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EVALUATION OF GERMICIDAL SOAP AND IT'S COMMERCIALIZATION SCOPE

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ABSTRACT

In the present research soap synthesized with natural ingredients like Neem Leaves (*Azadirachta indica*), Lemon Leaves (*Citrus limon*), Mango Leaves (*Mengifera indica L.*), Aloe Vera gel, Tulsi (*Ocimum tenuiflorum*), chandan (*Indian sandalwood*), Orange (*Citrus sinensis*) and Turmeric (*Curcuma longa*). Soap mostly use synthetic materials that can cause side effects, the selection of natural products is expected to reduce the growth of bacteria that can cause skin irritation. The examination of total fatty matters, saponification number, pH test and antibacterial activity were done by a scientific method and obtained reliable results, which are necessary for a grade - 1 soap.

Keywords: Soap base, TFM value, saponification number, antimicrobial screening

INTRODUCTION:

Cleansing the skin is very important to maintain and improve skin integrity [1]. Soap is a compound that can reduce water surface tension that remove dirt and oil [2]. The soap - making process, called saponification, is the alkaline hydrolysis reaction of triacylglycerol [3]. Soap molecules consist of long hydrocarbon like chain. The hydrocarbons consist of carbon atoms with very polar or ionic groups at one end. Carbon chains are lipophilic (dissolved in fats and oils) and Hydrophilic polar ends (dissolved in Water).

Soaps are chemical compound formed as a result of reaction between fatty acids, oils, and salts [4]. According to Osborn and

Grobe antibacterial soaps can remove 65 to 85% bacteria from human skin [5].

The use of ingredients in soap making is expected to improve the quality of the resulting soap. The natural ingredients that can be used in the process of making soap are Neem Leaves (*Azadirachta indica*), Lemon Leaves (*Citrus limon*), Mango Leaves (*Mengifera indica L.*), Aloe Vera gel, Tulsi (*Ocimum tenuiflorum*), Orange (*Citrus sinensis*), Chandan (*Indian sandalwood*) and Turmeric (*Curcuma longa*). soaps are made using various natural sources, which also includes organic ingredients.

The difference in leaf features of each type of plant makes leaves as one of the

references for classifying each type of plant [6]. The part of *Mengifera indica L.* that is rarely used is the leaves which can be one of the additional ingredients in making bathing soap.

Azadirachta indica oil contains various types of neem limonoids which can prevent mutagenic effect [7-10]. *Citrus limon* contains large spectrum of biological activity including antibacterial, antifungal, antidiabetic, anticancer and antiviral activities [11, 12]. Aloe vera gel contains 99.5% water, so it acts as a very fine moisturizer. It is used in many cosmetic products and medicines [13]. *Ocimum tenuiflorum* contains chemical and medicinal properties. *Santalum album* contains antioxidants that help reduce skin irritation and itching. It has essential oil that gives cooling and hydrates the skin [14].

EXPERIMENTAL SECTION:

Synthesized three soaps using natural ingredients. Soap base was prepared using conc. NaOH, coconut oil and SLS (Sodium Lauryl Sulphate) added as a surfactant.

Soap-1 was prepared by melting 50gm soap base in water bath and adding 3 ml of extract of *Azadirachta indica*, *Mengifera indica L.*, *Citrus limon* and *Ocimum tenuiflorum* each in it. 5g of aloe vera gel was added which is source of vitamin E. 0.5g of *Curcuma longa* was added which is anti-oxidant and exhibits antibacterial properties. 0.5ml of glycerine was added with constant stirring. That mixture moulded for 24-48 hours.

Soap-2 was prepared by melting 50gm soap base and adding 2ml of extract of *Azadirachta indica*, *Ocimum tenuiflorum* and *Curcuma longa*, glycerine and aloe vera gel. 0.2gm *Santalum album* and 0.3gm orange powder was added for fragrance. The mixture moulded for 24-48 hours.

Soap-3 was prepared by adding 5gm of coconut extract to melted 50gm soap base. 5ml of glycerine added in the hot slurry and the mixture moulded for 24-48 hours.

RESULT & DISCUSSION:

pH Test: The small quantity of soap sample dissolved in distilled water then measured by calibrated pH meter.

% of TFM: 5 gm sample of soap was dissolved in 100 ml of distilled water. 40ml of 0.5 N concentrated nitric acid was added to the soap solution. Heat the mixture in the water bath until a fatty layer separate over the solution. Solution was cooled to solidify the fat and filtered it. 50ml of chloroform was added to the filtrate to calculate the % of TFM.

SAPONIFICATION VALUE: 2 gm of fat refluxed with 25 ml of 0.5 N alcoholic KOH for 30minutes and 1 ml of phenolphthalein added and titrated against with 0.5 N HCL. Saponification value is determined by the number of milligrams of KOH required to completely hydrolyse one gram of the oil/fat. Saponification number can be calculated by the difference between blank titration (except fat) and actual titration (with fat) multiplied by the molecular weight of KOH.

Table 1: Result of analysis

Product	pH value	% of TFM	SAPONIFICATION VALUE
Soap-1	7.15	75	182.12
Soap-2	7.05	74	182.32
Soap-3	7.02	76	207.57

Antibacterial activity: Prepared soaps were tested for their antibacterial activity

against *E.coli* (gm -Ve) & *Bacillus* (gm +Ve) bacterias. The test bacterial isolates were

inoculated on to a plate of Muller Hinton Agar using a sterile swab, excess fluid was removed by turning the swab to avoid over inoculation of plates and then the bacteria inoculum was spread on the surface of the media. Soaps were formulated into 10mg concentration. 0.1 ml of chloramphenicol

were added into each of the wells. Well containing chloramphenicol alone acts as a negative control. The plates were allowed to stand for 30 min and then incubated at 37 °C for 24 h. Determination of antibacterial activity was done by recording the diameter of inhibition zone in mm [15].

Table 2: Zone of inhibition in mm (Antibacterial Activity)

Bacteria	Soap-1	Soap-2	Soap-3	Standard
<i>Escherichia Coli</i>	10	12	11	4
<i>Bacillus</i>	12	14	16	5

COSTING (INR):

Table 3: Costing of the soaps

Raw Material	Price/50 gm	Quantity Soap 1	Price Soap 1Rs	Quantity Soap 2	Price Soap 2 Rs	Quantity Soap 3	Price Soap 3 Rs
NaOH	30 Rs.	5gm	3	5gm	3	5gm	3
Coconut Oil	15 Rs.	40ml	12	40ml	12	12ml	12
Orange Powder	20 Rs.	-	-	1gm	0.4	-	-
Turmeric Powder	14 Rs.	1gm	0.28	1gm	0.28	-	-
Chandan Powder	22 Rs.	-	-	1.5gm	0.66	-	-
Glycerine	40 Rs.	1ml	0.8	1ml	0.8	1ml	0.8
SLS	30 Rs.	2gm	1.2	2gm	1.2	2gm	1.2
Coconut Extract	25 Rs.	-	-	-	-	5gm	2.5
TOTAL COST			17.28		18.34		19.5

Table 4: Final Price

SAMPLE	PRICE/50gm
SOAP-1	17.28 Rs.
SOAP-2	18.34 Rs.
SOAP-3	19.50 Rs.

CONCLUSION:

Looking towards daily & commercial need we designed these economical soaps using plants extract which exhibits medicinal properties. The synthesized soaps subjected to antibacterial screening. All three soap shows potent antibacterial activity against *E. coli* (gm-Ve) bacteria and *Bacillus* (gm +Ve) bacteria. This soap is relatively less costly compare to market survey. So, this innovation can be formulated for commercialization.

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