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A Research on Formulation and Evaluation of Herbal Soap

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Abstract

Soap is a salt of fatty acidsused in a variety of cleansing and lubricating products. In a domestic setting, soaps are usually used for washing, bathing and other types of housekeeping. In industry soaps are used as thickeners, components of some lubricants and precursors to catalysts. When used for cleaning, soap solubilizes particles and grime which can then be separated from the article being cleaned. Where soaps act as surfactants or emulsifyingoilsenable them to be carried away by water. Soap is created by mixing fats and oils with a base as opposed to detergent which is created by combining chemical compounds in a mixer. Humans have used soap for cleaning for millennia. Evidence exists of the production of soap like materials in around 2800 BC in ancient Babylon.

Keywords : Rebatching, Papaya, soap

1. INTRODUCTION

Soap is a salt of fatty acids [1] used in a variety of cleansing and lubricating products. In a domestic setting, soaps are usually used for washing, bathing and other types of housekeeping. In industry soaps are used as thickeners, components of some lubricants and precursors to catalysts. When used for cleaning, soap solubilizes particles and grime which can then be separated from the article being cleaned. Where soaps act as surfactants or emulsifying [2] oilsenable them to be carried away bywater.

Soap is created by mixing fats and oils with a base as opposed to detergent which is created by combining chemical compounds in a mixer. Humans have used soap for cleaning for millennia. Evidence exists of the production of soap like materials in around 2800 BC in ancient Babylon.

1.1 Types of Soap:

Since they are salts of fatty acids, soaps have the general formula $(RCO^-)\ M^{n+}_{2\,n}$ (where R is an alkyl, M is a metal and n is the charge of the cation). The major classification of soaps is determined by the identity of M^{n+} when M is Na or K, the soaps are called toilet soaps, used for handwashing. Many metal di-cations (Mg^{2+}, Ca^{2+} and others) give metallic soap. When M is Li, the result is lithiumsoap(e.g., lithium stearate), which is used in high-performance greases.[3]

1.1.1 - Non-toilet soaps

Soaps are key components of most lubricating greases and thickeners. Greases are usually emulsions of calcium soaporlithium soap and mineral oil[4]. Many other metallic soaps are also useful, including those of aluminium,sodium and mixtures thereof. Such soaps are also used as thickeners to increase the viscosity of oils. In ancient times, lubricating greases were made by the addition of lime to olive oil. [5] Metal soaps are also included in modern artist oil paints formulations as a rheology modifier. [6]

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1.1.3 - Liquid soap

Liquid soap was not invented until the nineteenth century; in 1865, William Shepphard Patented a liquid version of soap[7]. In 1898, B.J. Johnson developed a soap derived from palm and olive oils; his company, the B.J. Johnson Soap Company, introduced "Palmolive" brand soap that same year [8]. This new brand of soap became popular rapidly, and to such a degree that B.J. Johnson Soap Company changed its name to Palmolive [9]. In the early 1900s, other companies began to develop their own liquid soaps. Such products as Pine-Sol and Tide appeared on the market, making the process of cleaning things other than skin, such as clothing, floors, and bathrooms, much easier. Liquid soap also works better for more traditional or non-machine washing methods, such as using a washboard [10]. Soap is very important to modern life. It allowes us to keep clean and remove dirt and micro- organism and others. It leaves skin feeling clean refreshed. Soap when applied to skin, it dissolves oils andremovesoilsthatalonewatercannot.Italsopenetratestheupperlayerofskintodissolveembedded dirt and oil. Along with Papaya, (as active ingredient) other components of soap are added as soap base in the formulation as soap base which modify the properties ofsoap.

2. Methods of Soap preparation:

1.1.2 - Melt and Pour Soap:

Technically, all handmade soap is "Glycerin Soap." In much commercial soap, all the extra glycerin (formed naturally by the cold process soap making method) is harvested out. Thus, all handmade soap is glycerin rich (since handmade soap makers don't harvest out glycerin in their soap). Intoday'smarket,

The term"GlycerinSoap"iscommonlyusedtorefertoclearsoap.Generally,theclear soap has extra glycerin added to it to produce a very nourishing, moisturizing bar. Glycerin is a "humectant." It draws moisture to itself; the theory is that if you wash with glycerin soap, a thin layer of glycerin will remain, drawing moisture to yourskin.

Clear soap base can be purchased in large blocks to be melted down, colored and fragranced, and placed into molds (or used to make loaves of soap to be sliced). This type of soap is called "Melt and Pour" and the artistry of melt and pour is called "Soap Casting." Melt and Pour soap making is gaining in popularity because of its ease of use. There are no significant safety measures (other than basic common sense – don't put your hand in the hot soap, don't cut your finger off with the Knifeetcneeded for soap casting. Children can do it. It's a great outlet for creative types. You can also make clear soap from scratch. This method involves all the aspects of cold process soap making, but takes it a few steps further by adding alcohol for clarity and a glycerin and sugar mix to suspend and enhance the clarity. It is a dangerous process because of the alcohol vapors. If you wish to make clear soap (which will not melt down like melt and pour – its one pour only soap), please read "Making Transparent Soap" by Catherine Failor. This is an excellent resource for anyone wishing to make clear soap fromscratch.

1.1.3 - Cold Process Soap

It is made by combining fatty acids and sodium hydroxide (lye) together. Fatty acids can be almost any oil from beef tallow to olive oil to hemp oil.The combinations for making your

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ownpersonal recipe are endless. Cold process soap making is a combination of an art and science. The condensed version of this type of soap making is that there is a certain proportion of lye (sodium hydroxide) and water to fatty acids that forms a chemical reaction called "saponifaction." During saponification, the oils and lye mix and become soap, the process takes approximately six weeks to fully complete. Cold process of

Making requires the use of lye and the use of safety equipment, such as goggles and gloves. Please do not attempt to make cold process soap without researching the method thoroughly. Cold process soap is known for its hard, long lasting quality. Depending on the oils used, the bar can have great lather (coconut oil has excellent lathering properties), be incredibly mild (olive oil is renowned for its gentle qualities) or be very moisturizing (with the addition ofoils).

1.1.4 - Hot Process Soaps

There are variations on the cold process method. Hot process soap is an interesting take on the cold process method. The simple explanation is that you take all your ingredients, and add them to a pot (that is then placed over a heat source, such as a stove) and stir frequently until the soap goes through various stages. The excess water is evaporated off and the soap is ready to use oncecooled.

1.2.3 –Rebatching Soaps

Rebatching, also called French milled, or triple milled soap, is another form of cold process Soap making. You make your cold process soap from scratch, grate it up, place it over a heat source, in a kettle, with a little liquid (water works very well), and the mixture melts down into a mushy mess that you add colorant and fragrance too. This method is often used to preserve the scent or the healing properties of some essentialoils.

2. DRUGPROFILE

Name - Papaya

Synonym – Papaya, pawpaw, papaw.

Biological source - This is the ripe fruits obtained from plants of species *Carica papaya.* Belonging tofamilyCaricaceae.

Fig. 1 - Papayafriut

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Use – Skin whitening, boosting immunity, purifying agent for skin, to treat sunburn and irritation.

3. **EXCIPIENTS PROFILE**

7.1 Sodium hydroxide

Molecular formula - NaOH
Molecular weight - 40 gm/mol
Use -lye

7.2 Ethanol

Molecular formula – C_2H_5OH

Molecular weight - 46.07 gm/mol
Use - Soap hardening agent.

7.3 Coconut oil

7.4 Molecular formula – $C_{33}H_{62}O_6$ Molecular weight – 554.8gm/mol

Use - Moisturizer and lather enhancer

7.5 Propyleneglycol

Molecular formula – C_3H_8O
Molecular weight – 76.09
gm/molUse -Humectant

7.6 Sorbitol

7.7 Molecular formula –$C_6H_{14}O_6$ Molecular weight – 182.17 gm/mol Use - To prevent moisture loss

7.8 Glycerine

Molecular formula – $C_3H_8O_3$
Molecular weight - 92.09
gm/molUse -Solven

7.9 Water

Molecular formula – H_2O
Molecular weight - 18.01
gm/mol Use – Solvent

5. MATERIALS ANDMETHODS

5.1 Materials

Sr. No.	Name of ingredient	Procured from
1	Papaya	Local market, Satara.
2	NaOH	S.D. Lab chemicals center,

		Mumbai.
3	Coconut oil	Local market, Satara
4	Propylene glycol	S.D. Lab chemicals center, Mumbai.
5	Sorbitol	S.D. Lab chemicals center, Mumbai.
6	Ethanol	S.D. Lab chemicals center, Mumbai.
7	Rose oil	S.D. Lab chemicals center, Mumbai.
8	Glycerin	S.D. Lab chemicals center, Mumbai.
9	Water	Pharmaceutics Laboratory

Table no: 1 Material Used

5.2 Methods

5.2.1 Collection of Papaya fruit

The fully riped fruit of *Carica papaya* was taken from local plant of *Carica papaya*.

5.2.2 Preparation of Papaya juice

Papaya fruit was cut into pieces and then after removing its seeds, blended until liquid appears in a blender. Fine juice of papaya was filtered through muslin cloth. The filtrate was then taken in beaker and concentrated on water bath with heating. Concentrated product is kept in well closed container for further use.

5.2.3 Preparation of soap base

Glycerin and water was mixed together in a beaker. Sodium hydroxide was added in the solution slowly with constant stirring. Coconut oil was added in the solution and was kept aside for 10 minutes. Further, propylene glycol and clear solution of 70% sorbitol solution was added to it. After alladditionsgetover, ethanol wasadded in above solution theroseoilwasaddedPerfuming agent in the mixture the solution was solidified after some time. This was used as soap base.

Formulation of soap Composition of Papaya soap

Table no. 2:

Sr.No	Ingredients	F1	F2	F3	F4	Uses
1	Papaya	55 ml	50 ml	45 ml	40 ml	Active ingredient
2	NaOH	20 gm	20 gm	20 gm	20 gm	Lye
3	Coconut oil	50 ml	50 ml	50 ml	50 ml	Lather enhancer
4	Propylene glycol	30 ml	30 ml	30 ml	30 ml	Humectant
5	Sorbitol	25 ml	25 ml	25 ml	25 ml	To prevent moisture loss

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6	Ethanol	20 ml	20 ml	20 ml	20 ml	For hardening of soap cake
7	Rose oil	q.s.	q.s.	q.s.	q.s.	Perfume
8	Glycerin	20 ml	20 ml	20 ml	20 ml	Solvent
9	Distilled water	20 ml	20 ml	20 ml	20 ml	Solvent

Table no 2:- Composition of soap

5.2.4. Procedure

The base formulation was prepared in the four batches as per the procedure given above and quantities mentioned in the table no.2 and the solidified base was melted for further addition. Keeping the solution mixture in water bath, the papaya juice was added in every batch so as quantities with respect of 55 ml, 50 ml, 45 ml and 40 ml in each of the batch and mixed with constant stirring. Some drops ofrose oil were again added in this mixture to produce a good smell. The molds were lubricated with the glycerin (white petroleum jelly can also used here). The solution was poured immediately in the molds and kept in refrigerator (ice bath) for few hours then the soaps were removed from the molds after getting solidified.

6.EVALUATION TESTS FOR SOAP

6.1.1.Physical parameters:

- **Colour:**

The formulated soap formulations **F1, F2, F3,** and **F4**were visually evaluated for colour test.

- **Consistency:**

The formulated soap formulations **F1, F2, F3,** and **F4** were visually evaluated for their consistency.

6.1.2 Determination of pH of soap:

The pH of soap was determined by the pH meter.

6.1.3 Foam formation:

Cylinder shake method was used for determining foaming ability. Soap solution was put into a 250 ml graduated measuring cylinder and was shaken for 10 times. The total volume of foam content was recorded after 1 minute shaking.

6.1.4 Stability test:

The optimized formulation was subjected for stability study by keeping at room temperature for period of 7 days. After 7 days, parameters of evaluation such as pH, foam formation, irritancy test and organoleptic properties were studied**.**

7. RESULT AND DISCUSSION

7.1 Materials Used:

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Sr. No.	Name of ingredients	Use
1	Papaya	Active ingredient
2	NaOH	Lye
3	Coconut oil	Lather enhancer
4	Propylene glycol	Humectant
5	Sorbitol	To prevent moisture loss
6	Ethanol	For hardening of soap cake
7	Rose oil	Perfume
8	Glycerin	Solvent
9	Distilled water	Solvent

Table no. 3 – List of Ingredients with Uses

7.2 COLLECTION OF PLANT MATERIAL:

The fresh fruit of *Carica papaya* was collected from local market of Satara city.

7.3 PREPARATION OF JUICE:

Accurately weighed 250 gm of Papaya was blended in a blender. Using the muslin cloth, the juice was filtered and 200 ml of juice was used for the formulation of soap.

7.4 PREPARATION OF SOAP:

Total four formulations (F1- F4) were prepared by cold process method

Fig 2 F 1

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Fig 3 F2

Fig 4 F3

Fig 5 F 4

8. EVALUATION OF PREPARED PAPAYA SOAP:

The aim of present work is to prepare soap by using Papaya as active agent. The prepared soap was evaluated for physical appearance/visual inspection, pH, foam formation and stability test.

8.1 Physical appearance/visual inspection:

The prepared formulations (F1 – F4) were appeared yellow and yellowish brown in colour.

8.2 Determination of pH:

The standard value of pH of soap is slightly alkaline in nature. The pH of all formulations (F1-F4) was found to be as follows,

8.3 Foam formation:

Cylinder shake method was used to determine foaming ability of all formulations.

Sr.No.	Parameters	F1	F2	F3	F4
1	pH	7.1 ± 0.1	7.3 ± 0.1	7.3 ± 0.1	7.4 ± 0.1
2	Foam formation	151 ± 3.5	156 ± 3.5	163 ± 3.5	170 ± 3.5

Formulation **F4** was optimized formulation based on the evaluation parameters like pH, foam formation and physical parameters. The results showed that the formulation F4 of Papaya soap contains all

Good characters of an ideal soap. As per literature review of *Carica papaya*having skin whitening activity, so prepared formulation will also is used as skin whitening soap.

9. CONCLUSION

In the present work, efforts have been made to prepare and evaluate papaya soap by using *Carica papaya*. A soap preparation was formulated based upon traditional knowledge and emphasis was to formulate stable and functionally effective soap.

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