WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL RESEARCH

Research Article

2025
Volume: 02
Issue: 09
Page: 18-30

FORMULATION AND EVALUATION OF HERBAL PAPER SOAP CONTAINING DAISY FLOWER EXTRACT FOR ANTI-FUNGAL ACTIVITY

M. Eshvandhini*[1], P. Priyasree[2], R. Puratchioli[2], M. Radhika[2], E. Sanjay[2], T. Rakesh[2]

[1]Assistant Professor Department of Pharmaceutics, Aadhibhagawan College Of Pharmacy, Rantham.

[2]B. Pharm Students Aadhibhagawan College Of Pharmacy, Rantham.

Received: 18 July 2025 **Revised: 08 August 2025** **Accepted: 28 August 2025**

Corresponding Author: M. Eshvandhini

Address: Assistant Professor Department Of Pharmacology, Aadhibhagawan College Of Pharmacy, Rantham.

Email ID: lgopipharma10@gmail.com,

ABSTRACT

A herbal paper soap was successfully formulated using Daisy flower extract alongside both natural and synthetic ingredients. The preparation involved creating separate aqueous and oil phases, melting a soap base, and combining these under controlled conditions. The final mixture was spread over absorbent paper, dried, and cut into desired shapes. Physical and chemical evaluations revealed favorable properties such as high yield (93.5%), acceptable pH (5.9), strong foaming, and good solubility in water and ethanol. The formulation showed no skin irritancy and demonstrated antifungal activity, making it suitable for sensitive skin. The incorporation of Daisy extract provided added natural benefits like antifungal and soothing effects. The final product is eco-friendly, portable, and represents a promising alternative to conventional soap forms.

KEYWORDS: Herbal Soap, Daisy Flower Extract, Paper Soap, Antifungal Activity, Skin-Friendly.

1. INTRODUCTION

A soap is a salt of a compound, known as a fatty acid. A soap molecule has a long hydrocarbon chain with a carboxylic acid group on one end, which has ionic bond with metal ion, usually sodium or potassium. The cleaning action of soaps because of their ability to

emulsify or disperse water-insoluble materials and hold them in the suspension of water. This ability is seen from the molecular structure of soaps. When soap is added to water that contains oil or other water-insoluble materials, the soap or detergent molecules surround the oil droplets. The oil is, dissolved in the alkyl groups of the soap molecules while the ionic end allows it to be dissolved in water. As a result, the oil droplets are to be dispersed throughout the water and can be washed away.

A number of things affect the soap-making process and the quality of this soap produced. The characteristics of this soap depend on the quality of oil, and the amounts of the caustic soda and water used to make it. The speed of the reaction between the oil and the caustic soda is influenced by free fatty acid content of the oil, the heat of the components before mixing, and how vigorously the mixing is to be done. Free fatty acid contents, vigorous mixing, and heat, speed up the given soap-making process.

Fig. 1: Soaps.

2. Plant Profile

2.1 Gerbera Daisy

- **Synonym:** Transvaal Daisy, Barberton Daisy
- **Origin:** South Africa
- **Family:** Asteraceae
- **Local availability:** Commonly Gerbera daisies are available in Tamil Nadu, with various Growers and suppliers in cities like Hosur, Coimbatore, and Chennai.

2.2 Plant Description

- **Flower:** They come in various colors and can be single, double, or multi-petaled.
- **Size:** Typically grows 6 to18 inches tall.
- **Soil:** Well-drained, sandy or sandy loam soils are preferred.
- **Watering:** Require consistent moisture.

2.3 Chemical Constituent

- **Flavonoids:** Responsible for vibrant flower colors (e.g., anthocyanins)
- **Carotenoids:** Includes compounds like lutein, zeaxanthin, and β-carotene.
- **Phenolic compounds:** Caffeic acid, ferulic acid, and related compounds.

2.4 Uses

- They are also used in cosmetics and as a focal point in floral arrangements.
- Excellent as cut flowers due to their long as life
- Gerbera daisies are primarily used as ornamental plants.
- Mostly used as Antioxidant and Anti-inflammatory, Skin Irritation.

Fig. 2: Gerbera Daisy.

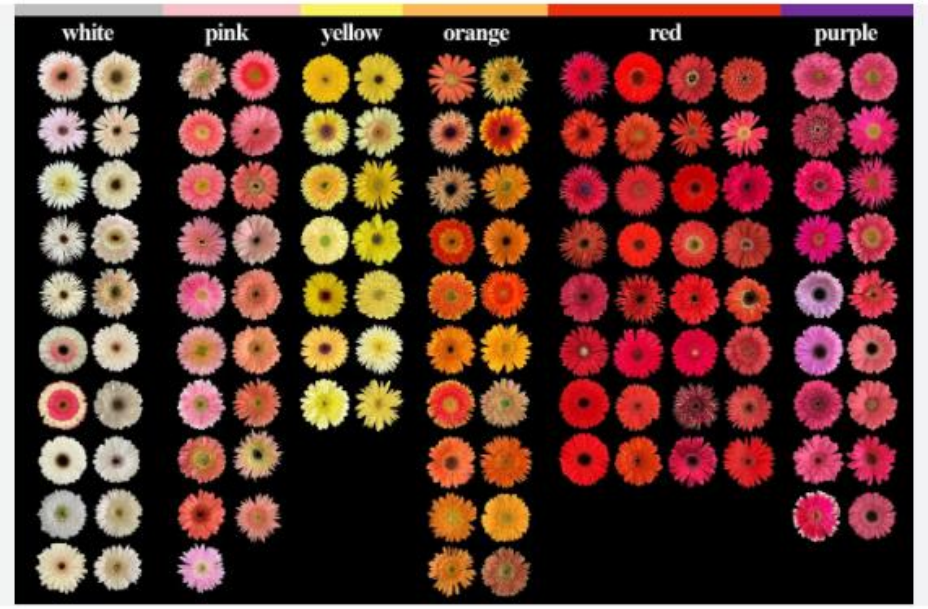

Fig. 3: Types Of Gerbera Daisy.

3. MATERIALS AND METHODS

3.1 Collection of Plant & Authentication

Daisy flowers were obtained from Vellore district, Tamil Nadu, India. It was identified and authenticated from Central council for Research in siddha, Chennai Ministry of AYUSH, Government of India. The flower leaves are washed thoroughly with tap water.

3.2 LIST OF CHEMICALS

Table: 1 List Of Chemicals.

S.NO	INGREDIENTS	PROPERTIES
1.	Sodium Benzoate	Preservative
2.	Stearic Acid	Hardening agent
3.	Daisy Flower Extract	Herbal active ingredient
4.	Sodium Lauryl Sulphate	Foaming agent
5.	Lavender Oil	Fragrance
6.	Castor Oil	Emollient
7.	Soap Base	Main cleaning base

3.3 MACERATION

The flower of the Daisy was collected and dried for some time. Then the flower is cut into small pieces as appropriate for the efficient extraction of chemical constituents. In the process of extraction the cut pieces of Daisy is placed in stoppered container with the ethanol as a solvent and allowed to stand at room temperature for a period of at least 3 days with

frequent agitation untill the soluble matter has dissolved. The mixture is then strained, the Marc is pressed, and the combined liquids are clarified by filtration after standing.

3.4 METHOD OF PREPARATION

Table 2: Composition Of Herbal Paper Soaps.

S.NO	INGREDIENTS	QUANTITY
1.	DAISY EXTRACT	10ml
2.	STEARIC ACID	5g
3.	SOAP BASE	30g
4.	CASTOR OIL	5ml
5.	LAVENDOR OIL	2-3 drops
6.	SODIUM BENZOATE	0.2g
7.	SODIUM LAURYL SOULFATE	20g

3.4.1 PROCEDURE

Preparation Of Aqueous Phase (Beaker A): In a clean beaker, add Sodium benzoate, stearic acid, Sodium lauryl sulfate (SLS) and Daisy extract. Gently mix thoroughly until the stearic acid dissolve (or) mix completely and a uniform solution form.

Preparation Of Oil Phase (Beaker B): In a second beaker, mix thoroughly, lavender oil and castor oil thoroughly. This forms the oil phase.

Melting The Soap Base: Melt the soap base (China dish) separate container using a water bath (or) on low steam. Stirring constantly to prevent burning. Heat until fully melted and clear.

Combining Ingredient: Gradually add the contents or Beaker A aqueous Phase) into the melted soap base while stirring, gently. Then add the oil phase (Beaker B) to the same. Continue stirring until the mixture becomes smooth and uniform.

Pouring & Drying: Place to be clean butter sheer (or) absorbent paper (cut the size) flat on a tray (or) clean surface. Pour the prepared soap mixture gently over the paper; spread (Or) it evenly using sterile glass rod (or) spatula allow the air to dry in a dust-free environment.

Cutting & Packaging: After drying, cut the paper into strips, squares (Or) any desired shape. Stored in an air tight, moisture proof packaging for preservation use

Fig. 4: Preparation Herbal Paper Soap.

3.5 Evaluation of Herbal Soaps

Physical Parameter

The prepared herbal soaps were inspected visually for their color, weight variation, odour, appearance. The pH was measured in each cream, using a pH meter.

3.5.1 Colors: All the formulated herbal soaps were tested for color by visual inspection. They were checked against white background.

3.5.2 Odours: The odors of all formulated herbal soaps were checked by mixing the herbal soaps in water.

3.5.3 Weight Variation: Collected 10 soap to calculated the individual weight finally calculated the average weight of herbal soaps.

3.5.4 Percentage Yield: The empty container was Weighed in which the herbal soap's formulation was stored then again, the container was weighed with herbal soap's formulation. Then subtracted the empty container weighed with the container with herbal soap's formulation then it gives the practical yield.

3.5.5 Determination Of pH: Weighed 5 gm of each herbal soap's formulation were transferred in 10 ml of the beaker and measured it by using the digital pH meter.

3.5.6 Solubility: 2gm of soap added 10ml of solvents and shake it 2min view the solubility result.

3.5.7 Determination Of Percentage Free Alkali: Dissolved 5 gm of prepared herbal soap in 50 ml of neutralized alcohol in a conical flask. Then boiled under the reflux on a water bath for 30 minutes. Then cooled and added 1 ml of phenolphthalein solution as an indicator. Then the solution was titrated with 0.1 HCl.

3.5.8 Foam Height: Dissolved 0.5 gm of prepared soap in distilled water then make up the volume up to 50 ml with distilled water in 100 ml measuring cylinder. Measured the foam height, above the aqueous volume by given 25 strokes.

3.5.9 Foam Retention: Prepared the 25 ml of the 1% soap solution and transferred into the 100 ml of measuring cylinder. Then the cylinder was shaken 10 times. The volume of foam was recorded at one minute for 4 to 5 minutes.

3.5.10 Skin Irritancy Test: Mark an area (1sq.cm) on the left-hand dorsal surface. The herbal soap was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.

3.5.11 Total Fatty Matter: 5 g of soap was accurately weighed and transferred into 250 ml beaker. 100 ml of hot water was added to completely dissolve the soap. 40 ml of 0.5 N Nitric acid was added until contents were slightly acidic. The mixture was heated in a water bath until the fatty acids were floating as a layer above the solution. The fatty acids were cooled in ice and separated them. 50 ml of chloroform was added to the remaining solution and

transferred it to a separating funnel. Shaken the solution and allowed the solution to separate into two layers. The bottom layer was drained. Added 50 ml of chloroform to the remaining solution in the separating funnel. Separated the fatty acid dissolved in chloroform again as in the previous case and transferred it to the collected fatty matter. The fatty matter was weighed in a pre-weighed China dish. allowed the contents to evaporate and weighed the residue. From the difference in weight, calculated the percentage of fatty matter in the given soap sample.

3.6 Antifungal Testing Of the Prepared Formulations

Preliminary antifungal sensitivity screening tests finding shown in the table that is given below. The antifungal herbal soap formulation proved to be beneficial and had excellent activity against tested organisms.

3.6.1 Preparation Of Agar Medium: Prepare MHA from the dehydrated medium according to the manufacturer's instructions. media should be prepared using distilled water or deionized water. Heat with frequent agitation and boil to dissolve the medium completely. Sterilized by autoclaving at 121℃ for 15minutes. Check the $_{P}$H of each preparation after it is sterilized, which should be between 7.2 and 7.4 at room temperature. This is done by macerating a small amount of medium in a little distilled water or by allowing a little amount of medium to get around a $_{P}$H meter electrode. Cool the agar medium to 40 to 50 ℃. Pour the agar into sterile glass or plastic petri dish on a flat surface to a uniform depth of 4mm. Allow to solidified. Prior to use, dry plates at 30-37℃ in an incubator, with lids partly agar, for not more than 30minutes or until excess surface moisture have evaporated. Media must be moist but free of water droplets on the surface. presence of water droplets may result to swarming bacterial growth, which could give in accurate results. They are also easily contaminated.

3.6.2 Inoculum Preparation: From a fungal culture (not more than 48 hours, old except for slow growing organism) take 4 or 5 colonies with a wire loop. Transfer colonies to 5ml of trypticase soy broth or 0.9% saline. Incubate the broth at 30℃ at an optimum growth temperature until it achieves or exceeds the turbidity of 0.5 MacFarland standard (prepared by adding 0.5ml of 0.048m $Bacl_2$ to 99.5ml of 0.36 NH_2SO_4; commercially available). Compare the turbidity of the test bacterial suspension with that of 0.5 MacFarland (vigorously shaken before use) against a white background with contrasting black line under

adequate light. Arrow points to tube with correct turbidity. Reduce turbidity by adding sterile saline or broth.

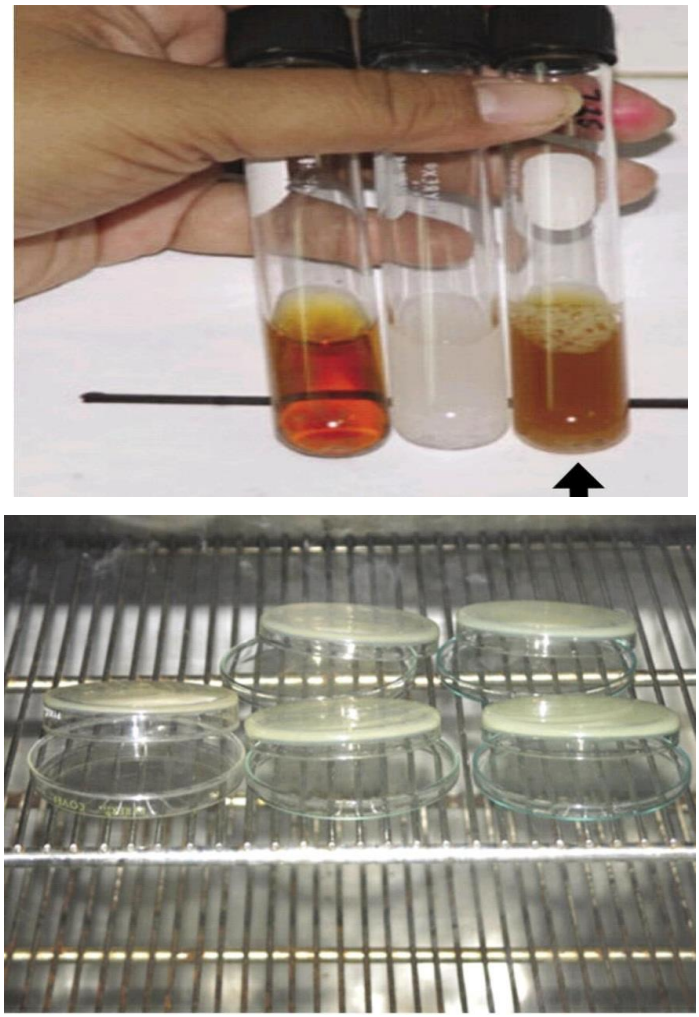

Fig: 5 Agar Medium Preparation.

4. RESULTS AND DISCUSSION

5.1 Physical Parameters

Table: 3 Physical Parameters.

FORMULATION	COLOR	ODOUR	AVERAGE WEIGHT	PERCENTAGE YIELD
F1	Pink	Aromatic	1.05 gm	93.5%

5.2 Evaluation of Paper Soap

Table: 4 Evaluation of Paper Soap

F	TOTAL FATTY MATTER	pH	FREE ALKALI	FOAM HEIGHT	FOAM RETENTION
F1	75.35	5.9	0.35	31cm	5min

5.3 Solubility

Table: 5 Solubility

FORMULATION	HOT WATER	COOL WATER	ETHANOL	ACETONE
F1	+++	+++	+++	++

Keys: + (weakly soluble), ++ (Partially soluble), +++ (soluble).

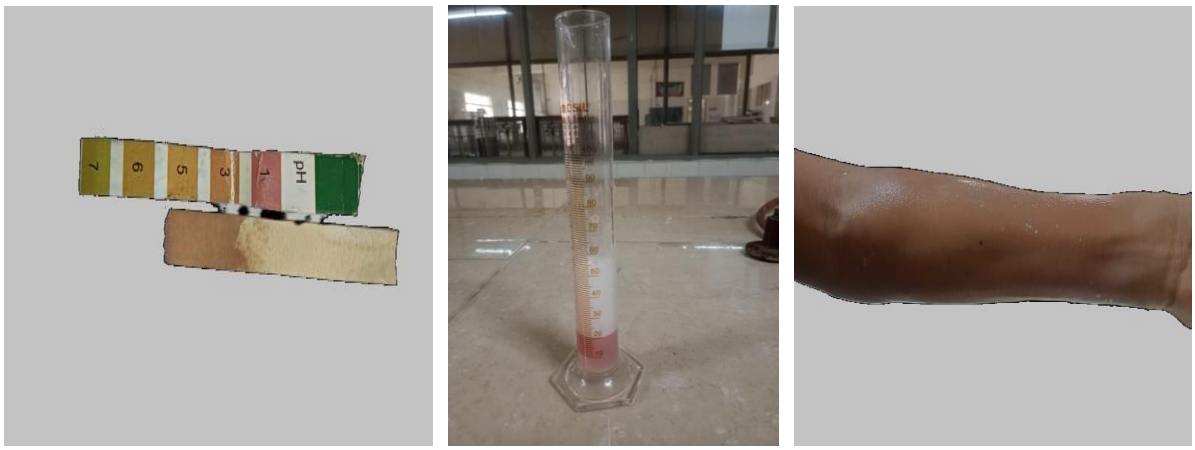

Fig: 6 Evaluation Of Paper Soap.

5.4 Skin Irritancy Test

Table: 6 Skin Irritancy Test.

FORMULATION	2hr	4hr	8hr	16hr	24hr
F1	*NIL*	*NIL*	*NIL*	*NIL*	*NIL*

5.5 Anti Fungal Activity

Fig: 7 Anti-fungal Activity.

S.No.	Microorganisms	Control	L	S	Amphotericin -B
		Zone of inhibition in mm			
1.	*Epidermophyton floccosum*	-	10	22	12

Table 7: Anti-fungal Activity.

5.6 IR Analysis

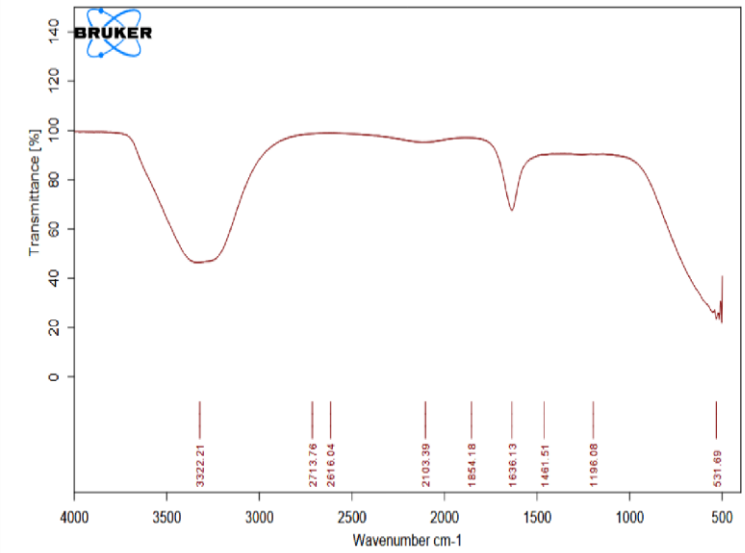

Fig. 8: Extract Of Daisy flower.

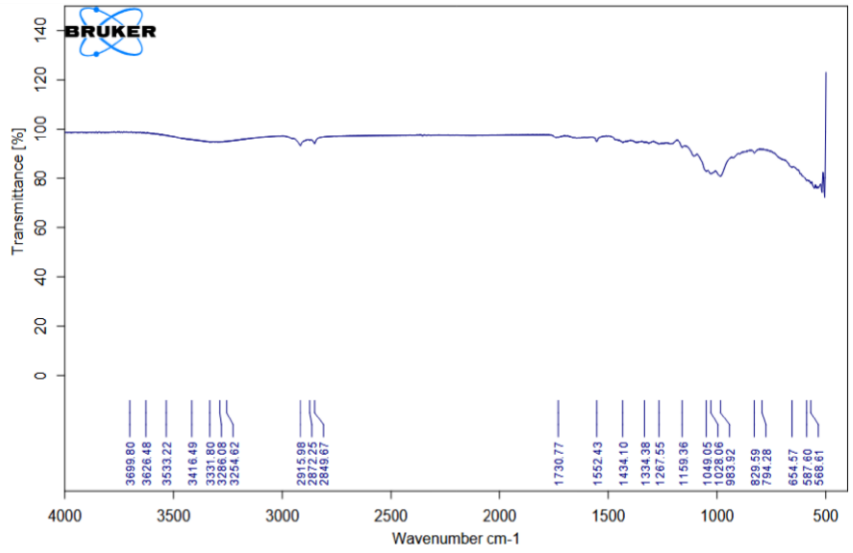

Fig. 9: Extract Of Daisy Flower Containing Herbal Paper Soap.

5. CONCLUSION

The formulated herbal paper soap using Daisy flower extract was successfully prepared and evaluated through the pouring method. The combination of natural and synthetic ingredients provided a stable, user-friendly soap sheet with effective cleansing, fragrance, and foaming properties. The Daisy flower extract contributed natural antifungal and soothing effects, making the product gentle on the skin and eco-friendly. This project demonstrates the potential for herbal-based personal hygiene products as an alternative to conventional soaps, with added benefits such as portability, biodegradability, and skin compatibility.

6. REFERENCES

1. Tortora G. J, Grabowski S. R., Principles of Anatomy and Physiology 10th edition published by John Wiley and Sons, 2003; 140-143.
2. Grace X. F, Sowmya K. V, Darsika Polyherbal Hand Sanitizer – Formulation and Evaluation, Indian Journal of Pharmacy and Pharmacology, 2015 April-June; 2(2): 143-144.
3. Sunhyo R, Peter I. S, Chang H. S, Hyeonsook C, Yoon Kyung P, Colonization and Infection of the Skin by S. aureus Immune System Evasion and the Response to Cationic Antimicrobial Peptides, International Journal of Molecular Science, Published on, 2014 May 16; 8754-8755.
4. Choudhari S, SutarM, Chavan M, Formulation, Evaluation and Antibacterial Efficiency of herbal hand wash, Indo American Journal of Pharmaceutical Research, 2016; 6(04): 5202-2503.
5. SaadA. H, Gamil S. N, Kadhim R. B, Samour R, Formulation and Evaluation of Herbal Hand Wash from Matricariachamomilla Flowers Extracts, International Journal of Research in Ayurveda and Pharmacy, 2011; 2(6): 1811-1813.
6. Ruckmani K, Krishnamoorthy R, Samuel S, Kumari H. L. J, Formulation of Herbal Bath Soap from Vitexnegundo Leaf Extract, Journal of chemical and pharmaceutical sciences, 2014; (2): 95.
7. Sharma A, Yadav R, Guha V, Soni U. N, Patel J. R, Formulation and Evaluation of Herbal Hand Wash, World Journal of Pharmacy and Pharmaceutical Sciences, 2016; 5(3): 675-683.
8. Londhe J, Jagpat S. D, Doshi C, Formulations of Herbal Hand Wash With Potential Antibacterial Activity, International Journal of Research in Advent Technology, 2015: 11-12.

9. Rangari V. D, Pharmacognosy and phytochemistry,2nd edition reprint, Volume 2nd,Nashik: published by career publication; May 2012, 115.
10. Majekodunmi S. O, Essien A. A, Development and evaluation of antimicrobial herbal formulations containing the methanolic extract of Cassia alata for skin diseases, Journal of Coastal Life Medicine, 2014; 2(11): 872-875.
11. Wijetunge W.M.A.N.K, PereraB.G.K, Preparation of Medicinal Soap Products Using the Leaf Extracts of Punica Granatum Pomegranate, International Journal of Pharmacy and Biological Sciences, 2016; 6(2):07-16.
12. Kokate C. K, PurohitA. P, Gokhale. B, Pharmacognosy, 29th edition, Pune, published by NiraliPrakashan; Jan 2009, 9.184.
13. Ragnar. D, Pharmacognosy and phytochemistry, 2nd edition reprint, Volume 1st, Nashik, published by career publication; May 2012, 115.
14. Londhe J, Jagtap S. D, Doshi C, Jagade D, Formulations of Herbal Hand Wash with Potential Antibacterial Activity, International Journal of Research in Advent Technology, 2015: 11.
15. Moghadamtousi S. Z, Kadir H. A, Hassandarvish P, Tajik H, Abubakar S, Zandi K, A Review on Antibacterial, Antiviral and Antifungal Activity of Curcumin, BioMed Research International, 2014: 02.
16. Khadbadi S. S, Deore S. L, Bhaviskar B. D, Experimental phytopharmacognosy, A Comprehensive Guide, 1st edition, may 2011,8.4.
17. Ariza T, The things well make, Homemade Glycerin Soap Recipe (from scratch), August 2017, Available from:
7. https://thethingswellmake.com/homemade-glycerin-soap-recipe-from-scratch/
18. Afsar Z, Khanam S, Formulation and Evaluation of Poly Herbal Soap and Hand Sanitizer, International Research Journal of Pharmacy, 2016; 7(8): 54-57.
19. Powar P. V, Bhandari N.R, Ashwini A, Sharma P.H, Formulation and Evaluation of Poly Herbal Anti-Bacterial Gel Based Hand Wash, International Journal of Pharmaceutical Sciences Review and Research, 2015; 33(1): 79-82.
20. Stevens, J. (2001). *Fungal skin infections*. School of Medicine, University of New Mexico.
21. White, S. (2006). *Fungal skin infections*. Davis, USA: University of California.