Indian J. Applied & Pure Bio. Vol. 37(1), 216-218 (2022). **ISSN: 0970-2091**
A web of Science Journal

Studies on antimicrobial activity of commercial handwashes against selected human pathogens

Varsha M. Chaudhari

Department of Microbiology, PSGVPM's S.I. Patil Arts, G.B. Patel Science and STCO-OP KVS
Commerce College, Tal-Shahada, Dist. Nandurbar-425 409 (India)
Author for Correspondence email : varsharaj2913@gmail.com

Abstract

In the present investigation, antimicrobial activity of various antiseptic and herbal market handwashes were determined against bacterial isolates present on the skin surface like *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli,* and *Pseudomonas aeruginosa* using the agar disc diffusion method. Various microbes are deposited on the surface of the skin from the dust present in the external environment which causes infection. Antimicrobial activities of commercial available handwashes like Dettol, Savlon, Patanjali herbal, Medimix herbal on skin microflora pathogens were studied. The results obtained revealed that among the different handwash Patanjali herbal hand wash showed the highest efficacy against Gram-positive isolates *Staphylococcus aureus* and *Bacillus subtilis* but in Gram-negative isolates *E. coli* and *Pseudomonas aeruginosa* dettol and savlon had maximum bactericidal activity.

Microbicidal activity of any substance is described as its potential to kill microorganisms or impede the growth of germs. Antimicrobial action is important in the prevention of illnesses and skin infections in humans[2]. Handwash is liquid soap emulsions that act as the disinfectants required in everyday practices for hygienic points. Handwashes are generally used to remove dirt, including dust, bacteria, and foul odors of hands[3]. Hands are the main part of the body that performed a number of activities and hence they are exposed to a variety of substances which includes dust, raw and contaminated materials from the environment. Hand hygiene is one of the most significant activities essential for the reduction of transmission of infectious diseases[5,8]. Washing of hands with antibacterial hand washes prevents the spread of microbes or loose transient flora thus protecting from harmful infections[6]. Thus hand washing is the better option for the prevention of diseases. Liquid hand washes and soaps contain active antimicrobial components which kill more bacteria as compared to plain soaps[4].

The aim of the present research work is to compare the efficacy of locally available market handwashes against skin infecting

human pathogenic bacteria such as *Staphylococcus aureus*, *Pseudomonas aeruginosa, Bacillus subtilis* and *E. coli*.

This study was carried out in the Department of Microbiology PSGVP Mandal's ASC College, Shahada.

Sample collection :

04 different types of handwash Dettol, Savlon, and Patanjali herbal, Medimix herbal commonly used were purchased from the standard pharmaceutical shop located in Shahada.

Isolation of microorganisms :

Bacterial cultures used for the present investigations include *Staphylococcus aureus, Bacillus subtilis*, *E. coli,* and *Pseudomonas aeruginosa* were isolated in the laboratory. Sterile moistened cotton swab sticks were used to collect skin swab samples from the hands of the students from the Department who were exposed to heavy dust during their bus up-down. The samples collected with swab sticks were inoculated in already prepared nutrients and LB agar plates and plates were incubated at 37°C for 48 hours. Biochemical characterization and identification of the test pathogen were carried out using Bergey's Manual of Systematic Bacteriology.

Preparation of test samples and discs :

Aseptically transferred 0.1ml and 0.5 ml of each handwash sample in the sterile test tube containing 1 ml of sterile distilled water and mixed thoroughly. Filter paper discs of 6mm size prepared from Whatman's No. 3 filter paper were saturated with each hand wash solution.

Antimicrobial Activity by disc diffusion method :

The antimicrobial activity of handwash solutions was done by the agar disc diffusion method[1]. The standardized 0.1 ml saline suspension of the overnight grown culture of test organisms was inoculated on the surface of sterile nutrient agar plates. Sterile filter paper discs saturated with different concentrations of the handwash samples were aseptically transferred directly into the surface of plates with the help of sterile forceps. All plates were incubated at 37°C for 24-48 hours and examined for the zone of inhibition around the disc. The zone of inhibition was determined by measuring the diameter in millimeters of the zone to which each handwash inhibited the growth of the organism.

Handwashes are liquid soap preparations used to remove dust and microbes present on the surface of hands. The choice of handwash varies from person to person but it should be safe for the skin and effective against disease-causing microbes present on the surface of hands. The present research investigation was carried out to determine the antimicrobial efficacy of some selected handwash like Dettol, Savlon, and Patanjali herbal, Medimix herbal against skin microflora isolates *Staphylococcus aureus*, *Bacillus subtilis*, *E. coli,* and *Pseudomonas aeruginosa.*

Results obtained (Table-1) from the experimental data revealed that most of the handwash preparations have antimicrobial activity. Varying levels of effectiveness were

Table-1. Antimicrobial activity of various handwash against human pathogens

Pathogen	Dettol		Savlon		Patanjali Herbal		Medimix Herbal	
	0.1ml	0.5ml	0.1ml	0.5ml	0.1ml	0.5ml	0.1ml	0.5ml
	Zone Diameter in mm							
S. aureus	18.0 ± 0.2	23.0±0.2	11.0 ± 1.0	15.0±0.5	25.0 ± 0.2	27.1 ±0.5	10.5 ± 1.0	14.2 ±0.5
B. subtilis	22.0 ± 1.0	25.0±0.5	16.0 ± 0.4	20.0±0.5	23.0 ± 0.5	28.0 ±0.5	8.5 ± 1.0	11.2 ±0.5
E. coli	20.0 ± 1.2	21.0±0.3	14.0 ± 0.3	17.5±0.5	11.0 ± 1.5	15.5 ±0.5	13.5 ± 1.0	14.0 ±0.5
P. aeruginosa	17.0 ± 1.4	19.0±0.2	16.0 ± 0.1	19.2 ±0.5	13.0 ± 1.5	17.2 ±0.5	11.0 ± 1.0	13.2 ±0.5

Values are mean ± S.D.

observed by handwashes against the isolated skin flora pathogens. When the antimicrobial efficacy of the handwash solutions was compared using the agar disc diffusion method results revealed that the significant differences in the germicidal activity of handwash were observed on the various microorganisms. *Staphylococcus aureus* has the higher zone of inhibition (27.1±0.5**mm**) while *Bacillus* have a zone of inhibition (28.0 ±0.5mm) with Patanjali herbal hand wash, followed by *E. coli* (21.0mm) with Dettol handwash and *Pseudomonas* have (19.2 ±0.5 mm) with savlon handwash.

Significant variations were observed in the zone of inhibitions in all types of handwash used for the study. It was also observed that variations exist among the different concentrations used for the study with 0.5ml, higher concentrations having a higher zone of inhibitions were observed than the lower concentrations.

The main objective of the present study was to evaluate antimicrobial activity of commercially available antiseptic and herbal handwash against selected human pathogens. Significant differences were observed in the antimicrobial activity of antiseptic and herbal handwash.

References :

1. Bauer A.W., W.M. Kirby, J.C. Sherris, and M. Jurck, (1996) *American Journal Clinical Pathology*., *451:* 493-496.
2. Chaudhari V.M. (2016). *Journal of Scientific and Innovative Research,* 201-204.
3. Ikegbunam M. N., R. C. Metuh, L. O. Anagu, and N. S. Awah (2013) *Int. Res J Pharm. App Sci*., *3*(4): 133-135.
4. Otokunefor, K., and I. Princewill, (2017) *J. Appl. Sci. Environ. Manage*. *Dec,* 2017 *21* (7) : 1276-1280.
5. Pittet, D., B. Allegranzi, H. Sax, S. Dharan, C.L. Pessoa-Silva, L. Donaldson, and J.M. Boyce, (2006). *The Lancet Infectious Diseases*. *6*(10): 641 – 652.
6. Sajed A.N., Shagufta, S. Haider, N.W. Yousaf, I. Ahmed, S. Ali and S. Imran (2014) *IOSR Journal of Pharmacy, 4*(2): *19-23*.
7. Vineeta, A. F. (2006) *J. Hosp. Infect., 43:* 109-113.
8. Zapka, C., J. Leff, J. Henley, J. Tittl, E. De Nardo, M. Butler, R. Griggs, N. Fierer, and S. Edmonds- Wilson, (2017). *mBio*. *8*(2): e00093-17.