

Efficacy of some medicated soaps and hand washes available in market

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Abstract

Background: Handwashing is underlined as the absolute most significant measure to forestall cross-transmission of small-scale life forms and consequently to forestall nosocomial contaminations. Be that as it may, under routine emergency clinic practice consistent with this measure is still unsatisfactorily low, under half in many investigations distributed in the previous 20 years. This consistent finding is stressing because ongoing investigations have demonstrated that this degree of consistency won't decrease the danger of transmission of multi- medicate safe microscopic organisms in the emergency clinics.

Results: In the present investigation effect of marketed hand washed namely Lifebuoy, Dettol and Savlon were tested on bacteria *E. coli*, *S.aureus*, *S.pyogen*, *Klebshiella* and, fungi *Candida albicans*. All the handwash at concentrated level found to be effective but only Dettol hand wash could give inhibitory action at 25ug/ml against *Klebshiella* while others at 50ug/ml.

Conclusions: Soapex and Dettol soap had broad spectrum activity as it inhibited the growth of Gram positive (*Streptococcus pyogen*) and Gram-negative (*Escherichia coli*). Liquid handwash such as Lifebuoy, Dettol and Savlon showed broad spectrum activity on both Gram-positive and Gram negative test microorganisms.

Keywords: Hand wash; Antimicrobial activity; Nosocomial; Infection; Soaps

1. Introduction

The antimicrobial activity of any substance is described as its ability to kill bacteria or inhibit the growth of bacteria. Antimicrobial activity is important when considering the human body in regards to preventing diseases and skin infections [1]. Soaps and other cleansing agents have been around for quite a long time. For the generations, hand washing with soap and water has been considered a measure of personal hygiene. Bacteria are very diverse and present in the soil, water, sewage and human body and are of great importance about health [2].

Chemicals accept a huge occupation in ousting and wiping out minuscule creatures. Despite the way that fats and oils are a general component of chemicals yet a couple of cleaning agents are added to redesign the antibacterial activities of chemicals. Antibacterial chemicals can remove 65 to 85% of the tiny life forms from human skin [3]. Minuscule creatures are varying and present any place, for instance, in the soil, water, sewage, standing water and even in the human body. Minute creatures' that attack on the human body are basic concerning prosperity [4]. Transient infinitesimal creatures are put away on the skin surface from environmental sources and cause skin defilements. Cases of such microorganisms are *Pseudomonas aeruginosa* [5] and *Staphylococcus aureus* [6] [7]. The criticalness of hand washing is more earnest when it is identified with human administration workers because of possible cross spoiling of

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minute life forms that may be pathogenic or spearheading chemical [8][9]. Hands perform various functions of the physical body and are receptive the spread of drugs that appreciate dust, different body fluids, raw and contaminated materials from the environment and, during personal hygiene. Hands that are apparently soiled or potentially tainted with muck or organic material must be washed with liquid soap and water [10]. Studies have shown that Gram-positive bacteria. The most resistant bacteria were killed at low concentration of soaps than Gram negative. Savlon hand wash is more effective as compared to other hand washes.

2. Material and methods

2.1. Soaps and Liquid Hand washes used

Soaps: -Dettol, Hamam, Medimix, Lifebuoy, Spa & U, Savlon, Soapex, Margo, Glyvera, and Alpha Liquid hand washes - Dettol, Lifebuoy and Savlon.

2.2. Inoculation of the test Organisms

Using sterile loop, 24-hour old culture of each of the test organisms was collected. The loops full of different bacterial culture were swirled into different test tubes containing 10ml of sterile saline water. The content of each of the test tubes was properly homogenized before the inoculation. Sterile swab sticks were dipped into each of the bacterial solution and were used to inoculate on the solidified Muller and Hinton agar plates ensuring that the plates were completely covered for uniform growth.

2.3. Preparation of Soap sample and Liquid hand wash sample

A sterile blade was used to scrap 1gram each of the soaps and which quantity was dissolved in 9 ml of sterile distilled water. 1ml of different liquid hand wash was dissolved in 9 ml of distilled water. Different concentrations of the various soap samples and liquid hand wash samples in the range of 100µg/ml to 25 µg/ml were prepared using distilled water following serial dilution.

2.4. Antimicrobial Susceptibility Testing

- Disk Agar Diffusion Method

The disk agar diffusion technique was originally delineated and used [11].

2.5. Method for Determining the Phenol Coefficient of the Soaps

- Place in order in a test-tube rack, one test tube of each of the different Lysol and phenol dilutions for each time interval.
- Add 0.5 ml of *S. aureus* to each tube of disinfectant and note the time. Mix each of the tubes to obtain a homogeneous suspension and allow the disinfectant to come into contact with the bacteria.
- Using the aseptic technique, at intervals of 5, 10, and 15 minutes, transfer one loopful from each disinfectant tube into the appropriately labeled nutrient broth tube.
- Incubate all tubes for 48 hours at 35°C.
- The experiment can be repeated with *P. aeruginosa*.

3. Results and discussion

The result obtained in this study of zone diameter of inhibition of soaps on various test microorganisms is presented in Table 1 (diluted) and Table 2 (MIC). The zone diameter of inhibition of liquid handwashes on various test microorganisms is presented in Table 3 (undiluted) and Table 4 (MIC). Graphs are plotted for different soaps and liquid handwashes.

Table 1 Effect of Concentration of soap 1gm of in 1ml distilled water on test organisms

Test Microorganisms	Soaps	Diameter zone of inhibition (mm)
<i>Escherichia coli</i>	Dettol	7
	Lifebuoy	-
	Hamam	-
	Medimix	-
<i>Staphylococcus aureus</i>	Dettol	12
	Lifebuoy	-
	Hamam	-
	Medimix	-
<i>Streptococcus pyogen</i>	Dettol	-
	Lifebuoy	-
	Hamam	-
	Medimix	-
<i>Candida albicans</i>	Dettol	8
	Lifebuoy	-
	Hamam	7
	Medimix	9
<i>Klebsiella pneumoniae</i>	Dettol	7
	Lifebuoy	-
	Hamam	-
	Medimix	-
Test Microorganisms	Soaps	Diameter zone of inhibition(mm)
<i>Escherichia coli</i>	Dettol	7
	Lifebuoy	-
	Hamam	-
	Medimix	-
<i>Staphylococcus aureus</i>	Dettol	12

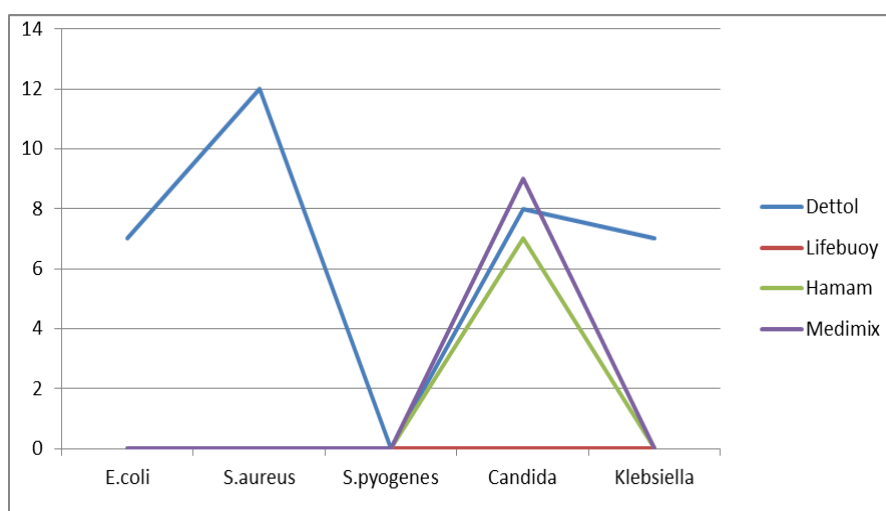
**Figure 1**Antimicrobial activity of different soaps

Table 2 Minimum Inhibitory Concentration (MIC) of soaps

Test Microorganisms	Soaps	Diameter zone of inhibition(mm)			
		100µg/ml	75 µg/ml	50 µg/ml	25 µg/ml
<i>Escherichia coli</i>	Dettol	13	12	-	-
	Savlon	22	12	10	-
	Alpha	13	12	11	11
	Soapex	23	16	20	-
	Margo	11	10	9	4
	Spa & U	-	-	-	-
	Glyvera	-	-	-	-
<i>Staphylococcus aureus</i>	Dettol	15	11	-	-
	Savlon	-	-	-	-
	Alpha	8	-	-	-
	Soapex	-	-	-	-
	Margo	-	-	-	-
	Spa & U	-	-	-	-
	Glyvera	7	-	-	-
<i>Streptococcus pyogen</i>	Dettol	12	-	-	-
	Savlon	-	-	-	-
	Alpha	11	-	-	-
	Soapex	17	14	13	8
	Margo	-	-	-	-
	Spa & U	-	-	-	-
	Glyvera	-	-	-	-
<i>Candida albicans</i>	Dettol	12	11	-	-
	Savlon	12	10	-	-
	Alpha	-	-	-	-
	Soapex	16	13	12	10
	Margo	-	-	-	-
	Spa & U	-	-	-	-
	Glyvera	-	-	-	-
<i>Klebsiella pneumoniae</i>	Dettol	7	-	-	-
	Savlon	8	-	-	-
	Alpha	-	-	-	-
	Soapex	20	18	12	10
	Margo	9	8	7	7
	Spa & U	-	-	-	-
	Glyvera	-	-	-	-

Table 3 Action of 1ml Undiluted liquid hand washes on test organisms

Test Microorganisms	Liquid Handwash	Diameter zone of inhibition(mm)
<i>Escherichia coli</i>	Lifebuoy	14
	Dettol	20
	Savlon	38
<i>Staphylococcus aureus</i>	Lifebuoy	12
	Dettol	17
	Savlon	24
<i>Streptococcus pyogen</i>	Lifebuoy	11
	Dettol	15
	Savlon	17
<i>Candida albicans</i>	Lifebuoy	8
	Dettol	17
	Savlon	16
<i>Klebsiella pneumoniae</i>	Lifebuoy	17
	Dettol	12
	Savlon	29

Table 4 Minimum Inhibitory concentration (MIC) of Liquid hand wash

Test Microorganisms	Liquid Handwash	Diameter zone of inhibition			
		100µg/mL	75µg/mL	50µg/mL	25µg/mL
<i>Escherichia coli</i>	Lifebuoy	7	-	-	-
	Dettol	7	6	-	-
	Savlon	26	-	-	-
<i>Staphylococcus aureus</i>	Lifebuoy	7	6	-	-
	Dettol	9	7	6	-
	Savlon	14	-	-	-
<i>Streptococcus pyogen</i>	Lifebuoy	-	-	-	-
	Dettol	8	7	-	-
	Savlon	-	-	-	-
<i>Candida albicans</i>	Lifebuoy	-	-	-	-
	Dettol	8	-	-	-
	Savlon	20	18	13	-
<i>Klebsiella pneumoniae</i>	Lifebuoy	-	-	-	-
	Dettol	14	9	7	5
	Savlon	23	21	10	-

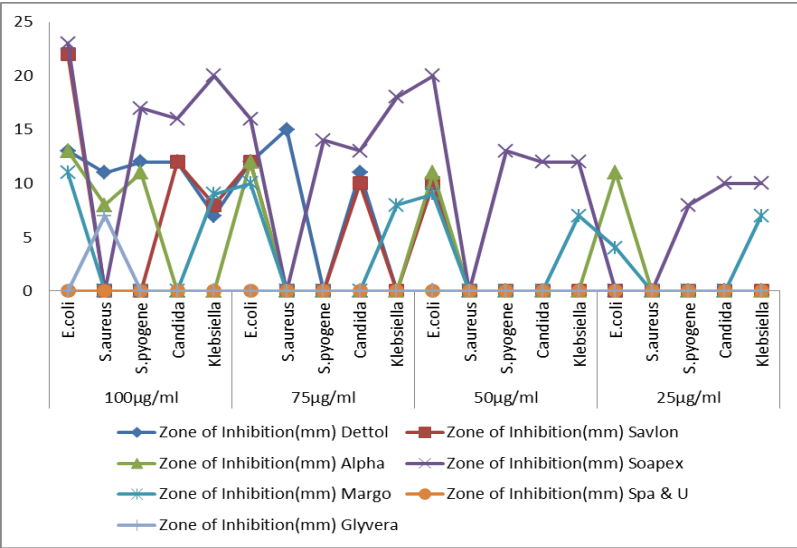


Figure 2 Antimicrobial activity of different soaps (MIC)

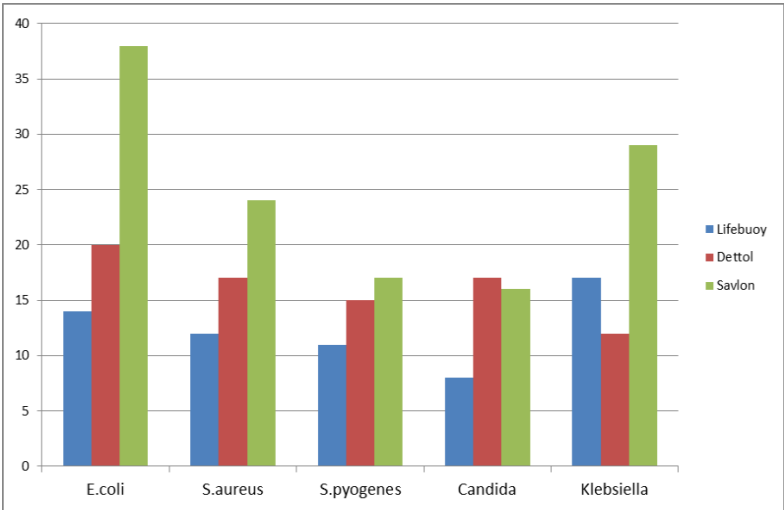


Figure 3Antimicrobial activity of different liquid hand wash

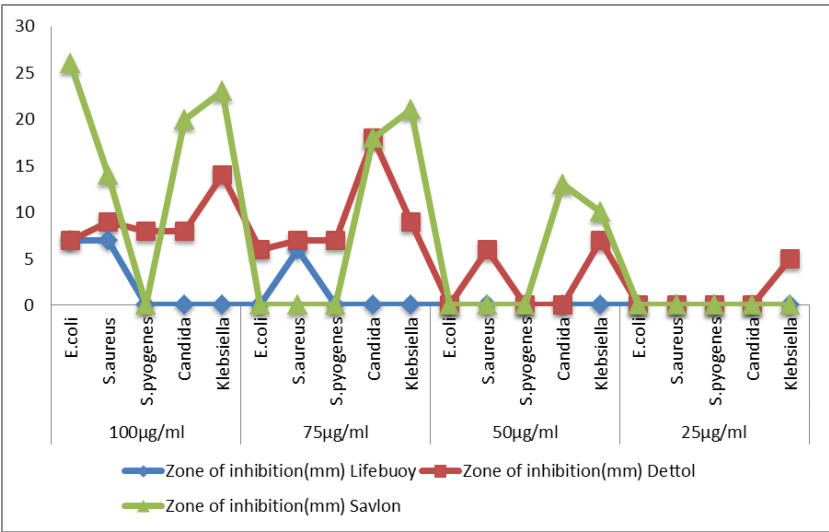


Figure 4Antimicrobial activity of different liquid hand wash (MIC)

3.1. Phenol Coefficient (PC)

3.1.1. Soapex

Table 5 Comparisons of phenol coefficient and Soapex with dilution

Disinfectant	Dilution	Growth in Subculture(min)		
		5	10	15
Phenol	1/180	-	-	+
	1/90		-	+
	1/100	-	-	-
Soapex	1/100	-	+	+
	1/150	+	+	+
	1/200	-	+	+

$$PC=1/100/1/200=200/100=2$$

Thus, Soapex is two times more effective than phenol in killing *S.aureus*.

3.1.2. Dettol

Table 6 Comparisons of phenol coefficient (PC) and Dettol with dilution

Disinfectant	Dilution	Growth in Subculture(min)		
		5	10	15
Phenol	1/180	-	+	+
	1/90	-	+	+
	1/100	-	-	-
Dettol	1/100	+	-	+
	1/150	-	+	-
	1/200	+	-	+

$$PC=1/100/1/200=200/100=2$$

Thus, Dettol is two times more effective than phenol in killing *S. aureus*.

Dettol as persuading against every one of the microbial strains endeavored (Fig.3 Table.4). Soapex was seen as productive against four microbial strains. Then again, Spa and U had no antimicrobial action. The zone of limitation of various synthetics went from 13mm (Dettol) to 23mm (Soapex) on *Escherichia coli*; 11mm (Dettol) to 0mm (Soapex) on *Staphylococcus aureus*; 12mm (Dettol) to 17mm (Soapex) on *Streptococcus pyogenes*; 12mm (Dettol) to 16mm (Soapex) on *Candida albicans* and 7mm (Dettol) to 20mm (Soapex) on *Klebsiella pneumoniae*. Dettol, Savlon and Lifebuoy were seen as persuading against every one of the microbial strains endeavored. The zones of a square of the undiluted model went from 20mm (Dettol) to 38mm (Savlon) on *Escherichia coli*; 17mm (Dettol) to 24mm (Savlon) on *Staphylococcus aureus*; 15mm (Dettol) to 17mm (Savlon) on *Streptococcus pyogenes*; 17mm (Dettol) to 16mm (Savlon) on *Candida albicans* and 12mm (Dettol) to 29mm (Savlon) on *Klebsiella pneumoniae*. In this assessment phenol coefficient secured with Soapex and Dettol was seen as twofold (Table 5 and 6). Accordingly, Soapex and Dettol have on various events more astounding than phenol in executing *S. aureus* (fig.4 and Table.4).

Chemicals are generally utilized for the expulsion of germs and for cleaning reason. Synthetic substances use is common and now consistently particularly antibacterial cleaning specialists are eminent. As shown by affiliation's case their

antibacterial synthetic substances are microorganisms' executioners. So with the utilization of antibacterial synthetics, we can get twofold cutoff points flight comparably as executing of minuscule living creatures [12].

The reports showed that Dettol and Savlon had the most significant antibacterial improvement against the whole test living being [13]. Additionally, the antibacterial impact of Dettol was better against *S. aureus*, *S. typhi* and *E.coli*. [14]. Further, the antibacterial impact of Dettol was better against *S. aureus* and *P. aeruginosa*. [15]. A layer of oil and design of the skin ruin the takeoff of microorganisms by fundamental hand washing. Utilizing a synthetic or gel will help eliminate the oil, and scouring with a brush for 7 to 8 minutes will expand the getting free from both transient (defiled) and inhabitant microorganisms [16]. A great deal of the attempted claimed synthetic compounds have sufficient antibacterial movement [17-24].

4. Conclusion

The outcomes show that various sorts of microorganisms fluctuate in their reaction to various kinds of cleansers and fluid handwashes. Lifebuoy recorded no antimicrobial action on every one of the five microorganisms. In the event of cleansers, Soapex recorded the most noteworthy zone of restraint *Escherichia coli* (23mm). If there should be an occurrence of fluid handwash Savlon recorded the most noteworthy zone of restraint *Escherichia coli* (38mm). Soapex and Dettol cleanser had wide range movement as it hindered the development of Gram- positive (*Streptococcus pyogen*) and Gram-negative (*Escherichia coli*). Fluid handwash, for example, Lifebuoy, Dettol and Savlon showed expansive range action on both Gram-positive and Gram-negative test microorganisms. No zones of the hindrance were recorded with Spa and U cleanser against the test microorganism.

Significance Statement

The purpose of the research is to get information only. According to our research, there is only a comparison among the different types of soaps and hand wash with the help of the experiments performed on different types of microorganisms. And our finding shows the efficacy of different soaps having after dilution with water. Our intention to study should seek to contextualize its findings within the larger body of research. Research must always be of high quality to produce knowledge that is applicable outside of the research setting. Furthermore, the results of our study may have implications for policy and future project implementation.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors state that there is no conflict of Interest among themselves.

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