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Studies on Antimicrobial Properties of Soap Manufactured from Natural Ingredients

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Abstract: *In current study, experimental analysis made on the antimicrobial properties of soap prepared by using natural ingredient such as orange peel, cucumber peel and rice flour. The soap of coconut oil with orange peel, cucumber peel and rice flour were prepared and there antimicrobial properties were determined. Overnight cultures were prepared for anti-microbial property determination. The main aim of this study was to identify the antimicrobial activity of antiseptic soaps and herbal soaps. Antiseptics soaps possess active germicidal chemical agent, it kills pathogen but its prolonged use should be avoided. As herbal soaps revealed similar antimicrobial activity like that of antiseptic soaps, they are more effective and considered better in our daily life. The soap is routine requirement of life, but it should have good active ingredients or plant extracted material which has the ability to kill bacteria but not to harm body tissues when used constantly. From obtained result showed a good appearance with orange white and green color and with a pleasant aromatic smell and showed good anti-bacterial properties.*

Keywords: Soap, Peel, Antimicrobial, Ingredients

I. INTRODUCTION

Antimicrobial movement of any substance is defined as its capability to either kill bacteria or prevent the growth of bacteria. Antimicrobial action is important with respect to the human body in stopping diseases and skin infections. Detergents and soaps are the sterilisers required in daily practices for sanitary point. Soaps are cleaning agents, which may be liquid, solid, semisolid or powders. Soaps are used to eliminate dirt, including microorganisms, stains dust, and bad smells in order to maintain health, beauty and eliminate bad odor from the body or non-living objects, including clothes[1,2].

Chemically soaps are the mixture of fats, oils and Salt. Soaps are usually salts of free fatty acid prepared via saponification, where alkaline materials react with fatty acids in fats or oils. Other materials are then supplementary to this salt of free fatty acid or soap base, to produce the diverse types of soaps we have[3,4,5]. They are mostly used as surfactants for washing, bathing and cleaning. Soaps are either non antimicrobial soaps or an antimicrobial soap, also known as an antibacterial or medicinal soap. An antiseptic soap can eliminate 65% to 85% of bacteria from human skin[6,7,8,9].

Antibacterial soaps are incorporated with definite amount of germicidal substances in adding to the normal soap base in order to rise their antiseptic activity. These antiseptic substances inform ability for the soap to destroy germs even after it has been used as residual antibacterial substances remain on the skin[10,11,12]. It is showed experimentally that antiseptic soaps kill the bacteria at a specific concentration; they also have bacteriostatic action and can hinder the growth of bacteria. Herbal soaps are manufactured by adding dried herbs, flowers and stems into soap base[13,14,15]. Herbs are the

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usual products could be found in the treatment of almost all diseases and skin problems owing to their high medicinal value, cost efficiency, availability and compatibility. Hence it can be used in soap base[16,17].

The goal of the current research work is to associate the efficacy of locally available market herbal soaps and antiseptic soaps against skin infecting human pathogenic bacteria such as Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus subtilis and E. coli. It was seen clearly that Gram positive bacteria were killed at low concentration of soaps than Gram negative bacteria. This study suggests that selection of soaps and cleaning products depends on their effectiveness in killing commonly encountered pathogenic microbes in day to day activities. Selection of soaps should depend on the present environment of the person and soaps having natural ingredients are better for constant long use.

Through this study, we explore the soap-making process, the role of each ingredient, and the overall effectiveness of the final product, highlighting its advantages over commercial alternatives.

II. MATERIALS AND METHDOLOGY

2.1 Soap Preparation

1. 5 gm of NaOH was dissolved in 10 ml of distilled water.
2. Cool above mixture at room temperature
3. Heat the 5 ml oil in water bath
4. Add sodium hydroxide with constant stirring.
5. Add natural ingredients to it.
6. Cool the resultant mixture.

   Antimicrobial properties of some can be determind

2.2 Preparation and dilution of soap samples extract

1. With the help of sterile sharp knife soaps were scraped atone side.
2. 250 mg and 500mg of each soap sample was weighed and dissolved in 1mlof sterile distilled water separately and used for the preparation of discs.

2.3 Preparation of Sterile Disc

1. Filter paper discs were prepared from Whatman's No.3 filter paper.
2. Discs of 6mm size were prepared in Petri plate and sterilize in an autoclave at 121℃ for 15 minutes.
3. Each sterile disc was incorporated individually with 250 mg and 500 mg of soap solution.
4. Paper discs soaked in the soap solution were allowed to stand for a period of one hour to ensure full saturation of the soap preparations.
5. The discs were then aseptically removed from soap solution and allowed to dry in an oven at 25°C.

2.4 Isolation of microorganisms

1. Bacterial cultures used for the present study includes Staphylococcus aureus, Bacillus subtilis, E. coli and Pseudomonas aeruginosa were isolated in laboratory.
2. Sterile moistened cotton swab sticks were used to collect skin swabs samples from the hands, necks and faces of the students from the Department who were exposes to heavy dust during their bus up-down.
3. The samples collected with swab sticks were then used to inoculate already prepared nutrient and LB agar plates.
4. The cultured plates were then incubated at 37°C for 48 hours.
5. Biochemical characterization and identification of the test pathogen was also carried out using the Bergey's Manual of Systematic Bacteriology.

2.5 Assay of Antimicrobial Activity

Overnight cultures were kept ready for anti-microbial activity.

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Discs diffusion assay

1. Agar disc diffusion method was used to detect antimicrobial assay.
2. The standardized 0.1 ml saline suspension of test organisms were inoculated on the surface of sterile Mueller-Hinton agar plates.
3. Sterile filter paper discs prepared from different concentrations of the various soap samples were aseptically transferred directly into the surface of plates with the help of a sterile forceps.
4. All plates were incubated at 370C for 24-48 hours and then were examined for zone of inhibition around the disk.
5. The zone of inhibition was determined by measuring the diameter in millimetres of zone to which the soap inhibited the growth of the organism.

III. RESULT AND DISCUSSION

3.1 Antimicrobial Test for Herbal Soaps

The results obtained from the studies were shown photographically as well as in table 4.8. The zone of inhibition for various soaps were calculated. The zone of inhibition is different for different soaps. A significant result was obtained for Pseudomonas aeruginosa, Staphylococcus aureus and Escherichia coli, is due to the synergistic effect produced by the incorporation of alcohol, which showed significant zone of inhibition and acts effectively against bacteria on the skin and can be used to treat acne and bacterial infections on the skin. Few soaps formulation was found to be the best formulation due to good quality of the soap with a neutral pH, safe to use on the skin without any irritation to the skin and also it forms good lather and retains well on the skin. The prepared Soap had minimal matter insoluble in alcohol and the soap prepared was pure with minimal moisture content and with increased shelve life. The soaps has high amounts of fatty acid (stearic acid) which imparts lubrication effect to the skin while washing, which was the basic criterion of good quality soap.

IV. CONCLUSION

The soap showed a good appearance with orange white and green color and with a pleasant aromatic smell and showed good anti-bacterial properties. Based on the study it can be concluded that herbal products can be effectively formulated in the form of medicated soaps by using laboratory technique with excellent anti-bacterial properties.

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