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**ANTIBACTERIAL ACTIVITY OF SOME SELECTED MEDICATED SOAP ON
Staphylococcus aureus FROM WOUND INFECTIONS.**

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ABSTRACT

Antibacterial activity of some selected medicated soaps such as Dettol, Tura, Sanitol, Safeguard and Tetmosol was determined on *Staphylococcus aureus* isolated from wound infections. Twenty (20) wound samples were swabbed aseptically from residents of Wukari local government area using sterile swab sticks. It was inoculated and sub-cultured and the test organism which is *Staphylococcus aureus* was isolated. Identification of the isolate was done by standard microbiological techniques. Zones of inhibition were examined and Tura soap had the highest antibacterial activity 20.00mm (100%), followed by Sanitol 15.00mm (75%), Safeguard 14.00mm (70%), Dettol 12.00mm (60%) and Tetmosol 10.00mm (50%) against *Staphylococcus aureus*. Hence medicated soap can be used to prevent skin infection, transmission of skin and wound pathogens. Also, it is recommended that prolonged usage should be discouraged as it kills both the pathogenic microorganisms and the normal flora.

KEYWORDS: Antibacterial, Bacterial, Medicated Soap, Skin, Wound, Wukari

INTRODUCTION

Antibacterial activity is significant with respect to the human body in preventing sepsis and skin infections (Ike, 2016). Soaps are cleaning agents, which may be liquid, solid, semisolid or powders. Soaps are used to remove dirt, including dust, microorganisms, stains and bad smells in order to maintain health, beauty and remove bad odor from the body or inanimate objects, including clothes (Ikegbunam *et al.*, 2013).

Medicated soaps contain additional ingredients, usually for the treatment of skin disorders and have germicidal substances that are added in a specific amount and their percentages are always stated on the soap case or leaflet which contains the information on how to use the soap for various purposes (Ike, 2016). On the other hand, *Staphylococcus aureus* (*S. aureus*) is known to be both a commensal bacterium and a human pathogen. Approximately 30% of the human population is colonized with *Staphylococcus aureus* (Tong *et al.*, 2015). According to Tong *et al.* *Staphylococcus aureus* infections range in severity from mild skin infections to severe necrotizing pneumonia. It is simultaneously the leading cause of bacteremia, infective endocarditis (IE), and can also cause osteoarticular, skin and soft tissue, pleuropulmonary, and device-related infections. These range from superficial skin lesions like folliculitis to deep-seated abscess and various pyogenic infections like endocarditis, osteomyelitis, etc. According to Ikegbunam *et al.* (2013), *Staphylococcus aureus* is an opportunistic pathogen affecting both immunocompetent and immunocompromised individuals frequently resulting in high morbidity and complications which constitutes problems to health. Chaudhari (2016) stated that medicated soap has germicidal substances in addition to ordinary soap base in order to increase their antibacterial activity. It therefore, becomes necessary to investigate the antibacterial activity of

some selected medicated soaps (Sanitol Soap, Tetmosol Soap, Dettol Soap, Tura soap and Safeguard soap) on *Staphylococcus aureus* isolated from wound infection.

MATERIALS AND METHODS

The materials used in this project were petri-dishes, test tubes, inoculating loop, spatula, cotton wool, swab sticks, test tubes, conical flask, glass slides, Gram's reagents, hydrogen peroxide, nutrient agar, MacConkey agar, Blood agar, distilled water and reagents for gram staining and biochemical tests.

Methods

All the glass wares listed above were properly washed and sterilized in the oven at 160⁰C for one hour and stored at the temperature of 4⁰C.

Study area

The study was carried out in Wukari Local Government Area of Taraba State.

Sources of soap sample.

The soap samples for the study were randomly purchased from Wukari market.

Wound swab collection

Twenty (20) wound swabs were obtained randomly from residents of Wukari, Taraba state. The affected area was swabbed with sterile swab-sticks aseptically. The test organisms used in the study were those obtained from wound infections from residents of Wukari Local Government of Taraba State, Nigeria. The test organisms were further identified and the biochemical and morphological characteristics were confirmed (Cheesbrough, 2006). The isolates were sub-cultured into Nutrient agar and were maintained.

Soap preparation

A total of five (5) samples of different brands of commonly used antiseptic soaps designated A, B, C, D, E and a normal beauty soap sample tagged F as control were randomly purchased from drug stores and pharmaceutical shops within Wukari town. The soaps were designated A, B, C, D, E and F as control respectively. The soaps were dissolved in a sterile distilled water to make a stock solution prior to the microbiological assay.

Media and reagent preparation

The media used were obtained in the commercially prepared powdered (dehydrated) form and were prepared according to the manufacturer's instructions. Specified quantity of each powdered media were reconstituted in specified volume of distilled water in a conical flask and mixed properly by shaking. The flask was then stoppered and sterilized by autoclaving at 121⁰C and 15psi for 15 minutes. The autoclaved media were allowed to cool to 45⁰C in a water bath before dispensing into pre-sterilized petri dishes and allowed to solidify.

Bacterial isolation and identification

Following the culture of wound swabs for 24 hours at 37⁰C, distinct bacterial colonies were plated out on freshly prepared nutrient agar plates using the streak plate method of bacterial isolation. Target organism (*S. aureus*) was identified using morphological features of the colonies, and standard biochemical and sugar utilization tests

Sensitivity testing

The agar well diffusion method was adopted. The prepared molten agars were allowed to solidify for 20 minutes, 6mm cup borer was used to bore six (5) holes at definite intervals in the plates, and various concentrations of soap samples were introduced into the bored holes and were labeled. The plates were allowed to stand for at least 30 minutes at room temperature for proper diffusion, after which they were incubated for each of the antiseptic soaps at 37⁰C for 24 hours. After incubation, the resultant diameter of zone of inhibition was measured and recorded.



Table 1: Cultural, microscopic and biochemical characteristics of isolates

S/N	MORPHOLOGY	GRAM STAIN	BIOCHEMICAL TESTS									ISOLATES
			CAT	COA	OXI	CIT	IND	MR	GLU	LACT	SUC	
1	Medium, spherical, yellow, dried and flat.	+ve Cocci	-	-	-	-	-	-	+	+	+	<i>Streptococcus spp</i>
2	Large, spherical, creamy, swampy, dried and raised	+ve Cocci	+	+	-	-	-	+	+	-	+	<i>Staphylococcus aureus</i>
3	Small, spherical, pink, mucoid and raised	-ve Rods	-	-	-	-	+	+	+	+	+	<i>Escherichia coli</i>
4	Large, spherical, pink, mucoid and raised	-ve Rods	-	-	-	-	-	+	+	+	+	<i>Klebsiella spp</i>
5	Large, spherical, pink, moist and raised	-ve Rods	-	-	-	+	-	-	+	+	+	<i>Proteus spp</i>
6	Large, spherical, pink, moist and raised	-ve Rods	-	-	-	+	-	-	+	+	+	<i>Pseudomonas spp</i>

Key: CAT= Catalase, COA= Coagulase, OXI= Oxidase, CIT= Citrate utilization, IND= Indole, MR= Methyl red, GLU= Glucose, LACT= Lactose, SUC= Sucrose, (+ve) =Positive, (-ve) =Negative.

Table 2: Concentration of medicated soap used with various zones of inhibition on *Staphylococcus aureus*

Conc. (g)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
1.0	12.00	10.00	20.00	15.00	14.00
0.75	10.00	9.00	18.00	14.00	13.00
0.50	9.00	7.00	17.00	12.00	10.00
0.25	7.00	6.00	16.00	10.00	8.00
0.1	6.00	6.00	10.00	6.00	6.00

Key: A= Dettol, B= Tetmosol, C= Tura, D= Sanitol, E= Safeguard

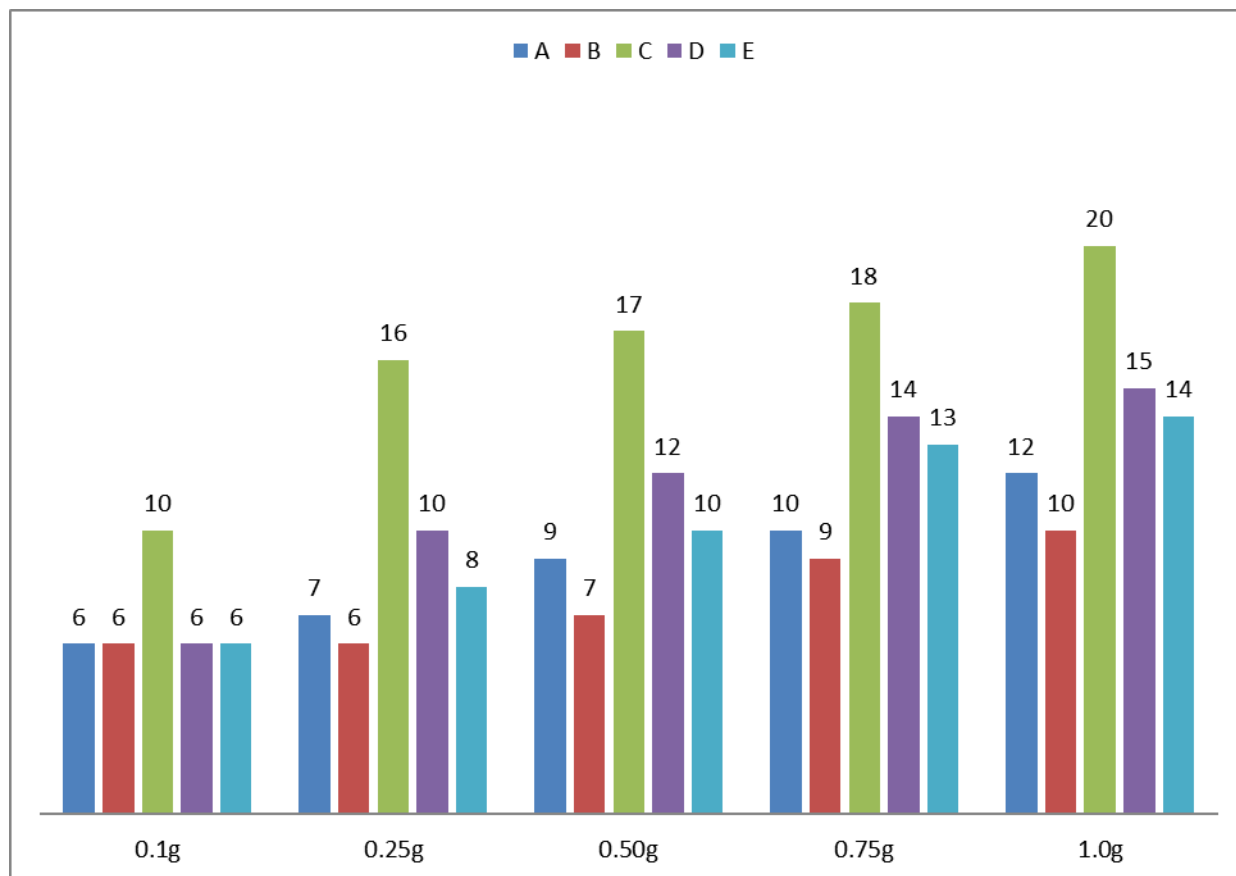


Figure 1. A bar chart comparing the zones of inhibition of each medicated soap

DISCUSSION

Soaps are generally used for cleaning purposes and for removing dust and microbes present on the surface of skin (Chaudhari, 2016). The choice of soap varies from person to person but it should not affect the sensitive skin and it should be effective against disease causing microbes present on skin. Antibacterial activities of all the three soaps against selected bacterial strains were recorded in the form of inhibition zone and measured in millimetre. The inhibition zones values of *Staphylococcus aureus* using these soap brands are shown in table 2 above. As Table 2 clearly indicated, the inhibition zone values of these antibacterial soaps were different from each other. Results show that the antibacterial activities of these soaps (Tura, Dettol, Sanittol, Safeguard and Tetmosol) increased as their concentration was increased. It means more

concentrated solution had strong antibacterial activity. According to the results obtained, Tura soap has the highest zone of inhibition with 20.00mm followed by Sanitol (15.00mm), safeguard (14.00mm), Dettol (12.00mm) and Tetmosol (10.00mm). This showed that higher concentrations of the various medicated soaps used are required to kill the test organism.

As described by Ike (2016), the inhibition of the growth pattern of the isolates indicates the varying abilities of the organism to resist the antimicrobial effect of the soaps. However, these variations could be due to differences in the nature and structures of the bacterial cell wall since it is ultimate target of any antimicrobial agent or disinfectant. The active ingredient in the soap is what distinguishes in the antimicrobial agents (Ike, 2016).

The indicated soaps in this study contain triclocarban and triclosan as active antimicrobial agents and this research is in line with that of Ike (2016). The control for the experiment which is the Beauty soap sample showed no observable inhibition against the test organism. This justifies why beauty soaps are not used as medication in control of pathogens. However, it possesses saponin effects for which reason they are used as regular soap to primarily wash out dirt from body surfaces and leave perfume on the skin (Ike, 2016).

CONCLUSION AND RECOMMENDATION

The present study has shown that medicated soaps can be used to prevent skin infections and transmission of skin and wound pathogens. However, prolonged used of these soaps could lead to development of microbial resistance in future and eradication of skin flora. In this regard, it is recommended that irrational and prolonged usage of antibacterial soaps should be discouraged or obvious reasons.

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