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FORMULATION AND EVALUATION OF POLY HERBAL SOAP

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ABSTRACT

Plants with medicinal properties are being used as traditional medicine from times immemorial. The extract obtained from the leaves, stem and roots of various medicinal plants have been employed as a natural remedy in curing various ailments and diseases. The aim of the present study is to formulate herbal soap containing *Vigna radiate*, aloe vera, tomato juice and further subjected to physicochemical characterizations such as color, odor, texture, foam height, foam retention, irritation, saponification value and pH. The main ingredient, moong dal (*Vigna radiata*), commonly known as green gram, has therapeutic qualities. Moong dal, is excellent for oily and acne-prone skin for beautification purpose. Green gram eliminates dangerous bacteria, removes dirt and excess oil, leaving the skin clear, supple and free of wrinkles. The antibacterial activity of the formulated soap was checked in agar diffusion method and it shows moderate active against the *S. aureus* and *E.coli*. The results show that the soap possesses moderate antimicrobial activity. The objective of this study is to formulate poly herbal soap for the beautification purpose. Hence, this study is concluded as the formulated poly herbal soap can be used as for the cleansing and beautification purpose.

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INTRODUCTION

Since the beginning of time, people have employed medicinal plants as a form of treatment. Several maladies and diseases have been treated naturally by using the extract made from the leaves, stems, and roots of several medicinal plants. Even though many of the plant based products have been replaced by synthetic chemicals, the safety and efficacy of Ayurvedic products has set standards. The active constituents responsible for such medicinal values are employed topically as creams, soaps, oils and ointments for treating skin related ailments like acne, wounds, eczemas, and ring-worms as an anti-microbial agent and for cosmetic purposes^[1]. Now a days, there is an increasing consumer demand for cosmetics comprising natural ingredients as healthier, organic, and ecological product^[2]. Consumers are more and more refusing synthetic chemicals in beauty and cosmetic products. A natural soap is prepared without a non-natural surfactant with addition of functional ingredient from natural substance, such as essential oil or plant extract.

A natural soap may be generally divided based on the production method into: a melt – pour soap, a hot process soap and a cold process soap. The hot process soap is called a transparent or translucent soap. The soap has good detergency or cleansing power, good moisturizing effects, long-lasting fragrance, and less of irritant. Herbal soaps are prepared by adding various dried herbs, flowers and stems into soap base. Herbs are the natural products could be found in the treatment of almost all diseases and skin problems owing to their high medicinal value, cost effectiveness, availability and compatibility^[3,4]. Hence it can be used in soap base. The attribute of a soap includes gentleness on the skin, rich lather, protection against various skin disorders (including rashes, eczema, scabies) treatment of skin infection (such as ringworm), protection of even skin toning and smoothness of the skin^[5].

Herbal soap do not contain the artificial colours, flavours, fluorides etc., when compared to the content of commercial soap. Natural soaps help maintain skin pH levels easily without disturbing the natural balance. Herbs are the natural products mostly found in the treatment of almost all diseases and skin problems owing their high medicinal value, cost effectiveness, availability and compatibility.

In this preparation of poly herbal soap containing moong dal powder (*Vigna radiata*), aloe Vera gel, tomato juice as natural plant ingredients and this content gives or shows anti-bacterial activity.

The aim of the present study to formulate poly herbal soap containing Moong dal powder, Aloe vera juice, tomatoe juice, methyl paraben, glycerol and evaluate the soap for physical and microbial evaluation.

MATERIALS AND METHODS:

Samlle collection and extraction:

The Moong Dal (green gram), tomatoes were purchased from local super market. Aloe vera juice is obtained by stripping away the outer leaf rind, rinsing or washing away the latex, and processing the remaining inner leaf material. Tomatoes finely chopped and juice was made by using mixer. Methyl paraben, glycerol were supplied by SD Fine Chemical, Chennai, Tamilnadu. Analytical-grade materials were employed for all chemical reagents, while pharmaceutical-grade materials were used for all other substances.

Table 1: Pharmacognostical profile of active ingredients.

S. No	Name	Biological Source	Parts	Chemical Constituents	Uses
1	Moong Dal	<i>Vigna radiate (Fabaceaa)</i>	seed	Carbohydrates, fats, protein	Antioxidant
2	Aloe vera	<i>Aloe barbadensis (Liliaceae).</i>	Pulp	Polymannans, anthroquinone, Cglucosides	Moisturizer, anti ageing.
3	Tomoto glycerol	<i>Solanum Lycopersicum (Solanaceae)</i>	berry	Lycopene, β -carotenoids, vitamins	anti-oxidative, anti-proliferative, anti-carcinogenic, anti-tumorigenic, anti-inflammatory, anti-mutagenic
4	Almond oil	<i>Prunus communis linn (Rosaceae).</i>	Nuts	Protein, lipid, tannins, linolenic acid, amino acids	Anti-oxidant

FORMULATION OF HERBAL SOAP:

Vigna radiata is collected and made into fine powder and kept for maceration for 3 to 4 hrs and filtered later and kept aside. 20 gms of paraffin wax was transferred in to a beaker and placed on water bath at 75°C and 3gm of *vigna radiata* powder was added which we kept aside for maceration. 10ml of glycerine was added into the beaker with continuous stirring. Further 1ml of almond oil, 5ml of aloe vera extract and 2ml of tomato juice were added to the mixture and heated the mixture of 2 min on water bath. Then vitamin E capsule was added. Finally 0.18gms of methyl paraben was added and stirred the mixture for 1 min then kept it aside and wait until the mixture comes down to room temperature and transferred the mixture into a soap mould and wait for 1-2 hrs for the mixture to solidify.

Table 2: Formula of Poly herbal soap.

S. No	Ingredients	Formulations				
		F1	F2	F3	F4	F5
1	Paraffin wax	10gm	10gm	15gm	20gm	20gm
2	Moong dal powder	5gm	5gm	7gm	7gm	10gm
3	Glycerine	10ml	10ml	5ml	10ml	10 ml
4	Tomato juice	1 ml	1 ml	1 ml	2ml	2ml
5	Aloevera gel	5ml	5ml	5ml	5ml	5ml
6	Propyl paraben	0.18mg	0.18mg	0.18mg	0.18mg	0.18mg

EVALUATION PARAMETERS

Physical evaluation:

Colour & shape: Colour and shape was checked by naked eye.

Odour: The smell of formulation was checked by applying preparation on hand and feels the fragrance of perfume.

pH: The pH of the prepared soap was assessed by touching a pH strip to the freshly formulated soap and jointly by dissolving 1 gram in 10 ml water with the help of digital pH meter.^[8]

Foam Height: 0.5 grams of sample of soap was taken dispersed in 25 ml distilled water. Then, transferred it in to 100ml measuring cylinder; volume was make up to 50 ml with water. 25 strokes were given and stand till aqueous volume measured up to 50 ml and measured the foam height, above the aqueous volume was measured.

Foam Retention: 25 ml of the 1% soap solution was taken in to a 100 ml graduated measuring cylinder. The cylinder was covered with hand and shaken 10 times. The volume of foam at 1 minute intervals for 4 minutes was recorded.^[9]

Irritation: It is carried out by applying soap on the skin for 10 minutes. If no irritation then it is considered as non-irritant product. ^[10]

Saponification value:

About 2 g of the paraffin wax was taken in a conical flask and the weight of the paraffin was considered as w g. The paraffin wax was dissolved in 25 ml of 0.5 N alcoholic potassium-hydroxide solution. Then the reaction mixture was refluxed using a water condenser on a water-bath for half an hour. The resulting solution was cooled and titrated against a 0.5 N HCl solution adding 1 ml of phenolphthalein as an indicator. The number of ml of acid required was noted (a). An exactly identical blank experiment (leaving the paraffin wax) was performed. Number of ml of hydrochloric acid required was noted (b).

Saponification value=Volume of acid required to neutralize remaining KOH*Equivalent factor*1000/w

$$= (b-a)*0.02805*1000/w$$

Anti-microbial activity:

Agar diffusion method was used. Petriplate containing 20ml of Mueller Hinton agar were seeded with 24hr culture of *Staphylococcus aureus* and *Escherichia coli*. Four wells were created in which one acts as control and in the rest three wells, different concentrations of the extract were added. The plates were incubated at 37^o C for 24h. The zone of inhibition was measured.

RESULT AND DISCUSSION

Table 3. Physicochemical parameters of the prepared formulations.

S. No	Parameters	F1	F2	F3	F4	F5
1	Colour	Pale yellow	Pale yellow	Pale yellow	Pale yellow	Pale yellow
2	Odour	Aromatic	Aromatic	Aromatic	Aromatic	Aromatic
3	shape	Circular	Hexagonal	Octagonal	Oval	Octagonal
4	Foam Height	2.1cm	2.4cm	2.5cm	2.7cm	2.9cm
5	Foam Retention	3min 11sec	3min 8sec	3min 4sec	3min 6sec	3min 14sec
6	Irritation	Non irritant	Non irritant	Non irritant	Non irritant	Non irritant
7	pH	6.7	6.8	6.7	7.0	7.2
8	Saponification value	44.52	41.35	40.2	42.05	49.08
9	<i>B.subtillus</i> ^{a,b}	2+0.13	2+0.19	2+0.22	2+0.32	2+0.49
10	<i>E.Coli</i> ^{a,b}	1+0.12	1+0.17	1+0.19	1+0.15	1+0.22

a=Concentrations of test compound: 100 µg/disc

b= Zone of inhibition in mm (Mean ± S.D).

The above given table describes the colour, odour, shape, pH, irritation, foam height and foam retention of the poly herbal soap. The colours of all the five formulation were pale yellow. The odour of all the five formulation was aromatic. The shape of all the five formulation was oval, circular, hexagonal and octagonal. As per evaluation test formulation F5 is may be the most standard formulation compared to other formulation because the pH of formulation F5 is 7.2 which is likely close to skin pH and there is no irritation beside foam retention and foamability of F5 is may be much better than other formulations. The F5 formulation have good antimicrobial activity among them.

CONCLUSION

The poly herbal soap was formulated using melt-pour process technique possessing moderate anti-bacterial property. The further clinical studies of this formulation can evaluate the use of poly herbal soap. The most important thing that poly herbal soap possesses is that free from chemicals and more eminent than synthetic soaps. Thus, in this research work, the prepared poly herbal soap possesses anti-bacterial properties that can be used as beauty regime which the exhibit satisfactory effect.

Conflict of Interest:

There are no conflicts of interest.

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ABBREVIATIONS

Mg	-microgram
MI	-milligram
Cm	-centimeter
⁰ C	-degree Celcius
Kg	-kilogram
Mm	-micrometer

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