



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## FORMULATION AND EVALUATION OF HERBAL SOAP OF NEEM

<sup>1</sup>Rushikesh Ram Khedkar, <sup>2</sup>Prof Zine S.R, <sup>3</sup>Dr prachi Udapurkar  
<sup>1</sup>Bachelor of Pharmacy, <sup>2</sup>Master of Pharmacy, <sup>3</sup>PhD Pharmacy  
<sup>1</sup>Kishori Collage Of Pharmacy

### ABSTRACT:-

Herbal products have become an item of global importance both medicinally and economically. Although usage of these herbal products has increased, their quality, safety and efficiency are serious concerns in industrialized and developing countries. The present research has been undertaken with the aim to formulate and evaluate the pure herbal formulation. A herbal soap was formulated using the leaf and bark extract of *Azadirachta indica*. Ayurvedic cosmetics are also known as the herbal cosmetics. The natural content in the herbs does not have any side effect on the human body. Most herbal supplements are based on several botanical ingredients with long histories of traditional or folk medicine usage. Among the numerous botanical ingredients available in the market today, numerous chemical toxins in microorganisms present in the atmosphere may cause chemical infection and damage to skin. Cosmetics alone are not sufficient to take care of skin and body parts. Neem (*Azadirachta indica*) tree has attracted worldwide prominence owing to its wide range of medicinal properties, neem leaves and its constituents have been demonstrated to exhibit anti-inflammatory, anti-hyperglycemic, anti-ulcer, anti-malarial, antifungal, antibacterial, anti-mutagenic and anti-carcinogenic properties. This study was conducted to evaluate the effect of aqueous ethanolic and ethyl acetate extract from neem leaves. The physicochemical parameters of formulations (Physical evaluation, pH, Foaming ability and foam stability) were determined. The results showed that the formulation has a pH level nearly equal to skin pH, foaming index is excellent.

### INTRODUCTION:-

Herbal soap preparation is a medicine or drug that contains antibacterial & antifungal agents which are mainly used for part of plants such as leaves, stem, roots & fruits to treat injury or disease or to achieve good health. Herbal cosmetics are also known as natural cosmetics. Herbal cosmetics are products which are used to purify and beautify the skin. The main advantage for using an herbal cosmetic is that it is pure and does not have any side effects on the human body; instead, it enriches the body with nutrients and other useful minerals. Soap is a solid product made from oil by means of saponification. In neem leaf and its extract exhibit immunomodulatory, anti-inflammatory, anti-ulcer, anti-malarial, antifungal, antibacterial, antioxidant, anti-carcinogenic property. The present scenario, it seems improbable that herbal soaps, although better in performance and safer than synthetic ones, will be popular with the consumers.

Soaps and detergents have been registering steady growth in demand in the country, in tune with the industrial

and economic growth. Herbal soap has generated considerable interest and enthusiasm amongst the consumers in recent times, due to its eco-friendly nature of the product. There is good scope for setting up herbal soap projects in the country. While there is no particular entry barrier from the point of view of technology, adequate market thrust is necessary to competitively sell the product in the market. The toilet soap consumption in India is estimated at 1200000 to per annum. The soap market is growing at the rate of about 9% per annum.

Reetha is an exceptional cleanser. Hence it's a perfect substitute for soap and face wash due to the presence of saponin. It is also good for use on sensitive skin. A combination of Reetha and Chickpeas gives a gentle and enriching experience to the skin it has conditioning properties, therefore, it keeps skin moisturized and cool. Reetha prevents the skin from drying and keeps it soft and supple it also helps to treat eczema and psoriasis. Shikakai is quite effective in treating various skin infections like scabies and also used as an anti-wrinkles property.

In this review article herbal soap containing neem, tulsi, shikakai and reetha as natural plant ingredients and this content gives or shows antibacterial, antifungal & anti-inflammatory activity. In this soap, neem is the main compound, and shows medicinal properties. Neem leaf and its extract exhibit immunomodulatory, anti-inflammatory, anti-ulcer, antimalarial, antifungal, antibacterial, antioxidant, anticarcinogenic property. Tulsi has got the greatest medicinal value. Tulsi is effective for diabetes by reducing blood glucose levels. Tulsi is also used in severe acute respiratory syndrome. Juice of its leaves gives relief in cold, fever, bronchitis and cough. Tulsi reduces stress, enhances stamina, relieves inflammation and also shows antifungal activity so tulsi is also used as the main compound in this herbal soap. The main antifungal activity of Tulsi serves to be beneficial in soap formulation.

The skin is deeply cleaned, acne is treated, and the skin tone is lightened, among other things. Acute respiratory syndrome was another term used by neem. Tulsi is also utilised by diabetic individuals to lower blood sugar levels. Colds, flu, bronchitis, and coughs are all alleviated by tulsi leaf juice. Neem provides additional benefits by lowering stress and boosting stamina.

It is also utilised as a primary ingredient. For moisturised skin, rose water is utilised in the manufacture of soap. This soap primarily provides antibacterial, antifungal, skin-lightening, acne-removal, and smoothing or moisturising properties. The skin is deeply cleaned, acne is treated, and the skin tone is lightened, among

other things. Acute respiratory syndrome was another term used by tulsi. Tulsi is also utilised by diabetic individuals to lower blood sugar levels. Colds, flu, bronchitis, and coughs are all alleviated by tulsi leaf juice. Tulsi provides additional benefits by lowering stress and boosting stamina. It is also utilised as a primary ingredient. Alovera is used as a moisturiser, to prevent signs of ageing, to lessen stretch marks, to lessen acne, to help lighten blemishes, and to minimise acne. Alovera also provides skin that is smooth and supple. For moisturised skin, rose water is utilised in the manufacture of soap. This soap primarily provides antibacterial, antifungal, skin-lightening, acne-removal, and smoothing or moisturising properties.

Treat acne: antibacterial properties of neem fight acne-causing bacteria which help in the treatment and prevention of acne. Tackles blackheads and whiteheads. Alovera shows moisturizer it is moisture the skin without giving it a greasy feel. It is perfect for anyone with an oily skin. It also fights sunburn or acne. This soap is mainly used for all skin problems.

The neem soap is used as an antiseptic soap so there is the antiseptic action to be provided when there is the neem gives an antimicrobial action.

**LITERATUREREVIEW:**

1. **AshleshaGhanwat\***, **SachinWayzod** and **Vanjire Divya**( in year 2020)The plant *Azadirictaindia*, *Ocimumtenuiflorum* , *Sapindusmukorossi* and *Acacia concinna* were extracted using water and subjected to various evaluation test according to previous research the antimicrobial activity of *Neem* was studied . the prepared formulation when tested for different test gave good results . It does not give any irritancy to skin it was determined by using these soap by few volunteer hence it is proved that soap does not give any irritancy to skin .Furthermore the prepared soap were standardized by evaluating various physico chemical properties such as pH appearance odour in which the exhibits satisfactory effect.
2. **Satish Kumar Sharma1\*** and **Suruchi Singh** (in year 2020) In the prior studies it was noted that Nosocomial infection has been recognized as a crucial issue in the outcome of hospital care, resulting in significant morbidity and mortality. The primary routes of infection transmission to patients are the hands of health-care workers. Many of the antiseptics are sanitizers that dependent on alcohol and can have deleterious effects. Their regular use can cause irritation of the skin. Therefore, herbal hand-wash was prepared using herbal extract *T. catappa*, *C. longa* and *G. indica*. The present results indicate that the ingredients of *T. catappa*, *C. longa* and *G. indica* extracts and their combinatorial compositions are capable of developing better antiseptic hand-wash against skin pathogens than the commercially available preparations. Therefore, a new way, of combating antibiotic drug resistance of pathogenic organisms and healthier living by germ-free aseptic hands can be found. A significant number of microbial load can be reduced by natural, economic and safe hand wash. This may serve as the reasonable basis for the preparation of the herbal hand-wash. This has opened new avenues in the production of 'antiseptic hand-wash' replacing the use of chemical substances.
3. **Rakesh K. Sindhu\*1**, **Mansi Chitkara2** , **Gagandeep Kaur1**, **Arashmeet Kaur1** , **Sandeep Arora1** and *indica* extracts and their combinatorial compositions are capable of developing better antiseptic hand-wash against skin pathogens than the commercially available preparations. Therefore, a new way, of combating antibiotic drug resistance of pathogenic organisms and healthier living by germ-free aseptic hands can be found. A significant number of microbial load can be reduced by natural, economic and safe hand wash. This may serve as the reasonable basis for the preparation of the herbal hand-wash. This has opened new avenues in the production of 'antiseptic hand-wash' replacing the use of chemical substances.
4. **I.S. Sandhu**( in year 2019) The evaluation parameters carried for standardizing the herbal soap by color determination, pH, TFM, ethanol soluble content, Saponification value were carried out. This led to an outcome of the formulation of stable Polyherbal soap possessing potent antimicrobial activity against various micro-organisms such as *E. coli* and *S. aureus*. In addition this formulation was found to be used for daily use and did not cause any skin irritation. The blends of various oils in this soap formulation helped in providing specific activity to the formulation possessing potent medicinal properties (Amehe et al., 2013)

**Makwana Ht , Pandya DJ** reported “ *Launaea pinnatifida* Cass. A Species of the Controversial Drug *Gojihva*: Comprehensive Review 2019” in which they stated that Many primary and secondary metabolites, including as carbohydrates, alkaloids, amino acids, glycosides, steroids, and tannin, have been discovered in root powder, according to pharmacognostical research. Only a few phytochemical components, such as *Taraxasterol* from the leaves and *Taraxeryl acetate* from the roots, have been identified from *L. pinnatifida*. Apart from that, triterpenoid saponins were extracted from Methanolic extract of *L. pinnatifida* seed, as well as recognized chemicals *glutenol* and

hopenol B. The ethanol fraction of *L. pinnatifida* leaves has been shown to have significant hepatoprotective, antibacterial, antifungal, and antioxidant properties

**Triveni S Inganakal** reported “*Launaea pinnatifida*: Controversial Drug: A Review on its Pharmacological and Traditional Uses 2021 “ in which he state that The plant is a valuable herb that is well-known for its Ayurvedic and traditional uses, which include health advantages for humans. Diuretic, hepatoprotective, jaundice, blood purifier, antioxidant, and many more ailments have all been treated with the herb. The presence of alkaloids, saponin, flavonoids, terpenoids, and tannin was discovered in a preliminary phytochemical research. Triterpenoid saponins, as well as glutenol and hopenol-B, were extracted from a methanolic extract of *Launaea pinnatifida* and have been shown to have antifungal, antibacterial, antioxidant, hepatoprotective, and antidiabetic properties. Serum markers in alloxan-induced diabetic rats showed substantial variable differences in serum markers when the isolated compound and ethanolic extract of *L. Pinnatifida* leaves were compared in an experimental model. When compared to controls, antidiabetic activity in streptozotocin-induced mice revealed a significant drop in blood glucose level and a persistence in reducing impact until the end of the trial. Furthermore, standardizing the development of data that supports its traditional claim requires scientific and methodical study of phytoconstituents of plants. This review considers phytochemical composition as well as contemporary research that has discovered benefits for human health, such as anti-inflammatory, antibacterial, antioxidant, antidiabetic, and hepatoprotective properties.<sup>6</sup>

AIMANDOBJECTIVE

**Aim:-**

To study the formulation development and evaluation of herbal antibacterial soap of neem (*Azadirachta indica*)

**Objectives:**

The ultimate aim of this study is to formulate and evaluate the herbal antibacterial soap using extracts of plant having ethnic and dermatological importance in Ayurveda.

**To study the evaluative parameters such as :-**

- 1) pH
- 2) Foam retention
- 3) Foam height
- 4) Moisture Content
- 5) Cleansing Ability
- 6) Skin Irritation

## Formulation of herbal soap

To obtain extract of *Azadiracta indica*, *Ocimumtenuiflorum*, *Sapindusmukorossi* and *Acacia concinna* powder was incorporated into a soap formulated with basic glycerin soap and which contain 1 gm stearic acid, 0.70gm soft paraffin. Weighed 1gm of stearic acid, 0.70gm soft paraffin, 5ml ethanol was taken. Glycerin basic soap was melted first and to it 1gm stearic acid, 0.70gm soft paraffin, 5ml ethanol were added. Extract was incorporated into melted solution with continuous agitation for 30 minutes until molten mixture became homogeneous. The semisolid mixture was poured into a mould and allowed to solidify.

## EXPERIMENTAL MATERIAL AND METHODS

### Chemicals

These include stearic acid, soft paraffin, ethanol, orange oil.

### Collection, identification and processing of plant

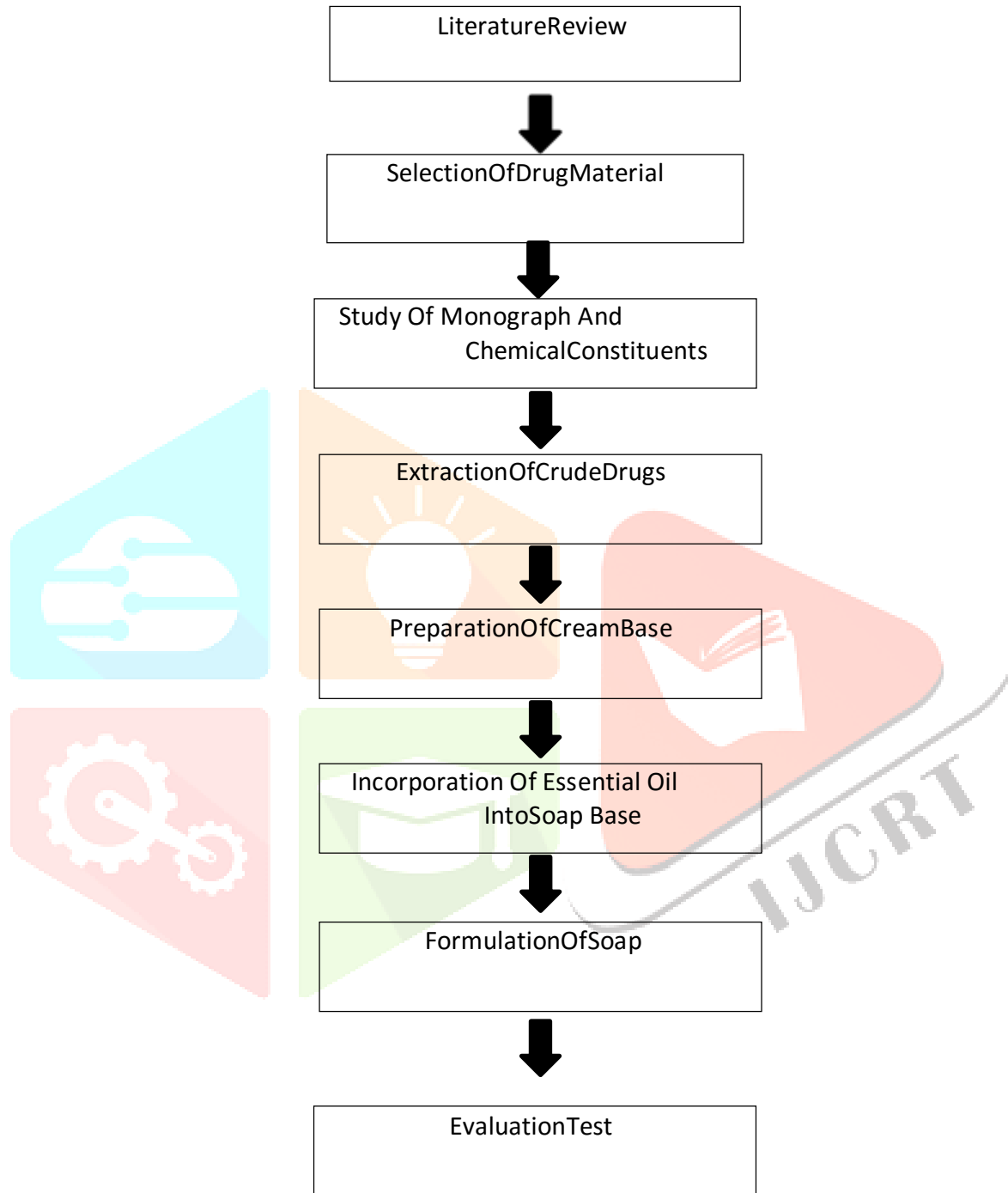
The leaves of *Azadiracta indica*, *Ocimumtenuiflorum*, and seeds of *Sapindusmukorossi* and pods of *Acacia concinna* were collected from different matured plant. The leaves were dried in hot air oven, pulverized and stored in airtight bottles for the studies

### Extraction

The *Azadiracta indica*, *Ocimumtenuiflorum*, *Sapindusmukorossi* and *Acacia concinna* powder was extracted with water by decoction process. 9 gm of above stated powder was taken in conical flask and extracted with water for four hours with occasional agitation. Then filtered

### Formulation of herbal soap

To obtain extract of *Azadiracta indica*, *Ocimumtenuiflorum*, *Sapindusmukorossi* and *Acacia concinna* powder was incorporated into a soap formulated with basic glycerin soap and which contain 1 gm stearic acid, 0.70gm soft paraffin. Weighed 1gm of stearic acid, 0.70gm soft paraffin, 5ml ethanol was taken. Glycerin basic soap was melted first and to it 1gm stearic acid, 0.70gm soft paraffin, 5ml ethanol were added. Extract was incorporated into melted solution with continuous agitation for 30 minutes until molten mixture became homogeneous. The semisolid mixture was poured into a mould and allowed to solidify

**PlanOfwork:**

## MATERIALS&METHOD

### NEEM

#### Monograph:-

- CommonName–Neem.
- ScientificName-AzadirachataIndica.
- BiologicalSource-AlmostallpartofplantAzadirachataIndica.
- Family-Meliaceae,themahoganyfamily
- Kingdom-plant.



**Fig:Neem**

Neem is an omnipotent tree and a sacred gift of nature. The neem tree is mainly cultivated in the Indian subcontinent. Neem is a member of the mahogany family, Meliaceae. Today it is known by the botanical name *Azadirachta indica* (A. indica)

Sarva Roga Nivariini – the curer of all ailments | Role of *Azadirachta indica* is a wonder drug stressed as far back as 4500 years ago.

### Importance of NEEM :-

- Some of its health restoring benefits: Effective in skin infection, rashes & pimples.
- Immunity booster, Anti-obesity, Blood purifier for beautiful & healthy skin, Anti-diabetic, Anti-viral, Dispels intestinal worms and parasites, Malaria, Piles, Hair disorder & Oral disorders.
- Neem is rich in fatty acids, including oleic, stearic, palmitic, and linoleic acids.
- Neem is used to treat psoriasis and eczema.
- Neem has been used to treat acne, reduce blemishes, and improve skin elasticity.
- Leaf extract accelerates wound healing through an increased inflammatory response and the formation of new blood vessels.

### Constituents:-

- Flavonoids,
- Alkaloids,
- Azadirone,
- Nimbin,
- Nimbidin,
- Terpenoids
- Steroids,
- Margaric acid,
- Vanilic acid,
- Glycosides,
- B-sitosterol,
- Nimbectin,
- Kaempferol,
- Quercetin

are present in Neem



**A Herbal soap should have the following characteristics:**

- It should remove dirt and sweat from your body.
- It should leave your skin feeling clean and refreshed.
- It should nourish and soften your skin.
- It should purify and protect skin from environmental damage.
- It should moisturize your skin.
- It should have a pleasant odour.

**Plant Materials:-****Neem:-**

- The Neem leaves were collected from different matured plants.
- Cracked and dry skin can be moisturised and made smooth by using neem.
- It acts as an antibacterial, antifungal, and antioxidant agent.
- Neem has been used to treat acne, reduce blemishes, and improve skin elasticity.
- Neem is rich in fatty acids, including oleic, stearic, palmitic, and linoleic acids.

**Chemicals : Glycerine**

- Glycerine is a non-toxic, odorless, and colorless liquid.
- Glycerine is used as a humectant in soap products.
- Glycerine will make sure that your skin will maintain its own moisture in order to protect it from damage caused by dryness.
- It can increase skin hydration, relieve dryness, and refresh the skin's surface.
- It's also an emollient, which means it can soften skin.

**Ethanol:-**

- Ethanol is most often used when making glycerin soap.
- Ethanol has the ability to dissolve on a partial level in water and oil.

- It helps in making soap transparent.
- Ethanol can be used as Antiseptic, Antidote and as Medicinal solvent

### **Steric Acid:-**

- Stearic Acid helps to harden products, such as candles and soap bars.
- It is usually used as a thickening agent.
- Stearic acid is an emulsifier, emollient, and lubricant
- Stearic acid is used mostly in the manufacture of soaps, detergents, and several other cosmetics such as shaving creams and shampoos.

### **Sodium lauryl sulphate:-**

- Sodium lauryl sulfate (SLS) is a surfactant
- sodium lauryl sulfate helps to stabilize and thicken solutions with ingredients of differing solubility.
- It allows products to achieve a more uniform texture for easier, and smoother application.
- It makes soap foamier.

### **FORMULATION:**

**Table 1**

<b>Ingredients</b>	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>Use</b>
NAOH	0.8gm	1.6 gm	3gm	Saponify oils
Propylene glycol	9.3ml	18.7ml	15ml	Penetration enhancer
Glycerine	3.1ml	6.25ml	8ml	Humectant
Ethanol	9.5ml	19ml	12ml	Solvent
Sodium lauryl sulphate	7.5gm	15gm	10gm	Surfactant

### **Formulation of Soap:-**

**Table 2**

<b>Ingredients</b>	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>Uses</b>

Stericacid	6.5gm	8gm	10gm	Hardening
Neemextract	3ml	6ml	8ml	Antimicrobial
neemextract	2ml	4ml	6ml	Antioxidant
Menthol	2gm	3.4gm	5gm	Perfume/cooling agent

### Materials:-

Table3

MATERIALS	SOURCE
Neem	Plant

### PROCEDURE:-

#### Extraction:-

The Azadirachtaindica powder, was extracted with water by decoction process.

9 gm of above stated powder of neem were taken in separate conical flask and extracted with water for 40-60 min with occasional agitation.

Then filtered.



Fig-Extraction of Neem

#### Preparation of flye:-

Lye solution was prepared by mixing 0.8g NaOH and 1.5ml DIH<sub>2</sub>O in 125ml beaker.

Measure 9.3ml Propylene glycol, 3.2ml Vegetable glycerine

Add 9.5 ml 95% Ethanol solution, 7.5 g Sodium lauryl sulfate into 250 ml beaker on hot plate with stir bar.

Heat mixture to 60°C.

### Preparation of Soap:-

6.5 g Stearic acid and heat mixture to 68°C.

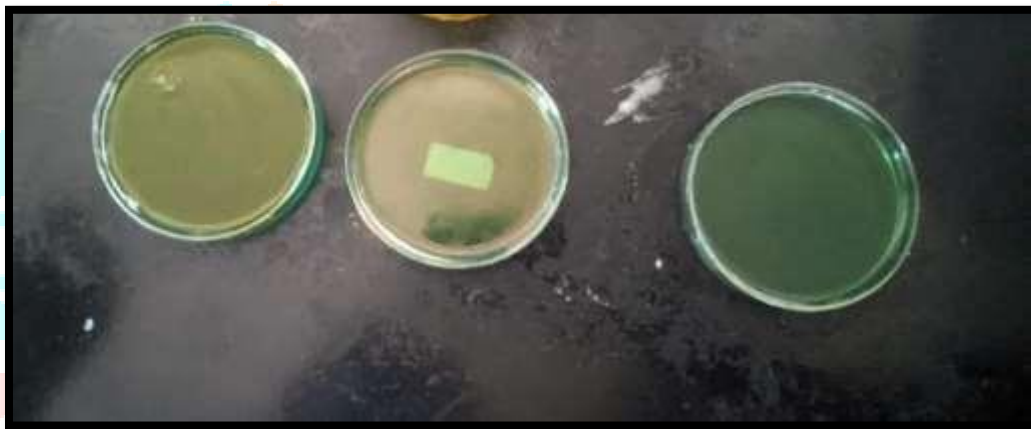
When at temperature slowly add the 50:50 lye solution and mix for 20 minutes while continuously stopping and starting stirring until mixture becomes transparent.

Further required quantity of Azadirachtaindica extract was mixed to the above mixture and volume made up to 100 ml by adding remaining distilled water.

Let solution sit for 1 hour at 68°C.

Few crystals of menthol were also added to impart aroma to the prepared soap.

Let soap solution cool to 62-64°C and pour into soap mold, let cool and harden.



### EVALUATION OF HERBAL SOAP:-

The herbal soap formulated was evaluated for the following:

1. Physical evaluation:-
2. pH:-
3. Foam retention:-
4. Foam height :-
5. Moisture content:-
6. Cleansing ability :-
7. Skin irritation test:

#### 1) Physical evaluation:-

Physical characteristics such as colour and Appearance were checked by naked eye. Odour was identified by Smelling.

1. Colour-Green

2. Odour-pleasant 3. Appearance-Good

## 2)pH

The pH was determined by using pH paper. The pH was found to be basic in nature.



## 1. Foam retention:-

Foaming ability and foam stability: Cylinder shake method was used to test for the foaming ability. 50 ml of the 1% formulated products solution was placed into a 250ml graduated cylinder, covered with one hand and shaken for 10 times. After 1 min of shaking, the total volume of the foam content was recorded. Foam stability was valued by recording the foam volume after 1 min and 4 min of shake test.

## 2. Foam height:

0.5 g of sample of soap was dispersed in 5 ml distilled water. Then, transferred it into 10ml measuring cylinder. Five-eight strokes were given and allowed to stand still and the foam height above the aqueous volume was measured.



**Fig:-Foam Height**

### 3. Moisture content

The moisture content was used to estimate the percentage of water in the soap by drying the soap to a constant weight. The soap was weighed and recorded as —wet weight of sample and was dried from 100 to 115°C using a dryer [21]. The sample was cooled and weighed to find the —dry weight of sample. The moisture content was determined using the formula.

$$\% \text{Moisture content} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Final weight}} \times 100$$

### 4. Cleansing ability:-

A dirty cloth was soaked in a bucket containing soap solution and rinsed slowly and the dirt removed from the cloth was observed.

### 5. Skin Irritation Test

Soap was applied on skin of hands and legs of 5 volunteers and observed.

### 6. Physical Ability:-

When soap is placed in a hot temperature for more than 10-15 minutes it enters into gel phase and the colour becomes

## RESULT AND DISCUSSION:-

Among all the formulations the formulation f2 in both table 1 and 2 exhibited good result .

The physicochemical parameters such as color, odor, appearance, and pH were tested. The pH of the soap was found to be 6.5 with pH strip . Remaining parameters such as foam height, foam retention, moisture content, and were also determined.

Foam Height was found to be: -2.5 Foam Retention was found to be: -5 min Moisture Content in soap is: -6.66%

### Discussion:-

The present work is concerned with the formulation of soap using extract of neem. The formulated soap was a dry, stable solid showing no colour change and good appearance and is foamy in nature. It showed good skin compatibility and causes no irritation when tested on 5 volunteers.



**Fig:-Herbal Neem Soap**

## CONCLUSION:-

The formulated soap showed considerable antibacterial activity as the commercial standard and all the other parameters were good.

The plant Neem were extracted using water and subjected to various evaluation test according to previous research the antimicrobial activity of Neem was studied . the prepared formulation when tested for different test gave good results .It does not give any irritancy to skin it was determined by using these soap by few volunteer hence it is proved that soap does not give any irritancy to skin. Furthermore the prepared soap were standardized

ed by evaluating various physicochemical properties such as pH appearance odour in which the exhibit satisfactory effect. The soap was free from harsh chemicals which are used in commercial soaps. Herbal soap can be used as a promising alternative to commercial chemical containing skin whitening soaps.

### The following are the conclusions drawn for the performed thesis

- Herbal soap containing natural ingredients was successfully formulated by using three different formulations. (F1 - F3).
- Among all the three formulations \*F2 formulations\* exhibited good results
- F2 soap containing natural ingredients was found to be in compliance with all the evaluation tests.

### REFERENCES:-

1. Cosmetics.(n.d.), Retrieved from: <http://en.wikipedia.org/wiki/Cosmetics>.
2. pCosmetics.(n.d). Retrieved from [www.cosmetics.co.in/cosmetic-products.html](http://www.cosmetics.co.in/cosmetic-products.html)
3. Saxton K., Crosby B., & Dunn k.(2013). Formulation of Transparent Melt and Pour Soaps Without Petroleum Derivatives. H-SC Journal of Sciences
4. Kole, P.L. Jadhav, H.R., Thakur, D.P., & Nagappa, A.N. (2005). Potential of Herbal Extracts. Indian Journal of Natural Products and Resources (IJNPR) Formerly Natural Product Radiance (NPR), 4(4), 315-321
5. Sharma, P.P. (2002). Cosmetic Formulation Manufacturing and Quality Control (3rd ed., pp. 644-647). Delhi: Bandanas Publication
6. Sudipta, D., Pallab, K.H. and Goutam, P. (2011). International Journal of Pharm Tech Research, 3, 140-143
7. Reddy, Y. R. R., Kumari, C. K., Lokanatha, O., Mamatha, S., & Reddy, C. D. (2013). Antimicrobial activity of Azadirachta Indica (neem) leaf, bark and seed extracts. Int. J. Res. Phytochem. Pharmacol, 3(1), 1-4.
8. Afsar, Z., Khanam, S., & Amir, S. (2018) Formulation and comparative evaluation of polyherbal preparations for their disinfectant effects, 1(1), 54-65
9. Joshi, M. G., Kamat, D. V., & Kamat, S. D. (2008). Evaluation of herbal handwash formulation. 7(5), 413-15
10. Dhanasekaran, M. (2016) International research journal of pharmacy. 7(2), 31-35.
11. Shivanand, P., Nilam, M., & Viral, D. (2010). Herbs play an important role in



- 12..Amit,J.,Subodh,D.,Alka,G.,Pushpendra,K.,&Vivek,T.(2010).Potentialofherbsas cosmaceuticals. International Journal of Research in Ayurveda and Pharmacy(IJRAP),1(1), 71- 77
13. Kapoor, V.P.(2005).Herbalcosmeticsforskinandhaircare.4(4).306-315.
14. Niharika, A., Aquicio, J. M., &Anand, A. (2010). Antifungal properties of neem(*Azadirachta indica*)leavesextracttotreat hairdandruff.E-ISRJ,2,244-52.
15. Kumar, K. P., Bhowmik, D., Tripathi, K. K., &Chandira, M. (2010). Traditional IndianHerbalPlantsTulsiandItsMedicinalImportance.ResearchJournalofPharmacognosy and Phytochemistry,2(2),93-101.
16. Panda, H. (2011). Herbal soaps & detergents handbook. NIIR Project Consultancy Services.
17. Bandyopadhyay, U., Biswas, K., Sengupta, A., Moitra, P., Dutta, P., Sarkar, D., ...&Banerjee, R. K. (2004). Clinical studies on the effect of Neem (*Azadirachta indica*)bark extract on gastric secretion and gastroduodenal ulcer. Life sciences, 75(24),2867-2878.
18. Sharma, J., Gairola, S., Sharma, Y. P., & Gaur, R. D. (2014). Ethnomedicinal plantsused to treat skin diseases by Tharu community of district Udham Singh Nagar, Uttarakhand, India. Journalofethnopharmacology,158,140-206.
19. Holetz, F.B., Ueda-Nakamura, T., Dias-Filho, B.P., Cortez, D.A.G., Mello, J.C.P., & Nakamura, C.V. (2002). Effect of plant extracts used in folk medicine on cell growth and differentiation of *Herpetomonas* *assamueli* (Kinetoplastida, Trypanosomatidae) cultivated in defined medium. Acta scientiarum, 24(3), 657-662.
20. Proksch E, Brandner JM, Jensen JM. The skin: An indispensable barrier. *Exp Dermatol* 2008; 17:1063-72.
21. Sharma K, Joshi N, Goyal C. Critical review of ayurvedic varnya herbs and their tyrosinase inhibition effect. *Anc Sci Life* 2015; 35:18-25.
22. Pulok M, Rajarshi B, Akanksha S, Subhadip B, Sayan B, Chandra K. Validation of medicinal herbs for anti-tyrosinase potential. *J Herb Med* 2018; 14:1-16.
23. Mukhopadhyay P. Cleansers and their role in various dermatological disorders. *Indian J Dermatol* 2011; 56:2-6
- 24.. Bernard P, Berthon JY. Resveratrol: An original mechanism of tyrosinase inhibition. *Int J Cosmet Sci* 2000; 22:219-26.
- 25.. Yi W, Cao R, Peng W, Wen H, Yan Q, Zhou B, et al. Synthesis and biological evaluation of novel 4-hydroxybenzaldehyde derivatives as tyrosinase inhibitors. *Eur J Med Chem* 2010; 45:639-46.
- 26.. Lee KT, Kim BJ, Kim JH, Heo MY, Kim HP. Biological screening of 100 plant extracts for cosmetic use (I): Inhibitory activities of tyrosinase and DOPA autooxidation. *Int J Cosmet Sci* 1997; 19:291-8.

- 27.. Afsar Z, Khanam S. Formulation and evaluation of poly herbal soap and handsanitizer. *IntResJPharm*2016;7:54-7.
28. AlAkeel,R.,Mateen,A.,Janardhan,K.,&Gupta,V.C.(2017).Analysisofantibacterial and anti-oxidative activity of Azadirachtaindica bark using varioussolventsextracts. *SaudiJournalof Biological Sciences*, 24(1), 11-14
29. Al-Hashemi, Z. S. S., &Hossain, M. A. (2016). Biological activities of different neemleaf crude extracts used locally in Ayurvedic medicine. *Pacific Science Review A:Natural Science andEngineering*, 18(2),128-131.
30. Alzohairy, M. A. (2016). Therapeutics role of Azadirachtaindica (Neem) and theiractiveconstituentsindiseasespreventionandtreatment. *Evidence-BasedComplementaryandAlternativeMedicine*,2016.

