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PRODUCTION OF MEDICATED SOAP FROM *BUTYROSPERMUM PARADOXUM* PLANT

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ABSTRACT

The potential of Butyrospermum paradoxum plant in the production of medicated soap was investigated. The oily extract from Butyrospermum paradoxum plant was extracted using soxhlet extraction method. The soap produced gave a pH of 7.9, foam height (14.2 cm), alcohol insoluble (8.0%), moisture content (19.33%), total fatty matter (84%), and free acidity of 0.41. The antifulgal activity of Butyrospermum paradoxum soap and the Butyrospermum paradoxum plant extract on *Trichophyton rubrum* shows a very good sensitivity of 54.6 mm and 28.6 mm respectively. From the analysis of the Butyrospermum paradoxum soap produced, it can be concluded that a highly effective medicated soap can be produced from Butyrospermum paradoxum plant.
Keyword: medicated soap, Trichophyton rubrum, extract, Skin diseases, and saponification

INTRODUCTION

In our daily life we use different forms of soap. We can't imagine a single day without the use of soap. It is an essential part of cleanliness in our civilized society. Soap is an important surface-active agent and it is chemically the alkaline metal salt of long-chain fatty acids. The most common used fat or oils for production of soap through saponification reactions are animal tallow, coconut oil, palm oil, kernel oil and linseed oil. (Kubmarawa, 2000). Similarly potassium and sodium hydroxides are widely used as the caustic alkaline for the purpose. (Eromosele, 1997). The demands for these materials for various other domestic and industrial applications are high resulting in high costs. Consequently, there is a need to explore unconventional sources of oils and caustic alkaline for the production of soap and to study the properties of the soap, and be sure they are within specifications of known standards. Several workers reported the use of caustic alkaline and oils for soap production. (kuye, 1990). Local materials from plants are presently used as source of raw materials for traditional soap making (Adebowale, 1985 and Taiwo, 2000). Soap is an anionic surfactant used in conjunction with water for washing and cleaning, which historically comes either in solid bars or in the form of a viscous liquid. The sodium and potassium salt of higher fatty acids, such as oleic, stearic, lauric, and palmitic acids are called soaps. Sodium salts are called hard soaps and Potassium salts are called soft soap (Sharma, 2006).

Soap can be produced either by the traditional or modern methods. The traditional method utilized animal or vegetable oil with agro waste ash as alkaline source. The modern method is a reaction of vegetable oil with sodium hydroxide (caustic soda), which is derived from chemical process (Kick-Othmer, 1983). Soaps are useful for cleaning because soap molecules have both a hydrophilic end, which dissolves in water, as well as a hydrophobic end, which is able to dissolve non-polar grease molecules. Although grease will normally adhere to skin or

clothing, the soap molecules can form micelles which surround the grease particles and allow them to be dissolved in water. Applied to a solid surface, soapy water effectively holds particles in colloidal suspension so it can be rinsed off with clean water. The hydrophobic portion (made up of a long hydrocarbon chain) dissolves dirt and oils, while the ionic end dissolves in water. Therefore, it allows water to remove normally-insoluble matter by emulsification. The cleansing action of soap depends on its physical properties as well as on it chemical properties. There are several factors, such as adsorption, surface tension, electrostatics forces of the polar soap molecules, its wetting action, emulsifying power, etc. which are of great importance in deciding the cleansing action of soap. Soap lowers the surface tension of water and this property of soap is very important in its cleansing power.. Soap wets the surface of a fabric due to the decrease in surface tension of water. Soap solutions also have another important property of emulsifying oils and fats. Hence they emulsify grease, oil, etc. that hold the dirt particles (Sharma, 2006). Some common examples of soap and their uses include:

i. Hard Soap: these are soap prepared from fats or oil using sodium hydroxide. They contain free alkali and are used for washing purposes.
ii. Soft Soap: they are soaps prepared from good oils using potassium hydroxide, they do not contain free alkali and give more lather. They are used as toilet soaps, in shaving, shaving creams and shampoos.
iii. Transparent Soap: these are prepared by dissolving toilet soap in alcohol and evaporating the filtrate. They contain glycerol.
iv. Medicated Soap: these are toilet soaps containing some other substances of medicated importance e.g. carbolic soap, neem soap, mercury soap, etc.
v. Metallic Soap: these are soaps of metals other than sodium and potassium. They are not use as cleansing agents, but are used for other purposes, e.g. calcium and magnesium soaps are used as lubricants and driers, aluminum and chromium soaps are used in sizing paper, zinc, iron, cobalt, nickel soaps used as water proofing leather and canvas, lead soaps for preparing adhesive. (Tewari et al, 1998).

Although many factors determine which of us are going to have skin problems and when, one factor stands out as common to most skin problems: almost everyone who has a skin problem has skin cell that have lost some of their capacity for retaining moisture. This lack of capacity for moisture retention is at the root of most skin problems. As a result of higher demand of soap, especially medicated soap (known for its high emolliency and moisturization capacity) derive from natural plant and animal, and the high cost of the available once produce from costly synthesis raw materials, has made this research work to explore the use of *Butyrospermum paradoxum* (which is the source of shea butter) a very cheap and available plant mostly found in West Africa. It is expected that when this plant extract is incorporated into soap manufacture can produce a soap of very good quality, mild enough for the skin at maximum recovery efficiency and minimum production cost, this is due to its medicinal, moisturizing and soothing properties. The aim of this research work is to produce

medicated soap from *Butyrospermum paradoxum* plant and ascertain it action on microorganism that causes skin diseases.

MATERIALS AND METHODS

Sample Collection and Preparation

The barks of *Buytrospermum paradoxum* plant were collected from Gerei, Adamawa state, Nigeria. The *Buytrospermum paradoxum* barks were ground into paste. The paste was placed in a soxhlet extractor. It was extracted with a mixture of ethanol and water in the ratio of 1:1 for about three hours. At the end of extraction, the solvent was distilled off, cooled and the oily product obtained was kept in a clean container which was used for the production of the soap.

PREPARATION OF SOAP

The boiling process was used during the soap preparation. 40ml of the oil mixture (Palm Kernel Coconut oil) was place in the 500cm^3 beaker and 20cm^3 of the *Butyrospermum paraduxum* oily extract was added. 4g of Sodium hydroxide (NaOH) in 20cm^3 of water was added to the mixture of oils and extract in the beaker. The mixture was heated for an hour in a water bath, maintaining the temperature in the range of 80 - 90^{0}C with frequent stirring at a time intervals. Little distilled was water was added occasionally to prevent the content of the flask from becoming solid due to evaporation of water and alcohol during heating. After the one hour of heating, 100cm^3 of a saturated solution of sodium chloride was added to the hot mixture and let to cool. The addition of the salt solution throws the soap out of solution ("salting out"). The soap float on the surface of the solution; it was filtered and place in the mould to dry

Determination of Some Physicochemical Characteristics

Standard analyses are carried out on the soap. (Longman, 1976 and Nigeria International Standard, 1972). The following tests were carried out on the soap produced.

i. pH
ii. Moisture Content
iii. Total Fatty Matter
iv. Free Alkalinity/Acidity
v. Foam Height
vi. Alcohol insolubility
vii. Microbial Effect.

pH Determination

The pH meter was calibrated using buffer solution of pH between 4.0 and 7.0, thereafter it was dipped directly into the sample while the reading was taken immediately.

Determination of Moisture Content

10g of the sample was weighed and reweighed after open heating for about 30minutes. The difference in weight gives the moisture content which is expressed in percentage.

Determination of Total Fatty Matter

5g of the sample was weighed into a beaker; 10ml of distilled water was added heated to dissolve, while 20ml of 2M H_2SO_4 was added to liberate fatty matter. It was cooked in a beaker and decanted leaving behind the fatty matter (extract) in the beaker. The extract was washed with distilled water till it is neutral to litmus paper. It was then dissolved in 70ml hot neutral alcohol and titrated with 1M NaOH using phenolphthalein indicator. Total fatty matter (TFM) was then determined as FMV/W where F is the factor of the oil blended, M is the molarity of the base, V is the volume of the base used (titer value) and W is the weight of the sample.

Determination of Free Acid Content

6g of the soap sample was dissolved in 70ml hot neutral alcohol and titrated against 2M H_2SO_4 using phenolphthalein indicator. The free alkali/acidity was calculated as 3.1.MV/W

Foam Height

2g of the sample was dissolved in a one liter volumetric flask and made to mark with tap water, 50ml of the solution was introduce into a measuring cylinder such that it followed the walls of the column to avoid foaming. 200ml of the solution was taken in a conical flask and poured into a funnel, which was already clamped with the outlet closed. The measuring cylinder was then put directly beneath the funnel while the level (height) of the foam generated was read from the cylinder immediately the funnel outlet was opened.

Alcohol Insoluble

5g of soap sample was dissolved in 50ml hot alcohol and quantitatively transferred unto already weighed filter paper; the residue was dried in oven at 105^0C for 30minutes, cooled in a dessicator and weighed again.

Antifulgal Sensitivity

0.1g/ml solution of the medicated soap produced was prepared together with the crude plant extract. Various dilutions (10^1, 10^2, 10^3, and 10^4) were also prepared for both the soap solution and the crude plant extract. The Saboraud Dextrose Agar (S.D.A) media was also prepared for 10 plates. About 20ml of the S.D.A was poured in each of the plates. The content in the plates were allowed to solidify after which, the fungi was placed in the plate (Pour plate method). Hole was made using 10mm diameter cork borer inside which the soap solutions and plant extract prepared were poured. The diameter of the inhibition zone was measured using millimeter ruler. The lager the diameter the more effective is the soap.

RESULTS AND DISCUSSION

Table 1: Some Physicochemical Characteristics of *Butyrospermum* paradoxum soap.

Parameter Determined	Butyrospermum paradoxum Soap
P^H	7.9
Foam Height (cm)	14.2
Alcohol Insoluble %	8.0
Moisture Content %	19.3
TFM %	84.0
Free Acidity %	0.41

Table 2: Antimicrobial Effect of *Butyrospermum paradoxum* Extract on *Trychophyton Ruburum*

	Diameter of Zone of Inhibition (mm)				
	Crude Extract	Dilutions			
		10^1	10^2	10^3	10^4
1	29 (S)	19 (S)	17 (S)	16 (S)	6 (RS)
2	28 (S)	20 (S)	19 (S)	14 (S)	4 (RS)
3	30 (S)	16 (S)	17 (S)	15 (S)	3 (RS)
4	27 (S)	18 (S)	17 (S)	16 (S)	5 (RS)
5	29 (S)	19(S)	16 (S)	16 (S)	6 (RS)
Mean	28.6 (S)	18.4 (S)	17.2 (S)	15.4 (S)	4.8 (RS)

Table 3: Antimicrobial Effect of *Butyrospermum paradoxum* Soap on *Trychophyton Ruburum*

	Diameter of Zone of Inhibition (mm)				
	0.1g/mil of Soap	Dilutions			
		10^1	10^2	10^3	10^4
1	55 (S)	37 (S)	30 (RS)	25(RS)	R
2	54 (S)	36 (S)	29 (RS)	24 (RS)	R
3	55 (S)	35 (S)	29 (RS)	23 (RS)	R
4	55 (S)	37 (S)	30 (RS)	23 (RS)	R
5	54 (S)	34(S)	28 (RS)	20 (RS)	R
Mean	54.6 (S)	35.8 (S)	29.2 (RS)	23 (RS)	R

KEY: S = Sensitive, R = Resistance, RS= ResistanceSensitive,

Table 1 shows the quality criteria of *Butyrospermum paradoxum* soap produced. The pH value of the medicated soap produced (*Butyrospermum paradoxum* soap) was 7.9, foam height in *Butyrospermum paradoxum* soap was 14.2 cm, this could be trace to the type of oil (palm kernel) whose major fatty acid is lauric acid and which is known for it high "foamability". The value of alcohol insoluble shows the crudity of *Butyrospermum paradoxum* soap because no much builder, ingredients were incorporated in the soap production. The Total Fatty Matter (TFM) in *Butyrospermum paradoxum* soap was 84%. The moisture content

was 19.3%. Table 2 shows the microbial sensitivity of *Butyrospermum paradoxum* extract on *Trichophyton ruburum,* a fungus that is most common cause of athlete's foot, jock itch, and ringworm. The diameter of zone of inhibition of the crude extract was measured and subsequently of various dilutions; the crude extract was sensitive with diameter of zone of inhibition 28.6mm but at a dilution of 10^{-4} it was found to be 4.8mm and resistance sensitive.

Table 3 shows the microbial effect of *Butyrospermum paradoxum* soap produced on *Trichophyton ruburum*. At a concentration of 0.1g/ml the soap was found to be very sensitive with a diameter of zone of inhibition found to be 54.6mm. At a dilution of 10^{-2} and 10^{-3} it was found to be resistance sensitive with diameter of zone of inhibition 29.2mm and 23mm respectively. At a dilution of 10^{-4} it was resistance i.e. the soap has no effect on *Trichophyton ruburum* at that dilution. This result shows that *Butyrospermum paradoxum* soap produced is a good medicated soap which can be use for the treatment of skin diseases caused by the fungi *Trichophyton ruburum*.

CONCLUSION

In conclusion, the detection of antifungal activity in extract of *Butyrospermum paradoxum* plant supports it use in the production of medicated soap to treat fungal infection. The plant extract and the soap produced were found to be effective against *Trichophyton ruburum* a fungus that is most common cause of athlete's foot, jock itch, and ringworm. From the analysis of the medicated soap produced it can be concluded that a good medicated soap can be produced from *Butyrospermum paradoxum* plant.

RECOMMENDATION

The skin is man's largest organ in human body, and essential to man's health are the plants showing dermatological properties, in view of this, full commencement of the production of medicated soap from *Butyrospermum paradoxum* plant is recommended, since the raw material is readily available. Further analysis on the microbial effect of *Butyrospermum paradoxum* extract on other related skin disease causing organism, for example *Tinea capitis*, *candida* etc to ascertain its total or complete medicated property is recommended. Several plant have the potential to generate novel metabolites, in view of this, medicated properties of other plant should also be exploited so as to get chip and more effective natural source of medicated soap and even cream ingredients that can be use in the treatment of various skin diseases.

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