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ANALYSIS OF THE ANTIBACTERIAL ACTIVITY OF AFRICAN BLACK SOAP ON SOME SELECTED PATHOGENS

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ABSTRACT

Analysis of antibacterial activity of African Black Soap on Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa was carried out using different concentrations of African Black Soap (0.05g/ml, 0.01g/ml, 0.15g/ml, and 0.20g/ml). The ditch plate method was used to obtain the zone of inhibition at different concentrations of African Black Soap on the test organisms. The highest zone of inhibition obtained was against 0.02g/ml concentration with the zone of inhibition 16mm on Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa. This result shows that African Black Soap exhibited antibacterial activities against Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa. And 0.15g/ml concentration was found to be the most sensitive on the Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa. Therefore, indigenous companies can improve its quality of the soap comparable to conventional antiseptic soap.

INTRODUCTION

As soap making is part of western world, African is not entirely left out. In African, traditional soap (black soap) is known with different names from various regions of the continent. For instance, in the western part of African, black soap is known as Anago soap or Alata simena in Ghana, and in Nigeria, it is known by the hausa as Sabilum-salo, the Yoruba as Ose-dudu and in Igbo as Ncha-Nkota. Traditional medicine can be described as total combination of knowledge, practice and belief incorporating plant , animals and minerals based medicine whether explicable or not, used in diagnosing, preventing or eliminating a physical, mental or social diseases and which may rely exclusively on past experience handed down from generation to generation either verbally or in writing (David, 2005 and sofowora, 1982).

The traditional African Black soap which has in combination, water, roasted plantain skin or cocoa pod, palm oil, palm kernel oil, or Shea butter, when put together, are collectively referred to as "black soap". African Black soap or black soap is a natural source of vitamin A and E, and iron (Grieve, 1997). Depending on where it is manufactured, black soap contains leaves and bark from plantains, Shea tree bark, cocoa pods or palm tree leaves. The leaves and bark are sun dried and then slow-roasted in a kettle or pot, then various oils, including coconut oil, Shea butter and palm kernel oil are stirred into the mixture. The soap is then allowed to cure for at least two weeks before it is ready for use (Bella, 2008). Black soap made with Shea butter offers protection against UV rays while black soap made with plantains contains a high concentration of iron along with vitamins A and E (Treehugger, 2008).

African Black soap has numerous benefits and importance. Black soap enjoys a reputation for improving or eliminating uneven skin tone, razor bumps caused by ingrown hairs and skin rashes. It is not scented and can be used by anyone who wishes to improve the quality of his/her skin. It is excellent for clearing up oily skin, acne price for its antiseptics properties. African people also use black soap to prevent the skin from rashes, ring worm, measles, and eczema and body odor. It is used as a natural shampoo to avoid dry itchy scalp. Black soap is used in the treatment of many infectious diseases caused by micro-organisms. Black soap is highly thought of; it is used in African for spiritual purification. (Karen, 2004 and Jones, 2001).

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OBJECTIVE: This research is sought to determine the susceptibility of African Black soap against some selected pathogens i.e. *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa.*

METHODOLOGY

SAMPLE COLLECTION

Samples of African black soap (made from plantain skin) were obtained from a herbal doctor at Birnin Kebbi central market. Ten milliliter (10ml) of distilled water was pipette into five (5) different test tubes. African black soap was weighed and put into the 10ml of the distilled water in test tube i.e. 0.05g of African black soap was put into the first test tube. 0.10g, 0.15g and 0.20g of the soap was also put in the 2^{nd}, 3^{rd}, 4^{th} and 5^{th} test tube to obtain various concentration of 0.05g/ml, 0.10g/ml, 0.15g/ml and 0.20g/ml respectively. The test tubes were shaken for the soap to dissolve.

MEDIA PREPARATION

The media use in this research was prepared according to the manufacturer's instruction. The nutrients used were nutrient agar and peptone water.

ISOLATION OF BATERIA

Pure culture of *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* were obtained by culturing the human skin in nutrient Agar. A portion of the pure culture of the test organisms was picked and streaked on the surface of the medium until the surface was covered. The Petri dishes were incubated at 37^{o}C for 24 hours.

DETERMINATION OF MORPHORLOGICAL CHARATERISTICS

A smear was prepared by placing a normal saline on a clean sterile glass slide; a sterilized wire loop was used to pick the colony for emulsification on the slide. The smear was heat fixed by passing through a flame three times.

The smear was covered with crystal violet to stain the bacteria and allowed to stand for one minute. It was washed with distilled water without blotting. This was followed by covering the logul's iodine solution and allowed to stand for one minute. It was washed with distilled water; it was then flushed with acetone alcohol to decolorize it for three seconds and washed immediately to prevent excessive decolourization. It was then flooded with safranin (counter stain) and left for one minute after which it was washed with distilled water and allowed to dry. The dried slides were viewed under the microscope using oil immersion objective (x100).

BIOCHEMICAL TEST

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The following biochemical test were carried out; catalase, coagulase, and oxidase test using standard procedures described in Barrow and Felthham, (1993), chessbrough, (2000).

PREPARATION OF TEST MEDIUM

The test medium (nutrient agar) was prepared using standard procedure described in Barrow and Felthham, (1993). A sterile syringe was obtained and cut from the edges using a sterile razor blade, the syringe was then used to dig a "well" (ditches) of 50 x 20mm on well-drained nutrient agar plates and various concentrations of the African black soap (i.e. 0.05g/ml, 0.10g/ml, 0.15g/ml and 0.20g/ml) were used to fill the "wells" and plain agar were used to seal the ditches, after inoculating the test bacteria on each of the plates and they were incubated at 37°C for 24 hours.

RESULT AND DISCUSSION

The results of this research work are presented on tables.

Table1: The mean zone of inhibition (mm) obtained using different concentration of African black soap against *Staphylococcus aureus*.

CONCENTRATION g/ml	TYPES OF SAMPLE OF INHIBITION (MM)				
	1ST	2ND	3RD	4TH	5TH
0.05	18.00	18.00	19.00	18.00	19.00
0.10	20.00	19.00	22.00	21.00	20.00
0.15	21.00	20.00	23.00	22.00	21.00
0.20	18.00	16.00	18.00	16.00	18.00

Table2: The mean zone of inhibition (mm) obtained using different concentration of African black soap against *Escherichia coli*.

CONCENTRATION g/ml	TYPES OF SAMPLE OF INHIBITION (MM)				
	1ST	2ND	3RD	4TH	5TH
0.05	18.00	18.00	18.00	18.00	19.00
0.10	21.00	21.00	20.00	19.00	19.00
0.15	22.00	22.00	22.00	21.00	20.00

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0.20	18.00	16.00	18.00	16.00	16.00

Table3: The mean zone of inhibition (mm) obtained using different concentration of African black soap against *Pseudomonas aeruginosa*.

CONCENTRATION g/ml	TYPES OF SAMPLE OF INHIBITION (MM)				
	1ST	2ND	3RD	4TH	5TH
0.05	18.00	19.00	18.00	19.00	19.00
0.10	20.00	19.00	19.00	19.00	18.00
0.15	20.00	20.00	21.00	22.00	21.00
0.20	17.00	18.00	18.00	17.00	17.00

KEY:

Mm = millimeter

G/ml = gram per millimeter

1st = first sample of African black soap

2nd = second sample of African black soap

3rd = third sample of African black soap

4th = fourth sample of African black soap

5th = fifth sample of African black soap

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DISCUSSION:

The research conducted reveals the effect of African black soap on *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. The soap was found to have antibacterial properties against the test organisms. *E. aereus*, *E. coli* and *P. aeruginosa*, the highest zones of inhibition for the three organisms obtained against the concentration 0.15g/ml, were 23mm, 23mm and 22mm respectively. While the lowest zone of inhibition obtained for the three organisms respectively against 0.20g/ml concentration were 16mm and 17mm for *Staphylococcus aureus*, *Escherichia coli* and *pseudomonas aeruginosa* respectively.

The zone of inhibition obtained also varies at different concentration used. For *Staphylococcus aureus*, the zone of inhibition obtained against 0.15, 0.10, 0.05 and 0.20 (g/ml) concentration were; 23, 22, 19 and 16 (mm), respectively. *Escherichia coli* at 0.15, 0.10, 0.05 and 0.20 (g/ml) concentrations were 23, 21, 19, and 16 (mm), respectively. While on *Pseudomonas aeroginosa*, the zones of inhibition obtained against 0.15, 0.10, 0.05 and 0.20 (g/ml) concentration were; 22, 20, 19 and 17 (mm) respectively.

The effect of African black soap on some selected pathogens (*Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*), is in line with the work of Popoola (2005) where the protective effect of Azadirachata indica used for dental ailments was amalgamated with tooth paste against pathogens and their effect over allopathic medicine on the human plaque cultures and bacteria present in the mouth.

In conclusion, this research work shows that African black soap exhibit antibacterial activity against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. 0.15g/ml concentration of African black soap was found to be active on the test organisms.

RECOMMENDATION

The response of the test organisms, *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*, has provided clues that African black soap has antibacterial activity. This therefore justifies the use of African black soap for other antibacterial purposes. Because of the properties of African black soap, government should improve on its quality and acceptability and encourage large scale production of the soap because this will in help create job opportunities for youths and reduce poverty and improve the standard of living. This is possible if experts are brought in to upgrade the ingredients. It is also advisable to use Africa black soap with the right proportion of ingredient in other to derive maximum utility.

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