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Formulation and Evaluation of Polyherbal Soap

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Abstract- The need to achieve and maintain healthy skin is on the rise. This causes the composition of oxidant detergents with complex synthetic chemicals whose safety on skin and mortal health is still unclear. The present work involved the expression and evaluation of poly herbal detergents. The herbal detergents were formulated using aloe vera, curcuma longa and eclipta alba estimated for colorful parcels like colour, odour, pH, Froth retention, frothheight. Some herbal factory excerpt have antibacterial exertion. The end and ideal of the present study is to formulate antibacterial poly herbal cleaner using eclipta alba excerpt and curcuma longa. The set polyherbal phrasings displayed a good antibacterial effect. The set phrasings were estimated for colorful physicochemical parameters for which good characteristics were observed.

Keywords- Antioxidants, moisturizer, herbal cleaner, Evaluation.

I. INTRODUCTION

1. Herbal Products as Cosmetics

The word cosmetic was derived from the Greek word kosmtikos meaning having the power, arrange, skill in decorating. The origin of cosmetics forms a continuous narrative throughout the history of man as they developed. The man in prehistoric times 3000BC used colours for decoration to attract the animals that he wished to hunt and also the mansurvivrd attack from the enemy by colouring his skin and adorned his body for protection to provoke fear in an enemy . The origin of cosmetics were associated with hunting, fighting, religion, and superstation and later associated with medicine. Herbal cosmetics , here in after referred as products, are formulated, using various permissible cosmetic ingredients to form the base in which one or more herbal ingredients are used to provide defined cosmetic benefits only, shall be called as herbal cosmetics.

The cosmetics , according to the drugs and cosmetics act is defined as articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into or otherwise applied to the human body or any part there of for cleansing, beautifying, promoting, attractiveness or altering the appearance. The cosmetic does not come under the preview of drug license. The herbal cosmetics are the preprations containing phytochemical from a variety of botanical sources which influences the functions of skin and provide nutrients necessary for the healthy skin or hair. The natural herbs and their products when used for their aromatic value in cosmetic

Preparation are Termed as Herbal Cosmetics

There is common belief that chemical based cosmetics are harmful to the skin and an increased awareness among consumers for herbal products triggered the demand for natural products and natural extracts in cosmetics preparations.

The increased demand for the natural product has created new avenues in cosmeceutical market. The drug and cosmetic act specify that herbs and

essential oils used in cosmetics must not claim to penetrate beyond the surface layers of the skin.

Skin

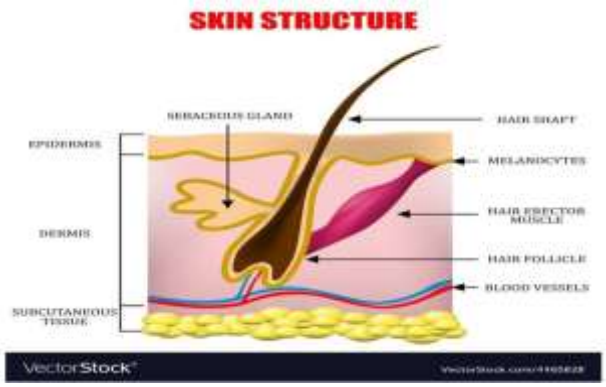

Figure 1: Skin

Skin is very important for all health care professionals to have basic information about the structure and function of human skin.Skin is also called cutaneous membrane.In adults the skin has a surface area ranging from1.2 to 2.2m. skin is the most exposed part of the body to the sunlight, environmental pollution and also used to some protection against the pathogen.

The human skin is the outer covering of the body and is the largest organ of the integumentary system. The skin has up to seven layers of eco dermal tissue guarding muscles, bones, ligaments, and internal organs.

Human skin is similar to most of the other mammals skin and it is very similar to pig skin. Thought nearly all human skin is covered with hair follicles. Skin play an important immunity role in protecting the body against pathogens and excessive water loss. Its other functions are insulation, temperature regulation, sensation, synthesis of vitamin B folates.

Soap

Soap is a salt of fatty acid used in a variety of cleansing and lubricating products. Soaps are surfactant usually used for washing and bathing and other types of house keeping. Soaps are used to remove dirt including dust microorganisms, strains bad smells from the body.

Commercial soap usually are made up of toxic mercury aluminium, barium, bis –phenol, plastics and other chemicals, which are absorbed into the body via internal organs from vaporization of the chemicals as well as skin absorption with negative side effects.

Soap is a mixture of sodium salts of various naturally occurring fatty acids. Some of the natural soap manufactures also use aroma therapy and herbal treatments to offer the best skin treatment solution for your skin.

Herbal Soap

Herbal soap preparation is a medicine it contain anti- bacterial, anti-septic, anti–ageing, anti-oxidant properties which mainly uses of part of plant to treatment for an injury or disease or to achieve health.

Herbal soap do not contain the artificial colours, flavours, fluorides etc. when compared to the content of commercial soap. Herbs are the natural product mostly found in the treatment of almost all disease and skin problems owing to their high medicinal value, cost effective ness, availability and compatibility.

The aloe vera has been known and used for centuries for its health, beauty, medicinal and skin care properties.Now a days most frequently aloevera used in the field of cosmetology. Aloevera contain 75 potentially active constituents.

Curcuma longa having properties like photo protection, anti-ageing, anti-septic,anti-inflammatory activity. Recent studies demonstrate that the curcumin is excellent for wrinkles and can control the inflammation and the formation of free radicles.

Almond oil has been used for hundreds of years to treat dry skin conditions, including eczema, and psorias is. Theoil may reduce the appearance of acne, enhance cell development and reverse sun damage.

The herbal soap was formulated by using extract of eclipta alba leaf and almond oil was glycerin soap base is very helpful and does not give any side effect. Eclipta alba having important role in traditional ayurvedic and unani system of health and herbal medicine. All parts of eclipta alba and chemical constituents mostly used as anti-oxidant, anti- ageing.

Adventages of Herbal Soap

- It helps in reducing acne and dry skin.
- It reduces skin tanning, dryness, and itching.
- It also detoxifies the skin and removes dirt from the skin.
- This soap has powerful antioxidants which keeps the skin hydrated.

Disadventages of Herbal Soap

- Most of the herbal drugs are not easily available.
- No pharmacopoeia defines any specific procedure or ingredients to be in any of herbal cosmetics.
- Manufacturing process are complicated.
- Herbal drugs haves lower effect than allopathic dosage form.

II. MATERIALS AND INSTRUMENTS

Table 1: Materials and instrument's

Materials	Instruments
Eclipta alba extract	500ml beaker
Glyerine soap base	250ml beaker
Almond oil	Burner and tripod stand
Steraic acid	Measuring cylinder
Vitamin E capsule	Thermometer
Coconut oil	Ph paper
Caster oil	Stirrer

Drug Profile

Eclipta Alba

Fig no 2 Eclipta alba plant

Botanical Name: Eclipta prostrate
Part Typically Used: Leaves and roots
Plant Colour: Green
Description: Eclipta plant can grow either prostate (flat) or erect up to 36 inches tall. Seeding leaves are ovate to egg shaped with short, toothed margin. Stems are reddish purple with short, flat, up tumed hairs.

Almond

Fig no 3 almond plant

Synonym- Almendro, almendra, amendoa, mandel, mandorlo
Biological source- Almond oil is a fixed oil obtained by expression from the seeds of prunus amygdalus var. dulcis.
Family- Rosaceae Chemical constituents-

- Almond contain 40-50 percent of fixed oil, about 20 percent of proteins mucilage and emulsion.
- The bitter almond contain in addition 2.5-4 percent of the colourless, crystalline.

- Almond oils consist of a mixture of glycerines of oleic, linoleic, palmitic, myristic.

Turmeric

Fresh turmeric is applied to perineal laceration after delivery to aid wound healing. It is applied to the served umbilical cord of new borns in rural india as an antiseptic. Women are given warm milk with turmeric, ginger and honey to drink after childbirth. Turmeric paste is applied for various skin diseases, burns, bites and eye infections. Turmeric and neem have been used for the treatment of small pox and chicken pox.

Synonym–Indian saffron, haldi, rhizome curcumae.
Biological source-Curcuma longa linn.

Chemical constituents-Curcumin,desmethoxycurcumin,bidesmethoxy curcumin volatile oil, sugar bitter substances oils and acids.

Uses

- Turmeric is a spice that has been used for centuries in traditional medicine. it is commonly used for osteoarthritis and has been touted as a remedy for everything from digestive issues to depression.
- Turmeric contains curcumin, which has potent antioxidant and anti inflammatory effects and has been linked to various health benefits, including reducing joint pain, boosting cognitive function and mood , supporting heart health, and protecting against cancer and type 2 diabetes. Turmeric can be added to curries, soups, or smoothness.

Fig no 4: Turmeric

Vitamin E Capsule

Vitamin E provides extra protection against acute UVB damage and protect against cell mutation caused by sun and pollution exposure. Vitamin E it help cleanse your skin and removing the impurities from and help improve skin elasticity. Vitamin E combination with lemon juice it help to whiten the skin. It is most commonly known for its benefits of skin health and appearance it has antioxidant and anti inflammatory proper.

Food Sources

Vitamin E is found in plant based oils, nuts, seeds, fruits, and vegetables.

- Wheat germ oil
- Sunflower seeds
- Almonds
- Sunflower, safflower, and soybean oil.
- Peanuts.
- Beet greens, spinach.
- Pumpkin
- Red bell pepper
- Mangoes

Benefits of Vitamine

- Remove dirt
- Improve dry skin
- Prevent sun burn
- Reduce hyperpigmentation
- Prevents skin adeing

Rose Water

Rose water contain vitamin B which often used in sunscreen and sun product. It helps to bolster the effectiveness of SPF. Rose water can be used to lighten the skin pigmentation. Rose water can remove oils and dirt from your skin by unclogging your pores.It helps maintain PH level of the skin . it is hydrating and nourishment agent for skin and protect skin against harmful environment aggressors. Gulabjal has antioxidant levels that tackle free radicals and keep skin healthy and glowing

- Family–rosaceae
- Chemical constituents–phenylethanol, linalool,citronellol,nerol,geraniol,andalongwith rose oxides.

- Biological source–rose water is obtained from sepals and petals of rosadamascema through

Uses

Rose water has a variety of uses including

- Soothing skin irritation and reducing redness
- Preventating and treating infections
- Enhancing mood and reducing stress
- Healing cuts, scars, and burns
- Adding fragnance to beauty products and house hold cleaners
- Adding flavor to food and drinks particularly in desserts

Fig.no5:Rose Water

Aloevera Gel

Aloe vera is a good active ingredients to reach in sunscreen arsenal. It has been proven to both treat and prevents burns on your skin.The leaves of aloe vera and A.barbadensisare the source of aloe vera gel. aloe vera gel is used in cosmetics lotion for its moisturizing . it blocks UVA and UVB rays and maintain skin natural moisture balance. It stops the sunburn and stimulate immune system intervention. Aloe vera gel can be used to help with in the healing process of sunburn it help relieve pain and redness by reducing inflammation. The gel also stimulate the production of collagen which help the healing process.

Coconut Oil

Coconut oil keeps the skin soft and smooth while preventing premature ageing of the skin. Coconut oil for skin use as a moisturizer, remove dead skin cells. Coconut oil moisturizing dry skin including in people with condtion such as eczema. Promoting wound healing it have antibacterial , antifungal, and antiviral, properties which prevents free radicals from causing damage to the skin. Coconut oil has anti inflammatory properties which reduce redneson skin this can be helpful for both dry and oily skin conditions by reducing inflammation of the skin.

Formula

Table 2: Ingredients and Quantity

Sr. No	Ingrdients	Quantity
1	Distilled water	32.gm
2	Sodium hydroxide	15.7gm
3	Distilled water	34.0gm
4	Palm oil	35.3gm
5	Castor oil	34.0gm
6	Glycerine	19.6gm
7	Isopropyl alcohol	38.0gm
8	Sugar	23.6gm
9	Distilled water	17.0gm

Procedure

The lye solution was prepared by taking sodium hydroxide(15.7gm) in distilled water (32.7gm) into an on metallic pan and heated at below 50 degree Celsius temperature until the clear solution was obtained and then cooled. The solution of oil and fats was prepared, in which palm oil, coconut oil, and castor oil were heated at low temperature with occasional stirring and the lye solution was added in it. Place the lid on the slow cooker and allow the soap mixture to cook for several hours (around 3 hrs) until it starts to get transparent. Mixed the alcohol and glycerine together and added the min to the soap. Allowed the soap to cook, covered and sealed, for around 30 min. the sugar solution was

prepared in which sugar completely dissolved in the water at low to medium heat.

After 30 min sugar solution was gently mixed with soap. Then cleared the foam Of the soap, and carefully poured the soap into the soap molds. Then allowed to solidify at room temperature.

Formula for Polyherbal Soap

Table 3: Ingredients and uses

Sr. No	Ingredients	F1	F2	F3	Uses
1	Soapbase(gm)	25	25	50	Remove dirt From skin
2	Eclipta alba extract(ml)	3	3	3	Antimicrobial and antibacterial
3	Turmeric(g m)	0.2	0.2	0.2	Antiseptic and anti Inflammatory
4	Aloe veragel (gm)	2	2	2	Antibacterial And antioxidant
5	Almond oil (ml)	1	1.5	1.5	Antioxidant
6	Multanclay (gm)	0.25	0.25	0.25	Remove oil From skin
7	Rose water (drop)	5	5	5	Perfume
8	Stearicacid (gm)	5.5	6	7.5	Lubricant Agent
9	Vitamin E capsule	1	1	1	Anti-oxidant

Preparation of Polyherbal Soap

- For preparing polyherbal soap take the required volume of soap base in a 500 ml of beaker and maintain the temperature at 45 degree Celsius to heat the soap base on the water bath without stirring.
- Then the soap base will be converts into liquid form. And also add the all ingredients to the above mixture. Boil the mixture without stirring .
- Then the mixture poured soap moulds and freeze the soap containing moulds upto 2- 3 hrs.
- After 2-3 hrs remove the soap moulds from the freeze allow to 5 min then soap will be forme.

III. RESULT AND DISCUSSION

The soap made was evaluated for physicochemical characters such as pH & other parameters, good characteristics were observed. The physicochemical parameters such as color, odor, appearance, and pH were tested. The pH of the soap was found to be 7.5 with pH strip.

Remaining parameters such as foam height, were also determined and the results are tabulated in Table 4.

Table 4: Parameters

Sr. No	Parameters	F1	F2	F3
1	Colour	Yellowish brown	Yellowish brown	Yellowis h brown
2	Odour	Non aromatic	Non aromatic	Non aromatic
3	Ph	9	10	11
4	Foam height	2.2 cm	2.2 cm	2.2 cm
5	Foam retention	17 min	16 min 54 sec	16 min 44 sec

The above given table describes the colour, odour, shape, pH, irritation, foam height and foam retention of the poly herbal soap. The colour of all the five formulation were yellowish brown. The odour of all the five formulation was non aromatic.. As per evaluation test formulation F6 is may be the

most standard formulation compared to other formulation because the pH of formulation F5 is 11.

IV. CONCLUSION

The Prepared formulation when tested for different test gave good results. It does not give any irritancy to skin it was determined by using this soap by few volunteer hence it is proved that Soap does not give any irritantcy to skin. Furthermore the prepared soap were standardized by evaluating various physicochemical properties such as PH appearance odour in which the exhbit satisfactory effect.

REFERENCES

1. Juncan, A.M. and Lung,C.,2016.Formulation and optimizing of a anti-aging cosmetic cream. Studia UBB Physica, 61(2), pp.101-110.
2. Jadoon, S.,Karim, S., Asad, M.H.H.B., Akram, M.R., Kalsoom Khan, A., Malik, A., Chen, C. and Murtaza, G., 2015. Anti-aging potential of phytoextract loaded pharmaceutical creams for human skin cell longetivity. Oxidative Medicine and Cellular Longevity, 2015.
3. Haneefa, M.K., Shilpa, N.M., Junise, V. and Chandran, A., 2019. Formulation and evaluation of medicated soap of Ixora coccinea root extract for dermal infections. Journal of Pharmaceutical Sciences and Research, 11(8), pp.3094-3097.
4. Browning, M.,2002.Melt &Pour Soap making. Sterling Publishing Company, Inc.
5. Jacob, B. and Ciyamol, V., Formulation and Evaluation of Herbal Soap
6. Pierce, A., 2013. Soap Making Recipes: Soap Making For Beginners. Speedy Publishing LLC
7. Chattopadhyay, P.K., 2003. Modern Technology of Soaps, Detergents and Toiletries: With Formulae and Project Profiles. National Institute of Inustril re..
8. Anant, M.G., FORMULATION AND EVALUATION OF HERBAL SOAP BY USING NATURAL INGREDIENTS BY SIMPLE MATCHED.
9. Fujioka, N., Hibino, S., Wakahara, A., Kawagishi, T., Taku, K., Mizuno, S., Watanabe, S., Takahashi, H., Hamada,U.,Takahashi,Y.andYonei,Y.,2009.Effects of various soap elements on skin. Anti-Aging Medicine, 6(12), pp.109-118.
10. Ruckmani, K., Krishnamoorthy, R., Samuel, S. and Kumari, H.L.J., 2014. Formulation of herbal bath soap from vitex negundo leaf extract. Journal of Chemical and Pharmaceutical Sciences ISSN, 974, p.2115.
11. Adigun,O.,Manful,C.,PrietoVidal,N.,Mumtaz,A.,Pham,T.H.,Stewart,P.,Nadeem,M., Keough, D. and Thomas, R., 2019. Use of natural antioxidants from newfoundland wild berries to improve the shelf life of natural herbal soaps. Antioxidants, 8(11), p.536.
12. Gana Manjusha, K., Balakrishnaiah, P., Syamala, R., Mounik, N. and RaviChandra, T., 2019. Formulation And Evaluation Of Herbal Bath Soap Containing Methanolic Extracts Of Three Ayurvedic Varnya Herbs. Asian Journal Of Pharmaceuticels and clinical research. Innovare Academic Sciences, 12(11)
13. Sindhu, R.K., Chitkara, M., Kaur, G., Kaur, A., Arora, S. and Sandhu, I.S., 2019. Formulation development and antimicrobial evaluation of polyherbal soap. Plant Arch,19(2), pp.1342-6
14. Matangi,S.P.,Mamidi,S.A.,Raghavamma,S.T.V.andNadendla,R.R.,2014.Formulation and evaluation of anti aging poly herbal cream. skin, 5(6)
15. Jadhav, V.M., Thorat, R.M., Kadam, V.J. and Salaskar, K.P.,2009.Chemical composition, pharmacological activities of Eclipta alba. Journal of Pharmacy Research, 2(8), pp.1129-1231
16. Mithun,N.M., Shashidhara,S. and VivekKumar, R., 2011. Eclipta alba(L.)Are view on its phytochemical and pharmacological profile. Pharmacologyonline, 1(1), pp.345- 357.
17. Chokotia,L.S.,Vashistha,P.,Sironiya, R. and Matoli, H.,2013. Pharmacological activities of Eclipta alba (L.). International Journal of Research and Development in Pharmacy and Life Sciences, 2(4), pp.499-502.
18. Rattan,S.I.,2005. Anti-ageingstrategies: prevention or therapy? Slowing ageing from with in. EMBO reports, 6(S1), pp.S25-S29.
19. Tungmunnithum, D., Abid, M., Elamrani, A., Drouet,S.,Addi,M. and Hano,C.,2020. Almond

Skin Extracts and Chlorogenic Acid Delay Chronological Aging and Enhanced Oxidative Stress Response in Yeast. Life, 10(6), p.80.

20. Rusu,M.E.,Gheldiu,A.M., Mocan,A., Vlase,L. and Popa,D.S.,2018. Anti-aging potential of tree nuts with a focus on the phytochemical composition, molecular mechanisms and thermal stability of major bioactive compounds. Food & function, 9(5), pp.2554-2575.
Lee, S.L.,Song, B.R., Shin, H.S.,Lee, Y.J.and Park,S.N.,2018. Antioxidant, antiaging and antimicrobial effects of ethanolic extract and ethyl acetate fraction from Eclipta prostrata. Journal of the Society of Cosmetic Scientists of Korea, 44(3), pp.349- 362.
21. Baskaran,P. and Jayabalan,N.,2005.An efficient micro propagation system for Eclipta, alba—A valuable medicinal herb. In Vitro Cellular & Developmental Biology Plant, 41(4), pp.532-539
22. GraceX.F,SowmyaK. V,DarsikaC, Polyherbal Hand Sanitizer –Formulation and Evaluation, Indian Journal of Pharmacy and Pharmacology, 2015;2(2): 143-144.
23. TortoraG.J, GrabowskiS. R. Principles of Anatomy and Physiology.10 th edition, published by John Wiley and Sons; 2003,140-143.
24. Sunhyo R,PeterI. S, Chang H. S, Hyeonsook C, Yoonkyung 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, 2014;15(5):8753–8772.
25. Choudhari S, SutarM, Chavan M, Formulation Evaluation and Antibacterial Efficiency of herbal hand wash, Indo American Journal of Pharmaceutical Research, 2016; 6(4):5202-2503.
26. Saad A. 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.
27. RuckmaniK, KrishnamoorthyR, SamuelS, KumariH.L. J,Formulation of Herbal Bath Soap from Vitexnegundo Leaf Extract,Journal of chemical and pharmaceutical sciences,2014;13(2):95-6.
28. Sharma A, YadavR, GuhaV,SoniU.N,PatelJ. R, Formulation and Evaluation of Herbal Hand Wash, World Journal of Pharmacy and Pharmaceutical Sciences, 2016; 5(3): 675-683.
29. Londhe J, Jagpat S. D, Doshi C, Formulations of Herbal Hand Wash with Potential Antibacterial Activity, International Journal of Research in Advent Technology,2015:21:11-12.
30. Rangari V.D, Pharmacognosy and phytochemistry, 2nd edition reprint. Career publication; Nashik; May 2012, 115.
31. Majekodunmi S. O, Essien A. A, Development and evaluation of antimicrobial herbal formulations containing the methanolic extract of Cassiaalata for skin diseases, Journal of Coastal Life Medicine, 2014; 2(11): 872-875.
32. KokateC.K, PurohitA.P, Gokhale.B, Pharmacognosy. 29th edition, published by Nirali Prakashan; Pune; 2009.
33. Ragnar.D, Pharmacognosy and phytochemistry. 2nd edition reprint. Volume 1st , published by career publication; Nashik;2012, 115.
34. Londhe J, Jagtap S. D, DoshiC, Jagade D, Formulations of Herbal Hand Wash with Potential Antibacterial Activity, International Journal of Research in Advent Technology, 2015;31: 11-14.
35. MoghadamtousiS. Z, Kadir H. A, Hassandarvish P, Tajik H,Abubakar S, Zandi K, A Reviewon Antibacterial, Antiviral and Antifungal Activity of Curcumin, BioMed Research International, 2014; 18:1-12.
36. KhadbadiS.S,DeoreS.L,BhaviskarB.A.Experimental phytopharmacognosy A Comprehensive Guide. 1st edition. Published by Nirali Prakashan; 2011.
37. 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.
38. Afsar, Z., Khanam, S., & Aamir, S. (2018) Formulation and comparative evaluation of polyherbal preparations for their disinfectant effects, 1 (1), 54-65.
39. Joshi, M. G., Kamat, D.V., &Kamat, S. D.(2008).Evaluation of herbal handwash formulation.7(5), 413-15.

40. Dhanasekaran, M. (2016) International research journal of pharmacy.7(2),31-35.
41. 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.
42. 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.
43. Kapoor,V.P.(2005).Herbal cosmetics for skin and hair care.4(4).306-315.
44. Niharika, A., Aquicio,J.M. & Anand,A.(2010). Anti fungal properties of neem (Azadirachta indica) leaves extract to treat hair dandruff. E-ISRJ, 2, 244-52.
45. 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.
46. Panda,H.(2011). Herbal soaps & detergents handbook. NIIR Project Consultancy Servi