



Formulation And Evaluation Of Herbal Antimicrobial Soap

Shaikh Nihal Nijam,

Dr. Prachi Udapurkar

(phD,Principal Kishori College of Pharmacy)

Ass Prof A.S. Sanap

(M.Pharm)

Kishori College of Pharmacy , Beed, Maharashtra 431122

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, tulsi Ayurvedic cosmetics are also known as the herbal cosmetics the natural content in the herbs does not have any sideeffect on the human body. Most herbal supplement 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 microorganism present in the atmosphere may cause chemical infection and damage to skin cosmetics alone are not sufficient totake 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, antihyperglycemic, antiulcer antimalarial, antifungal, antibacterial, antimutagenic and anticarcinogenic properties. This study was conductedto 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 formulation have pH level nearly equal to skin pH, Foaming index is excellent.

Index Terms – Neem , Tulshi

AIM AND OBJECTIVE :-

Aim :-

To study the formulation development and evaluation of herbal antimicrobial soap of neem (Azadirachta indica) & tulsi (Ocimum tenuiflorum).

Objectives:

The ultimate aim of this study is to formulate and evaluate the herbalantimicrobial soap using extracts of plant having ethnic and dermatological importance in Ayurveda,namely,Neem Azadirachta indica, and Tulsi Ocimum tenuiflorum

To study the evaluative parameters such as :-

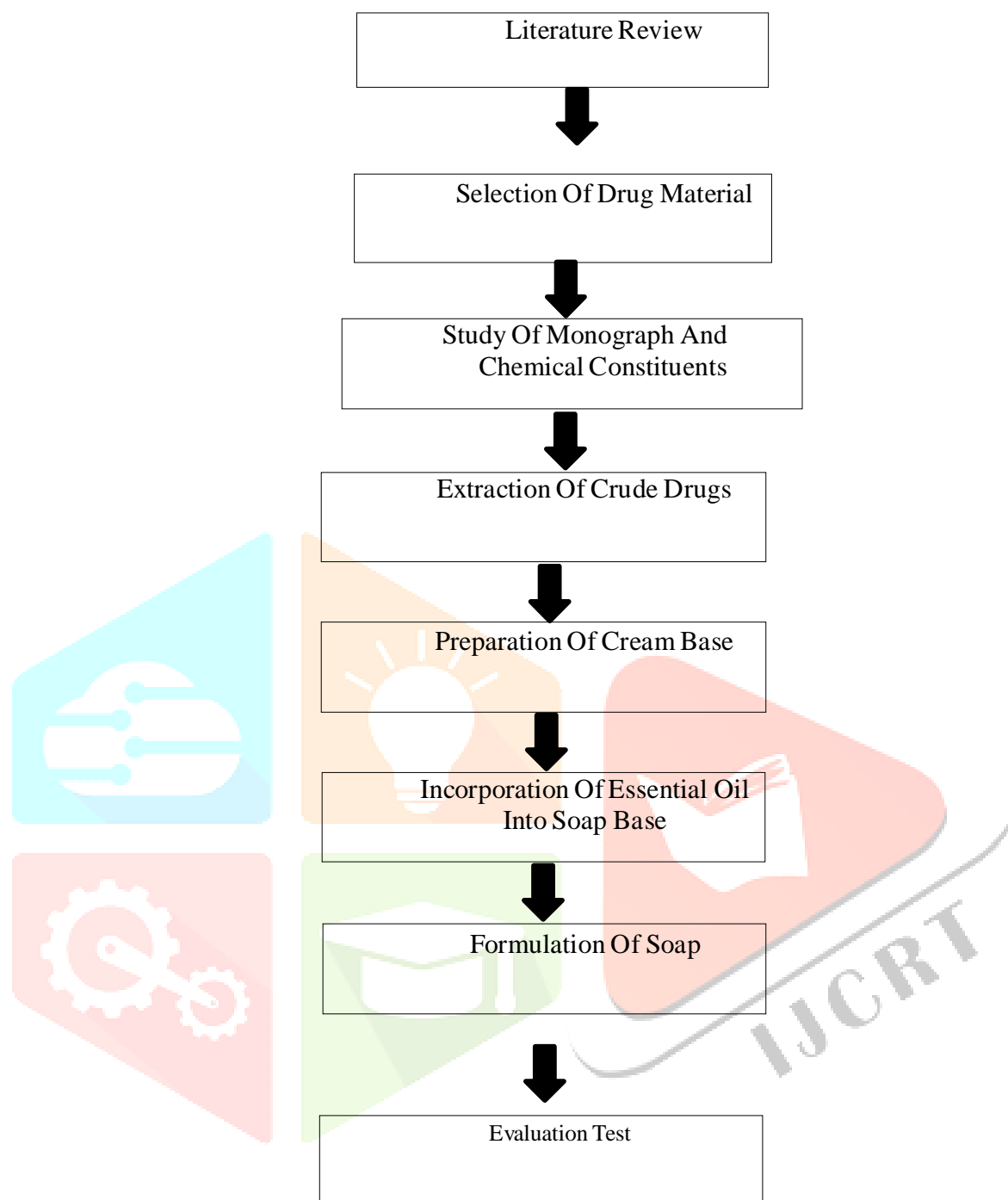
- 1) pH
- 2) Foam retention
- 3) Foam height
- 4) Moisture Content
- 5) Cleansing Ability
- 6) Skin Irritation

I. INTRODUCTION

Herbal soap preparation is a medicine or drugs it contain Antibacterial & antifungal agents which e mainly uses of part of plants such as like leaves, stem, roots & fruits to treatment for a 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 enrich 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, antiulcer antimalarial, antifungal antibacterial antioxidant anticarcinogenic property. Tulsi is called the queen of all herbs, it is used widely in Ayurvedic and naturopathic medicines which helps in the healing of the human body in a natural manner. Not only do Tulsi leaves benefit people, but their flowers too. Tulsi can help you get rid of many health problems ranging from fever to kidney stones. The present scenario, it seems improbable that herbal soaps , although better in performance and safer than the 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 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 tonnes per annum. The soap market is growing at the rate of about 9% per annum

Plan Of work :-**LITERATURE REVIEW:**

Ashlesha Ghanwat , Sachin Wayzod and Vanjire Divya (in year 2020) The plant *Azadiricta india*, *Ocimum tenuiflorum* , *Sapindus mukorossi* 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 . Further more the prepared soap were standardized by evaluating various physico chemical properties such as pH appearance odour in which the exhibit satisfactory effect.

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 handwash. 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.

Rakesh K. Sindhu¹, Mansi Chitkara², Gagandeep Kaur¹, Arashmeet Kaur¹, Sandeep Arora¹ and 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 (Ameh et al., 2013)

CONTENTS OF THE SOAP :-

NEEM

Monograph :-

- Common Name – Neem.
- Scientific Name- *Azadirachata Indica*.
- Biological Source- Almost all part of plant *Azadirachata Indica*.
- Family- Meliaceae, the mahogany family



Fig: Neem

Neem is an omnipotent tree and a sacred gift of nature. 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 Nivarini – the curer of all ailments || Role of *Azadirachata Indica* as a wonder drug is 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, Disperses 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 neem
- leaf extract accelerates wound healing through an increased inflammatory response and the formation of new blood vessels.

➤ Constituents :-

- a) Flavonoids,
- b) Alkaloids,
- c) Azadirone,
- d) Nimbin,
- e) Nimbidin,
- f) Terpenoids
- g) Steroids,
- h) Margosic acid,
- i) Vanilic acid,
- j) Glycosides,
- k) B-sitosterol,
- l) Nimbectin,
- m) Kaempeerol,
- n) Quercuserti

are present in Neem Leaf.

Tulsi :

- Common Name – Tulsi
- Scientific Name- *Ocimum tenuiflorum*
- Biological Source- leaves Of Tulsi
- Family- Lamiaceae
- Kingdom- plant



Tulsi is called as the Holy Basil⁶ in India with reference made to it in the Holy Scriptures. In its native India, it has been cultivated for nearly 2,000 years. Healers call it tulsi, the Queen of Herbs, the "Incomparable One," and it is prominent in Ayurveda and Hinduism for its various therapeutic applications. For skin care, the properties come from its impressive antioxidant abilities and for how it acts as a stress relieving agent.

IMPORTANCE OF TULSI :-

- Owing to its healing, antibacterial, antifungal anti-inflammatory properties
- Tulsi benefits the skin by preventing blackheads, acne and relieves skin infections, to name a few.
- Rich in vitamin K and antioxidants
- Tulsi benefits hair by stimulating blood circulation and promoting hair growth amongst others.
- Tulsi has skin and hair benefits. It contains camphene which works as a natural toner to remove excess oil in the skin.
- Tulsi neutralizes free radicals and rejuvenates the skin, reviving the youthful glow.

Chemical Constituents Of Tulsi Are:

- | | | |
|----|---|------------------------|
| a) |  | Oleanolic acid |
| b) |  | Ursolic acid |
| c) |  | Rosmarinic acid |
| c) | | Eugenol, Carvacrol |
| d) |  | Linalool |
| e) |  | β -caryophyllene |
| f) | | vitamin A |
| g) | | vitamin C |

Benefits And Characteristics of Neem and Tulsi Soap :-

- Natural Soap is Highly Moisturising.
- Better Ingredients Used.
- Cruelty-Free and Animal-Friendly.
- Wider Choice.
- Better for the Environment.
- Rich in Antioxidants.
- Fights Against Free Radicals
- Acts as an antibacterial clearing up skin irritations and acne.
- It is smooth, soft and gentle without leaving a residue or sticky film
- Rejuvenates the skin, reviving the youthful glow.

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

FORMULATION AND MATERIALS :-**Formulations of Lye :-**

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

Formulation of Soap :-

Ingredients	F1	F2	F3	Uses
Steric acid	6.5gm	8gm	10gm	Hardening
Neem extract	3ml	6ml	8ml	Antimicrobial
Tulsi extract	2ml	4ml	6ml	Antioxidant
Menthol	2gm	3.4gm	5gm	Perfume/cooling agent

Materials

MATERIALS	SOURCE
Neem	Plant
Tulsi	Plant

Plant Materials :-

Neem :-

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

Tulsi :-

- Tulsi is well known for its myriad medicinal properties antibacterial, antifungal, antipyretic,antioxidant, antiseptic and anticancer. Helps beat stress. Tulsi is a natural herb with anti- stress qualities
- .Tulsi is rich in Vitamin C and zinc , Rich in vitamin K and antioxidants.
- Tulsi benefits the skin by preventing blackheads, acne and relieves skin infections.
- It contains camphene which works as a natural toner to remove excess oil in the skin.
- . Tulsi neutralizes free radicals and rejuvenates the skin, reviving the youthful glow.

Chemical

- Glycerine is a nontoxic, 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

Stearic Acid :-

- Stearic Acid helps to harden products, such as candles and soap bars.
- It's 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 .

Menthol :-

- Menthol is an organic compound, more specifically a monoterpenoid, made synthetically or obtained from the oils of corn mint, peppermint, or other mints. It is a waxy, clear or white crystalline substance, which is solid at room temperature and melts slightly above. Wikipedia
- Formula: C₁₀H₂₀O
- Boiling point: 212 °C
- IUPAC ID: (1R,2S,5R)-2-isopropyl-5-methylcyclohexanol
- Density: 890 kg/m³
- Molar mass: 156.27 g/mol
- Classification: Organic compound

PROCEDURE

EXTRACTION :-

- The Azadirachta indica powder, and Tulsi leaves were extracted with water by decoction process.
- 9 gm of above stated powder of neem and Tulsi leaves were taken in separate conical flask and extracted with water for 40-60 min with occasional agitation.
- Then filtered.



Fig– 1. Extraction of Neem and Tulsi

Preparation of lye :-

- Lye solution was prepared by mixing 0.8g NaOH and 1.5ml DI H₂O in 125ml beaker.
- Measure 9.3ml Propylene glycol, 3.2ml Vegetable glycerine
- Add 9.5ml 95% Ethanol solution, 7.5g Sodium lauryl sulfate into 250ml beaker on hotplate with stir bar.
- Heat mixture to 60°C.

Preparation of Soap:-

- 6.5g 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 Azadirachta indica and Tulsi 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 molde, let cool and harden



EVALUATIONS 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
8. Physical Ability :-

1. Physical evaluation :-

Physssical characteristics such as colour and Appearance where checked by nakedeye Odour was identified by Smelling .

1. Colour :- Green
2. Odour :- pleasnt
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 250 ml 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 10 ml measuring cylinder. Five-eight strokes were given and allowed to stand still and the foam height above the aqueous volume was measured.



Fig .2 : - Foam Height

1. 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

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

2. 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 .

3. Skin Irritation Test :-

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

4. Physical Ability :-

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

RESULT AND DISCUSSION :-

Result :-

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: 5min Moisture Content in soap is:- 6.66%

Discussion:-

The present work is concerned with the formulation of soap using extract of neem and Tulsi. 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 :-3. Herbal Neem And Tulsi Soap

CONCLUSION :-

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

The plant Neem and Tulsi 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 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 formulation F2 formulations exhibited good results
- F2 soap containing natural ingredients was found to be in compliance with all the evaluation tests.

REFERENCE :-

1. Cosmetics.(n.d.), Retrieved from: <http://en.wikipedia.org/wiki/Cosmetics>. pCosmetics. (n.d). Retrieved from www.cosmetics.co.in/cosmetic-products.html
2. Saxton K., Crosby B., & Dunn k.(2013). Formulation of Transparent Melt and Pour Soaps Without Petroleum Derivatives. H-SC Journal of Sciences
3. Kole, P.L. Jadhav, H.R., Thakur , D.P., & Nagappa, A.N. (2005). Cosmetics Potential of Herbal Extracts. Indian Journal of Natural Products and Resources (IJNPR) Formerly Natural Product Radiance (NPR), 4(4), 315-321
4. Sharma, P.P.(2002). Cosmetic Formulation Manufacturing and Quality Control (3rd ed., pp. 644-647). Delhi: Bandanas Publication
5. Sudipta, D, Pallab, K.H. and Goutam, P. (2011). International Journal of PharmTech Research, 3, 140-143
6. 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.
7. Afsar, Z., Khanam, S., & Amir, S. (2018) Formulation and comparative evaluation of polyherbal

preparations for their disinfectant effects, 1 (1), 54-65

8. Joshi, M. G., Kamat, D. V., & Kamat, S. D. (2008). Evaluation of herbal handwash formulation. 7 (5), 413-15
9. Dhanasekaran, M. (2016) International research journal of pharmacy. 7(2), 31-35.
10. Shivanand, P., Nilam, M., & Viral, D. (2010). Herbs play an important role in the field of cosmetics. International Journal of PharmTech Research, 2(1), 632-639
11. Amit, J., Subodh, D., Alka, G., Pushpendra, K., & Vivek, T. (2010). Potential of herbs as cosmaceuticals. International Journal of Research in Ayurveda and Pharmacy (IJRAP), 1(1), 71- 77 Kapoor, V. P. (2005). Herbal cosmetics for skin and hair care. 4(4). 306-315.
12. Niharika, A., Aquicio, J. M., & Anand, A. (2010). Antifungal properties of neem (Azadirachta indica) leaves extract to treat hair dandruff. E-ISRJ, 2, 244-52.
13. Kumar, K. P., Bhowmik, D., Tripathi, K. K., & Chandira, M. (2010). Traditional Indian Herbal Plants Tulsi and Its Medicinal Importance. Research Journal of Pharmacognosy and Phytochemistry, 2(2), 93-101.
14. Panda, H. (2011). Herbal soaps & detergents handbook. NIIR Project Consultancy Services.
15. 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.
16. Sharma, J., Gairola, S., Sharma, Y. P., & Gaur, R. D. (2014). Ethnomedicinal plants used to treat skin diseases by Tharu community of district Udham Singh Nagar, Uttarakhand, India. Journal of ethnopharmacology, 158, 140- 206.
17. 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 muelleri* (Kinetoplastida, Trypanosomatidae) cultivated in defined medium. Acta Scientiarum, 24(3), 657-662.
18. Proksch E, Brandner JM, Jensen JM. The skin: An indispensable barrier. *Exp Dermatol* 2008;17:1063-72.
19. Sharma K, Joshi N, Goyal C. Critical review of ayurvedic varnya herbs and their tyrosinase inhibition effect. *Anc Sci Life* 2015;35:18-25.
20. 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.
21. Mukhopadhyay P. Cleansers and their role in various dermatological disorders. *Indian J Dermatol* 2011;56:2-6
22. Bernard P, Berthon JY. Resveratrol: An original mechanism on tyrosinase inhibition. *Int J Cosmet Sci* 2000;22:219-26.
23. 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.
24. 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 auto-oxidation. *Int J Cosmet Sci* 1997;19:291-8.
25. Afsar Z, Khanam S. Formulation and evaluation of poly herbal soap and hand sanitizer. *Int Res J Pharm* 2016;7:54-7.
26. Al Akeel, R., Mateen, A., Janardhan, K., & Gupta, V. C. (2017). Analysis of antibacterial and anti-oxidative activity of Azadirachta indica bark using various solvents extracts. *Saudi Journal of Biological Sciences*, 24(1), 11-14
27. Al-Hashemi, Z. S. S., & Hossain, M. A. (2016). Biological activities of different neem leaf crude extracts used locally in Ayurvedic medicine. *Pacific Science Review A: Natural Science and Engineering*, 18(2), 128-131.
28. Alzohairy, M. A. (2016). Therapeutics role of Azadirachta indica (Neem) and their active constituents in diseases prevention and treatment. *Evidence-Based Complementary and Alternative Medicine*, 2016.