

# A Comparative Antibacterial Activity of Commercial Soaps and Medicated Soaps against Pathogenic Microorganisms

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## ABSTRACT

The present investigation was carried to prove the antimicrobial activity of soaps. Soaps commonly known as an antiseptic or medicated soaps, it includes commercial as well as antimicrobial soap can remove 65% to 85% of bacteria from human skin. Antiseptic soaps are incorporated with germicidal chemicals in addition to the ordinary soap base to increase their antibacterial activity. These antiseptic substances has the ability to kill germs even after it has been used as residual antiseptic substances remain on the skin. Soaps tested in the present study showed varied levels of activity against the pathogenic organism. The antimicrobial activity of ketoconazole and cetaphil shows high effectiveness against *Candida* and dettol shows high effectiveness on most of bacteria. Margo shows least antimicrobial activity against all the bacterial strains and *Candida albicans*.

**KEYWORDS:** Soaps, Bacteria and Fungi

## INTRODUCTION

Soaps playing an important role in removing or killing of bacteria. Fats and oils are the general ingredients of soaps, but it has some detergents to enhance the antibacterial effect of soaps.

Soaps were used for personal hygiene from many centuries. The effectiveness of soap to clean the dirt, it is based on its detergent properties. However, soaps which contain antiseptic agents in addition to detergents, which are available since the 19<sup>th</sup> century.

Antimicrobial activity is significant with respect to the human body in preventing diseases and skin infections. Soaps have chemical different combination of fats, oils (of animal or vegetable origin) and salt (*Friedman M et al., 1996*).

Soaps commonly known as an antiseptic or medicated soaps, it includes commercial as well as antimicrobial soap can remove 65% to 85% of bacteria from human skin (*Norrbyet al., 1987*). Antiseptic soaps are

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incorporated with germicidal chemicals in addition to the ordinary soap base to increase their antibacterial activity. These antiseptic substances has the ability to kill germs even after it has been used as residual antiseptic substances remain on the skin.

*Staphylococcus aureus* an opportunistic pathogen affecting both immunocompetent and immunocompromised individuals frequently resulting in high morbidity and complications which constitutes problems to health (*Ikegbunamet al., 2013*).

Nowadays, disinfection, decontamination, antiseptics/sanitization, and sterilization just naming a few, there are terms that describe processes of cleaning by either using soaps/detergents or other cleaning agents (*Hunt et al., 1999*). Numerous cleaning agents are commercially available in the market, which are presented in various forms with distinct formulations. Triclosan, trichlorocarbamide

and p-chloro-m-xyleneol (PCMX/chloroxylenol\_) are the commonly used antibacterial substances in medicated soaps. There are generally used as preservative level unless the product is clearly marked as antibacterial, antiseptic, or germicidal.

Scrubbing body and hand wash with soaps, is the first line of the defense mechanism against bacteria and others pathogens that can commonly cause colds, flu, skin infections and even deadly communicable diseases. The aim of the study was to compare the possibilities for the determination of antimicrobial activity of commercially available soaps.

## **MATERIALS AND METHODOLOGY**

### **SAMPLE (SOAP COLLECTION)**

The commercial and medicated soaps were collected as sample from various standardized pharmacy and reputed supermarkets of Thirukkivilur, Villupuram District. The batch numbers and expiry date noted with the presence or absence of the manufacture seals.

### **LIST OF SOAPS USED:**

Ketoconazole, Cetaphil, Hamam, Medimex, Cinthol, Margo, Dettol.

### **COLLECTION OF SAMPLE:**

Skin samples were randomly collected from both male and female Arunai Medical hospital, Thiruvannamalai using sterile swab and placed in sterile peptone water for each collected sample. The samples were collected from different body parts.

### **CONTROL:**

Acetic acid were used as positive control DMSO used as the negative control for well diffusion technique, while streptomycin was used as positive control and distilled water as negative control.

### **PREPARATION OF SOAP AND SOAP DILUTION:**

A sterile blade was used to scrap the soaps into small pieces. 1g of each soap sample were dissolved in 9ml of sterile distilled water in such a way that no foam is produced to form a stock solution. These stock solutions were stored in refrigerator in well-sealed containers for further use.

### **ISOLATION AND IDENTIFICATION OF TEST MICROORGANISM:**

The sample were collected in swab sticks were already inoculated on both nutrient broth, nutrient agar and SDA and labelled finally it incubated. Biochemical characterization, identification of organisms were carried out using the Bergey's manual of determination bacteriology 9<sup>th</sup> edition (1994)

The bacteria isolated were characterized by colonial character, cellular morphology and biochemical characters, Identification determined by Grams staining, motility test, coagulase test, colony character cell morphology, biochemical test.

The Lactophenol cotton blue staining and Germ tube test were for *Candida albicans* identification and colony characters were carried.

### **STRAIN MAINTENANCE:**

All the strains were grown on nutrient agar plates at 37°C for 48 hours. Stains were stored at -70%.

### **ASSAY OF ANTIMICROBIAL ACTIVITY:**

Overnight cultures were kept ready for antimicrobial activity. Assay of the antimicrobial activity of soaps were done by disc diffusion method. Agar well diffusion method, minimal inhibitory concentration and minimum bactericidal concentration.

### **DISC DIFFUSION METHOD:**

MHA Plates prepared and swabbed (bacteria and fungal strain). Then sterile filter paper discs prepared from different concentrations, of various soap samples aseptically transferred into the plates with sterile forceps. The plates were incubated at 37°C for 24 hours and then examined for zone of inhibition. It determined by measuring the diameter in millimeter of zone to which the soap inhibited the growth of organism.

### **AGAR WELL DIFFUSION METHOD:**

Muller Hinton Agar Petri plates were swabbed with bacterial and fungal strains. Agar plates was punched with sterile cork borer of 4mm size and 100µl of each sample was poured with micropipette in well of MHA. The plates were allowed to stand by for 30 minutes. The plates were incubated at 37°C for 24 hours and then examined for zone of inhibition around the well. The zone of inhibition was determined by measuring the diameter in millimeters of zone to which the soap inhibited the growth of organism.

### **RESULT AND DISCUSSION:**

Soaps are employed mainly for washing or bathing with the aim of removing dirt and microbes of skin surface. The choice of soap varies from person to person but it should not affect the skin's sensitivity and that soap should be effective on disease causing microbes present on skin.

The antimicrobial activity of different soaps commercially available in market for daily use were used against *Staphylococcus*, *E. Coli*, *Pseudomonas*, *Candida albicans*.

The present study of medicated and commercial soap was found to be effective against, the gram positive

organisms with 9.3mm to 18.2mm respectively in disc diffusion method, while 11.7 to 17.1 in agar well diffusion method.

Gram negative organisms with 10.8mm to 19.7mm respectively in disc diffusion method, while 10.8 to 22.5mm respectively in agar well diffusion method.

#### TABLE CLEARLY INDICATES THE ZONE OF INHIBITION VALUES OF SOAP SAMPLES:

Org/Stock	Agar Well Diffusion 50mg/ml (100µl Each)						Disc Diffusion 50 mg/ml (100µl Each)							
	K	C	H	M	C	M	D	K	C	H	M	C	M	D
<i>E. Coli</i>	12.8	19.1	11.1	12.1	14.5	18.3	22.5	10.8	13	15.1	13.5	14.5	17.1	19.7
<i>Staphylococcus</i>	12	13	11.7	15.1	14.3	16.1	17.1	9.3	10.3	12.5	10.5	13.2	17.3	18.2
<i>Pseudomonas</i>	11.3	12.5	14.8	16.1	17.8	19.2	22.4	10.9	12.4	13.1	15.5	17.1	19.5	16.2
<i>Candida albicans</i>	22.5	23	13.2	12.1	14.3	11.1	20.3	21.1	22.3	19.1	18.2	17.3	12.3	21.4

Ketoconazole, Cetaphil, Hamam, Medimex, Cinthol, Margo, Dettol

#### CONCLUSION:

The soaps are cleaning agents routinely used for cleaning purpose and removing germs soaps and detergents were disrupts the microbial cell membrane and disrupt cell proteins. Soaps tested in the present study showed varied levels of activity against the pathogenic organism. The antimicrobial activity of ketoconazole and cetaphil shows high effectiveness against *Candida* and dettol shows high effectiveness on most of bacteria. Margo shows least antimicrobial activity against all the bacterial strains and *Candida albicans*.

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