools,[6] and in university conference halls/dormitories[7], reduce microbial load in

pharmaceutical[8], reduces hospital and community-acquired infections [9].

According to the Centres for Disease Control and Prevention (CDC), FDA and WHO the ethanol-based, isopropanol-based and chlorhexidine based sanitizer has a good safety record. Alcohol based hand sanitizers have excellent in vitro germicidal activity against gram-positive and gram-negative vegetative bacteria, including multidrug-resistant pathogens (MRSA, VRE) [10], Mycobacterium tuberculosis, HIV, influenza virus, RSV, vaccinia, and

Table 2. The efficacy of Microbat (Sterigard) hand rub against Yeast and molds

Subjects	Exposure time	Results (CFU/swab)		Percentage reduction
		Initial count	Post treatment	
A	60 seconds	07	0	>99.99%
B		02	0	>99.99%
C		05	0	>99.99%
D		03	0	>99.99%
E		06	0	>99.99%
F		05	0	>99.99%

hepatitis B and C viruses, Ebola virus, Zika virus (ZIKV), severe acute respiratory syndrome coronavirus (SARS-CoV), and Middle East respiratory syndrome coronavirus (MERS-CoV) [11] and even recommended by CDC for COVID-19. Whereas chlorhexidine has good in vitro activity against enveloped viruses such as HIV, cytomegalovirus, herpes simplex virus, influenza, and RSV, but significantly has less activity against non-enveloped viruses [12].

Despite of having excellent effectiveness of hand sanitizers, it is important to notice that the efficacy of theses sanitizers are dependent upon its proper usage technique, the quality and quantity of product used, and its consistency. There are also situations where the effectiveness of sanitizer can decrease like, in preventing the spread of certain type infections, significantly soiled hands and higher bacterial load [11]. The common transient floras in any facility consist of Escherichia coli, S. aureus and Pseudomonas aeruginosa that can colonize them in the superficial layers of skin in a short span [13]. Hence, in this study we aimed to test the hand sanitizers on natural hand flora and determine their susceptibility and efficacy in minimum time.

MATERIALS AND METHODS

Test product formulations: The test preparation used in this study was our sanitizing products named MICROBAT (Sterigard) Hand Rub (propanol 70%, v/v) is an alcohol based hand rub and MICROGUARD (Sterigard) Alcoholic Hand Disinfectant (chlorhexidine gluconate with ethyl alcohol (2.5%/70% v/v) is an alcohol based hand rub with chlorhexidine which are ready to use.

Human subjects: Total 6 candidates were selected for the study out of which are 3 male (named as Subject A, B & C) and 3 female (named as Subject D, E & F) candidates. The test populations were overtly healthy subjects and are at least 18 years of age. All subjects were provided with and signed informed consent forms and were examined to ensure hands were free of clinically evident dermatomes and any other disorders that could have compromised the subject and the study.

Test Procedure: This study was performed by ASTM E2755 methodology for testing the efficacy of the Microbat (Sterigard) hand rub and Microguard (Sterigard) hand disinfectant [14]. The test product application procedure has been slightly modified from the normal ASTM E2755 standard method, to

Table 4. The efficacy of Microguard (Sterigard) hand disinfectant against yeast and molds

Subjects	Exposure time	Results (CFU/swab)		Percentage reduction
		Initial count	Post treatment	
A	60 seconds	05	0	>99.99%
B		06	0	>99.99%
C		03	0	>99.99%
D		04	0	>99.99%
E		08	0	>99.99%
F		04	0	>99.99%

better simulate real working conditions. All the test volunteers were provided with 3 ml of Microbat (Sterigard) hand rub and Microguard (Sterigard) hand disinfectant was used on the palm area and rubbed gently front and back for 60 seconds by volunteers themselves as per WHO guidelines. The instructions for the application of sanitizers are followed as mentioned by the British Columbia Ministry of Health (2012). After drying of palm and fingers a sterile swab was rubbed to take microbial load. Base line microbial count was obtained by rubbing swab on palm and fingers before application of test

Table 3. The efficacy of Microguard (Sterigard) hand disinfectant against bacteria

Subjects	Exposure time	Results (CFU/swab)		Percentage reduction
		Initial count	Post treatment	
A	60 seconds	541	0	>99.99%
B		538	0	>99.99%
C		617	0	>99.99%
D		576	0	>99.99%
E		562	0	>99.99%
F		491	0	>99.99%

product. The plates were incubated at 30-35 °C for 1-2 days for Bacteria and 20-25 °C for 2-5 days for Yeasts & Molds. Colony counts obtained and log reductions calculated.

RESULTS AND DISCUSSION

The results obtained clearly shows that Microbat (Sterigard) hand rub and Microguard (Sterigard) hand disinfectant from Imago & Getter shows more than log 4 reduction at contact time of just 60 seconds on all subjects. As the alcohol based sanitizers can effectively rapture the cell walls of the microbe resulting in killing the organism. Therefore, this indicates that all the test hand sanitizer and hand disinfectants have great antimicrobial efficacy in minimum time. The use of all the mentioned disinfectants may be means to reduce the contamination caused by the test microorganisms. Cleaning and disinfecting hands can prevent the spread of any infections, including the resistant germs, difficult to remove or to treat. But despite of great importance, on an average healthcare individuals do not clean their hands on regular basis [15]. Moreover, in outreach programs, screening procedures in day-to-day practice, water scarcity areas, and bed-side and chair-side clinical examination, hand sanitizers could be an alternative to achieve asepsis.

CONCLUSION

Practicing regular hand hygiene is a simple and very effective way to prevent infections from any facility. Sanitizing our hand is one of the most important things we can do to prevent and control the spread of many illnesses. The anti-microbial spectrum of sanitizers proves them best option in controlling any pandemic disease including COVID-19. Hence hand hygiene must be included as regular practise for healthier lifestyle.

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CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

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REFERENCES

1. Kolhapure SA (2004). Evaluation of the antimicrobial efficacy and safety of purehands herbal hand sanitizer in hand hygiene and on inanimate objects. *Antiseptic*; **101(2)**: 55-57.

2. Jain VM, Karibasappa GN, Dodamani AS, Prashanth VK, & Mali GV (2016). Comparative assessment of antimicrobial efficacy of different hand sanitizers: An in vitro study. *Dental research journal*; **13(5)**: 424.

3. Boyce JM, & Pittet D (2002). Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *Infection Control & Hospital Epidemiology*; **23(S12)**: S3-S40.

4. Sandora TJ, Taveras EM, Shih MC, Resnick EA, Lee GM, & Ross-Degnan D. (2004). Hand sanitizer reduces illness transmission in the home [abstract 106]. In 42nd annual meeting of the Infectious Disease Society of America; Boston, Massachusetts (30).

5. Bloomfield SF, Aiello AE, Cookson B, O'Boyle C, & Larson EL (2007). The effectiveness of hand hygiene procedures in reducing the risks of infections in home and community settings including hand-washing and alcohol-based hand sanitizers. *American journal of infection control*; **35(10):** S27-S64

6. Guinan M, McGuckin M, & Ali Y (2002). The effect of a comprehensive handwashing program on absenteeism in elementary schools. *American journal of infection control*; **30(4)**: 217-220.

7. White C, Kolble R, Carlson R, Lipson N, Dolan M, Ali Y, & Cline M (2003). The effect of hand hygiene on illness rate among students in university residence halls. *American journal of infection control*; **31(6):** 364-370.

8. Sutton S (2010). Hand washing, hygiene, CGMP, and science. *Journal of GXP Compliance*; **14(1)**: 62.

9. Hassan AO, Hassan RO, Muhibi MA & Adebimpe WO (2012). A survey of Enterobacteriaceae in hospital and community acquired infections among adults in a tertiary health institution in South-western Nigeria. *African Journal of Microbiology*; **6:** 5162-5167.

10. FDA, U. & Food and Drug Administration. (2014). Hand sanitizers carry unproven claims to prevent MRSA infections.

11. Gold NA and Avva U (2019). Alcohol sanitizer, StatPearls Publishing LLC.

12. World Health Organization. (2016). WHO guidelines on hand hygiene in health care. First Global Patient Safety Challenge. Clean Care is Safer Care. Geneva: WHO; 2009.

13. Widmer AF (2000). Replace hand washing with use of a waterless alcohol hand rub? *Clinical infectious diseases*; **31(1)**: 136-143.

14. American Society for Testing and Materials (2010). ASTM E2755-10, Standard Test Method for Determining the Bacteria-Eliminating Effectiveness of Hand Sanitizer Formulations Using Hands of Adults. West Conshohocken, PA: American Society for Testing and Materials.

15. Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) Division of Healthcare Quality Promotion (DHQP) (2019). Hand Hygiene in healthcare settings.