CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

https://doi.org/10.5281/zenodo.15586612

https://www.iajps.com/volumes/volume12-may-2025/45-issue-05-may-25/

Available online at: http://www.iajps.com Research Article

FORMULATION AND EVALUATION OF HERBAL FACEWASH CONTAINING COFFEE POWDER

Sachin Chavan[1]*, Poonam Ghorpade[2], Sanjay Garje[3], Gaffar Sayyed[4]

[1*-4]SAJVPM's, College of Pharmaceutical Sciences and Research Center, Kada, Beed, MH-414202.

Abstract:

The human skin, the body's largest organ, plays a crucial role as a protective barrier and is composed of multiple layers with specialized cells and functions. Skin health and appearance are profoundly influenced by its type, which determines the most appropriate care and treatment strategies. This study provides a comprehensive overview of the various skin types' namely normal, oily, dry, combination, sensitive, acne-prone, mature or aging, and hyper pigmented skin emphasizing their unique characteristics and skincare requirements. Normal skin is well-balanced with minimal issues, whereas oily skin is marked by excessive sebum production and a predisposition to acne. Dry skin lacks moisture, leading to flakiness and irritation, while combination skin presents a mix of oily and dry areas, particularly an oily T-zone and dry cheeks. Sensitive skin is reactive to environmental and chemical stimuli, often showing signs of redness and irritation. Acne-prone skin is susceptible to breakouts due to clogged pores and increased oil production. Mature or aging skin exhibits signs of degeneration such as wrinkles and loss of elasticity, while hyper pigmented skin shows uneven tone and dark patches caused by excessive melanin production. The identification and understanding of individual skin types are essential for designing personalized skincare regimens that address specific needs and promote long-term skin health. Furthermore, this paper underscores the importance of selecting appropriate ingredients and formulations tailored to each skin type, as well as the need for sun protection and professional dermatological consultation when required. This foundational understanding aids not only in everyday skincare but also in guiding the development of effective dermatological and cosmeceutical interventions.

Keywords: *Coffee Powder, Turmeric, orange extract, facewash.*

Corresponding author:

Sachin Chavan,

SAJVPM's, College of Pharmaceutical Sciences and Research Center, Kada, Beed, MH-414202.

Email: sachinchavan6231411@gmail.com

QR code

Please cite this article in press ***Sachin Chavan*** *et al.,* ***Formulation And Evaluation Of Herbal Facewash Containing Coffee Powder.,*** *Indo Am. J. P. Sci, 2025; 12(05).*

INTRODUCTION:

The skin, being the largest organ of the human body, performs vital protective, sensory, and regulatory functions. It serves as the first line of defense against environmental aggressors such as pollutants, microbes, and UV radiation. In today's fast-paced and urbanized world, skin is frequently exposed to these external stressors, leading to concerns like dullness, dryness, acne, and premature aging. Maintaining clean, healthy, and rejuvenated skin is essential not only for cosmetic and aesthetic purposes but also for overall dermatological health. As awareness of skincare has increased, so has the demand for effective, safe, and natural skin care products.

Among various skincare formulations, facewashes are a fundamental part of daily hygiene and cosmetic routines. They are designed to cleanse the skin by removing dirt, oil, dead cells, and other impurities, helping to prevent skin conditions such as acne and clogged pores. However, traditional chemical-based facewashes often contain harsh surfactants, synthetic fragrances, and preservatives that may cause skin irritation, allergic reactions, or long-term damage with frequent use. Consequently, there is a rising consumer inclination toward herbal and plant-based alternatives that are gentle on the skin and free from harmful chemicals.

In this context, herbal facewashes have gained immense popularity due to their holistic approach, combining cleansing action with therapeutic and nourishing properties derived from natural sources. Herbal ingredients are not only biocompatible and environmentally friendly, but they also tend to offer multiple skin benefits with minimal side effects. One such promising natural ingredient is coffee powder, derived from the seeds of *Coffea arabica* or *Coffea robusta*. Coffee has been traditionally valued for its stimulating effects, but recent research has highlighted its potent dermatological benefits as well. Rich in caffeine, chlorogenic acid, antioxidants, and polyphenols, coffee offers a multitude of skin-enhancing properties. Topically applied coffee helps to stimulate blood circulation, reduce inflammation, and protect against oxidative stress—all of which contribute to healthier, brighter skin. Additionally, coffee's natural granular texture makes it an excellent exfoliating agent, assisting in the removal of dead skin cells, unclogging pores, and promoting smooth skin texture. Its antimicrobial and anti-inflammatory properties make it particularly beneficial for acne-prone and oily skin types.

This research is focused on the formulation and evaluation of a herbal facewash incorporating coffee powder as a key bioactive component. The goal is to develop a mild, skin-friendly formulation that leverages coffee's natural exfoliating, antioxidant, and revitalizing effects. In addition to coffee powder, other complementary herbal ingredients such as aloe vera, neem extract, turmeric, and essential oils may be incorporated to enhance the overall efficacy and sensory appeal of the product.

The formulated facewash will be subjected to various physicochemical and performance evaluations, including tests for pH, viscosity, foaming ability, spreadability, stability, and antimicrobial activity. These parameters are crucial to ensure product safety, stability, and consumer acceptance. The study also aims to determine the suitability of the product for different skin types, particularly oily and acne-prone skin.

In summary, this research contributes to the ongoing development of herbal cosmetic formulations by offering a novel, sustainable, and consumer-friendly facewash using coffee powder. The emphasis on natural, non-toxic ingredients aligns with current trends in cosmetology and supports the movement toward clean, green, and conscious skincare.

MATERIALS AND METHODS:

Table 1: List of Materials (Composition)

Sr. No.	Name of Ingredients	Quantity	Uses
1	Aloe vera	2 ml	Soothing agent & Anti-bacterial
2	Coffee powder	3 gm	Anti-acne
3	Turmeric	0.5 gm	Anti-inflammatory
4	Lemon juice	1 ml	Skin brightening
5	Orange powder	1.5 gm	Anti-oxidant
6	Methyl paraben	1.5 gm	Preservative
7	Glycerin	0.5 ml	Humectant
8	Rose oil	2-3 drops	Fragrance
9	Sodium lauryl sulphate (SLS)	2 gm	Foaming agent, surfactant
10	Glycerol	0.6 ml	Moisturizer
11	Distilled water	Q.S.	Vehicle
12	Gum tragacanth	1.5 gm	Gelling agent, Thickener

Table 2: List of Equipment

Sr. No.	Name of Equipment	Purpose
1	Weighing balance	To accurately weigh ingredients
2	Beakers	For mixing and holding solutions
3	Measuring cylinders	For measuring liquid ingredients
4	Glass rods	For stirring and mixing
5	Magnetic stirrer with hot plate	For uniform mixing and heating
6	Water bath	To maintain gentle heat for extract incorporation
7	pH meter	To check and adjust the pH of the formulation
8	Viscometer (Brookfield)	To measure the viscosity of the final facewash
9	Homogenizer	For uniform dispersion of ingredients
10	Storage containers (HDPE/Glass)	To store the final facewash formulation
11	Filter paper & funnel	For filtration if required

The present study was carried out to formulate a herbal facewash using natural ingredients such as coffee powder, aloe vera, turmeric, lemon juice, orange peel extract, and other herbal constituents. All materials used were of analytical grade, and the preparation was done under hygienic laboratory conditions. The method involved a sequence of extraction, blending, and gel formation steps, followed by evaluation of the final formulation through standard parameters.

Procedure

1. Extraction of Coffee Powder

The roasted and ground coffee powder was subjected to hot water extraction under pressure to extract water-soluble active constituents. The extract was then allowed to cool. In some cases, it was centrifuged to remove insoluble particles, followed by concentration through gentle heating. The concentrate was dried using either spray drying or freeze-drying techniques, depending on equipment availability.

2. Preparation of Aloe Vera and Turmeric Extracts

Fresh aloe vera gel and turmeric powder were extracted using the hot extraction method with water as the solvent. The mixture was gently heated using a water condenser to ensure maximum recovery of active components from both herbal ingredients. The extracts were filtered and kept aside for further use.

3. Incorporation of Citrus Extracts

The herbal formulation was further enhanced by incorporating orange peel extract. This was followed by the addition of a small quantity of freshly extracted lemon juice, known for its natural skin-brightening and astringent properties.

4. Preparation of Base Solution

The required quantity of methyl paraben, serving as a preservative, was dissolved in distilled water with

mild heating on a water bath. After complete dissolution, the solution was allowed to cool to room temperature. Sodium lauryl sulphate (SLS), acting as the foaming agent and surfactant, was then added gradually with continuous stirring to avoid foaming and ensure uniform dispersion.

5. Addition of Humectants and Fragrance
To enhance moisturization, glycerin and glycerol were added to the formulation. These humectants help in retaining skin moisture and preventing dryness. Rose oil was then added dropwise to provide a pleasant fragrance to the final product.

6. Gel Formation
Gum tragacanth, a natural gelling agent, was incorporated into the mixture under continuous stirring to ensure uniform gel consistency. Finally, the volume was made up with distilled water to achieve the desired quantity, and the mixture was homogenized thoroughly to form a consistent herbal gel face wash.

Evaluation of Herbal Face wash
1. Rheological Characteristics
The physical properties such as colour, clogging behavior, viscosity changes, and skin sensation were studied to evaluate the texture and applicability of the formulation.

2. Determination of pH
The pH of the face wash was determined using a digital pH meter. For this, 1 gram of the formulation was dispersed in 100 ml of demineralized water and left to equilibrate for two hours. The pH was measured in triplicate to ensure accuracy, and the instrument was calibrated using standard buffer solutions (pH 4) before use.

3. Spread ability Test
Spreadability was determined using a lab-fabricated apparatus as described by Mortimer et al. Approximately 1.5 g of the facewash was placed between two glass slides. A 1000 g weight was placed on top for 5 minutes to compress the sample. A 60 g weight was then tied to the upper slide and allowed to pull it horizontally. Spreadability was calculated using the formula:

$$S = (m \times l) / t$$

Where:
S = Spreadability (gm·cm/s)
m = Weight tied to upper slide (60 g)
l = Length of glass slide (11.2 cm)
t = Time in seconds

4. Washability
The facewash was applied to the hand and washed off under running tap water. The ease of removal and residue-free nature of the product were noted visually.

5. Stability Studies
The stability of the formulation was evaluated by storing the product under different temperature and humidity conditions for an extended period. Parameters such as color, phase separation, sedimentation, and pH were observed to assess product stability.

6. Grittiness
The facewash was tested for grittiness by applying a small amount to the skin and gently rubbing it. The product was assessed for the presence of any coarse or gritty particles that may cause discomfort during application.

7. Physical Evaluation
Color: The final formulation was visually inspected against a white background and was observed to be dark brown in color.

Odour: The fragrance of the facewash was pleasant and rosy, attributed to the rose oil incorporated into the formulation.

RESULTS AND DISCUSSION:

The prepared herbal facewash formulations (F1 and F2) were evaluated for various physical and physicochemical parameters to determine their suitability, efficacy, and compatibility for topical application. The evaluation included assessment of organoleptic characteristics, pH, and skin-friendliness, with a comparison to a marketed formulation (Himalaya Aloe Vera Face Wash) as a standard.

Formulation Composition and Variation
Two formulations, F1 and F2, were developed using similar core ingredients with slight variations in turmeric, lemon juice, and orange powder content. Both formulations contained coffee powder (3 g) and aloe vera gel (2 ml) as key herbal components for anti-acne and soothing effects, respectively. F1 had a slightly higher concentration of turmeric (0.6 g) and orange powder (1.5 g), while F2 contained a higher volume of lemon juice (2 ml), which could influence the pH and brightening effect of the formulation.

Table 3: Composition of face wash formulation

Sr. No	Ingredients	F1 (50 ml)	F2 (50 ml)
1.	Coffee powder	3 gm	3 gm
2.	Aloe vera	2 ml	2 ml
3.	Turmeric	0.6 gm	0.5 gm
4.	Lemon Juice	1 ml	2 ml
5.	Orange powder	1.5 gm	1 gm

1. Physical Evaluation

The physical characteristics of the facewash formulations, including color, odor, consistency, and clogging behavior, were assessed and compared to the marketed formulation. Both F1 and F2 exhibited a pleasant rose-like fragrance, which enhances consumer appeal. The color of the formulations was dark brown, attributed to the presence of coffee and turmeric, and matched closely with the aesthetic of natural products. The consistency of both samples was semi-solid and smooth, suitable for gel-based facewash application. Importantly, no clogging or phase separation was observed in any formulation, indicating good physical stability.

Table 4: Physical Evaluation of prepared formulations

Formulation Code	Odour	Colour	Consistency	Clogging
Marketed (Himalaya aloe Vera face wash)	Pleasant	Brown	Semi-solid	Absent
F1	Pleasant	Dark brown	Semi-solid	Absent
F2	Pleasant	Dark brown	Semi-solid	Absent

2. pH Evaluation

Skin compatibility is strongly influenced by the pH of topical products. The ideal pH for skin applications ranges from 4.5 to 6. The pH values of the formulated facewashes were found to be within an acceptable and safe range. F1 and F2 exhibited pH values of 5.3 and 5.2 respectively, which are slightly lower than the marketed formulation (5.5), but still close to the natural pH of human skin. This indicates that both formulations are unlikely to cause skin irritation and are suitable for regular facial use. The slightly acidic pH may also help in maintaining the skin's acid mantle, which is essential for antimicrobial defense and barrier function.

Table 5: PH of prepared Formulations

Formulation Code	pH
Marketed	5.5
F1	5.3
F2	5.2

Both formulations, F1 and F2, demonstrated favorable physical attributes and appropriate pH levels, making them promising candidates for herbal anti-acne facewash products. The inclusion of natural ingredients such as coffee, aloe vera, turmeric, lemon, and orange powder not only contributes to the functional benefits but also aligns with the growing consumer preference for plant-based skincare. The absence of any clogging or instability further confirms the effectiveness of the gelling and preservative system used in the formulation.

Further evaluation such as antimicrobial activity, spreadability, viscosity measurement, and user acceptability studies would provide more insights into product performance and commercial viability.

3. Washability and Spreadability

Both spreadability and washability are critical parameters for evaluating the user-friendliness and overall performance of a facewash formulation. A good spreadability ensures that the product can be easily applied over the facial skin with minimal effort, whereas good washability ensures easy removal of the product from the skin without leaving any residue.

The results showed that both developed formulations (F1 and F2), as well as the marketed aloe vera facewash used for comparison, exhibited excellent spreadability. The formulations spread uniformly over the skin surface, indicating the appropriate consistency and viscosity for topical application.

In terms of washability, all formulations, including

F1, F2, and the marketed product, demonstrated good results. They were easily washable with water, without any greasy or sticky residue left behind. This indicates the suitability of the formulation for everyday use, particularly for individuals seeking a clean, refreshing post-application feel.

Table 6: Washability and spreadability of prepared formulations

Formulation Code	Washability	Spreadability
Marketed	Good	Good
F1	Good	Good
F2	Good	Good

4. Skin Irritability Test

The safety of the formulated herbal facewash was assessed through a skin irritation test to evaluate its compatibility and potential for causing any dermal reactions. A small amount of each formulation was applied to a defined area of skin and observed over time intervals of 1 hour and 3 hours for any signs of redness, inflammation, itching, edema, or other visible irritation.

Both formulations (F1 and F2) showed no signs of irritation during the observation period, suggesting that the herbal components and excipients used are well-tolerated by the skin. The absence of adverse reactions supports the safety of these formulations for topical use. This test is particularly important when using natural ingredients like lemon, turmeric, and essential oils, which can sometimes cause sensitivity. However, in the present formulation, the concentrations were optimized to be both effective and gentle on the skin.

Table 7: Skin Irritability Test of prepared formulations

Formulation Code	Irritability (1 hr)	Irritability (3 hrs)
Marketed	-	-
F1	No	No
F2	No	No

The herbal facewash formulations F1 and F2 demonstrated excellent washability, good spreadability, and no irritation during short-term application, comparable to a standard marketed facewash. These characteristics highlight the potential of these herbal formulations for consumer use, particularly for individuals with sensitive or acne-prone skin. The use of natural, skin-friendly ingredients like aloe vera, coffee powder, and rose oil contributes to the overall mildness and effectiveness of the product.

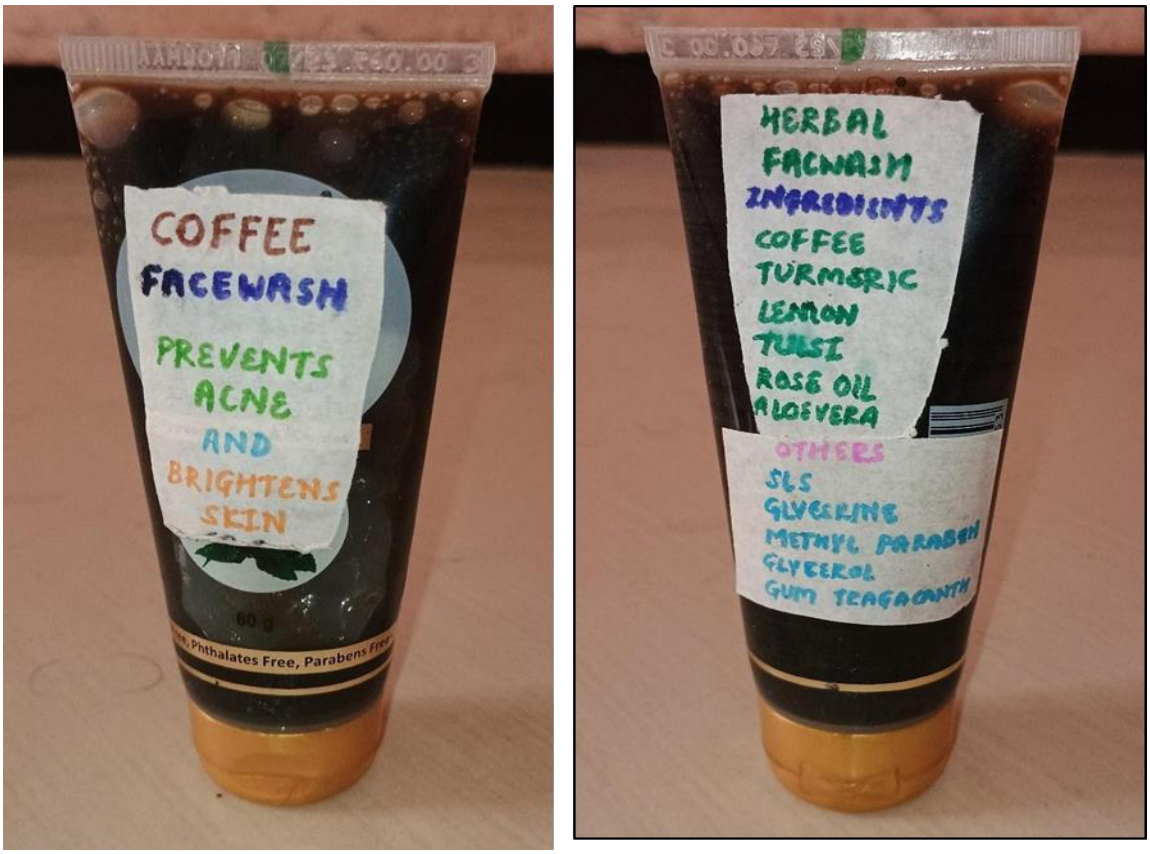

Figure 1: F1 and F2 Face wash formulations

SUMMARY AND CONCLUSION:

The present research was undertaken with the objective of formulating and evaluating a herbal facewash using coffee powder as the principal active ingredient, owing to its proven anti-acne, antioxidant, and exfoliating properties. Alongside coffee, several other natural ingredients were incorporated, each selected for their beneficial roles in skincare. These included aloe vera (for its soothing and antibacterial properties), turmeric (for its anti-inflammatory activity), lemon juice (to promote skin brightening), orange peel powder (rich in antioxidants), rose oil (for fragrance), and glycerin and glycerol (as humectants and moisturizers). The formulation was developed using standard cosmetic preparation techniques and divided into two variations: Formulation 1 (F1) and Formulation 2 (F2), each differing slightly in the quantity of turmeric, lemon juice, and orange peel powder.

Upon evaluation, both formulations demonstrated satisfactory physical characteristics. They were observed to be semi-solid in consistency, dark brown in color, and possessed a pleasant rose fragrance—attributes comparable to a well-known marketed aloe vera facewash. This similarity in sensory appeal suggests a good potential for consumer acceptance.

The pH evaluation of the formulations showed values of 5.3 for F1 and 5.2 for F2, which are very close to the skin's natural pH range (4.5–6.5). This indicates that the formulations are likely to be well-tolerated and non-irritating to the skin, an essential criterion for topical cosmetic preparations. In terms of spreadability and washability**,** both formulations were easy to spread and rinse off, ensuring a smooth application process and effective cleansing during use.

The skin irritability test**,** conducted over a 3-hour observation period, showed no signs of redness, inflammation, or irritation, confirming the dermatological safety of the formulations. This is particularly important when introducing products with plant-based actives, as some individuals may be sensitive to herbal extracts. Furthermore, both formulations passed the grittiness test**,** with no coarse particles felt upon application, and remained

physically stable without any evidence of sedimentation or phase separation during storage.

Taken together, these findings suggest that the herbal facewash formulations, particularly F1**,** offer a balanced combination of cleansing, soothing, and aesthetic properties. F1 was slightly more stable and visually appealing, making it the preferred formulation. The study successfully demonstrates that herbal ingredients can be effectively harnessed to produce a safe, skin-compatible, and consumer-friendly facewash formulation.

In conclusion, this research confirms the potential of developing a natural, effective, and affordable skincare product using common herbal ingredients. Further studies involving microbiological assays, consumer acceptability trials, and long-term stability tests would be valuable to validate the product's effectiveness and shelf life under real-world conditions. This work lays the foundation for future development of eco-friendly, chemical-free personal care products that align with the growing demand for sustainable cosmetics.

REFERENCES:

1. Singh, S. Anti-acne synergistic herbal face wash gel: Formulation, evaluation and stability studies. World J. Pharm. Res., 2015; 4(9): 1261-1273.
2. Mendhekar, S. Y., Thorat, P. B., Bodke, N. N., Jadhav, S. L. & Gaikwad, D. D. Formulation and Evaluation of Gel Containing Neem, Turmeric, Aloe Vera, Green Tea and Lemon Extract with Activated Charcoal. Eur. J. Pharm. Med. Res., 2017; 4(12): 439–443.
3. Sahu, P. K. et al. Therapeutic and Medicinal Uses of Aloe vera: A Review. Pharmacol. & Pharm, 2013; 04: 599–610.
4. Kumar, N. S. & Sreeja, P. S. D. The surprising health benefits of papaya seeds: A review. J. Pharmacogn. Phytochem, 2017; 6(1): 424–429.
5. Aravind, G., Bhowmik, D., Duraivel, S. & Harish, G. Traditional and Medicinal Uses of Carica papaya. J. Med. Plants Stud, 2013; 1(1): 7–15.
6. Milind, P. &. P. Chickoo: a Wonderful Gift From Nature. Int. J. Res. Ayurveda Pharm. 2015; 6(4): 544–550.
7. Wani, S. A. & Kumar, P. Fenugreek: A review on its nutraceutical properties and utilization in various food products. J. Saudi Soc. Agric. Sci., 2018; 17: 97–106.
8. Vankar, P. S. & Shukla, D. Natural dyeing with anthocyanins from Hibiscus rosa sinensis flowers. J. Appl. Polym. Sci., 2011; 122: 3361–3368.
9. Ingle, A. & Meshram, M. B. Formulation and evaluation of ayurvedic face wash. Int. J. Phytopharm, 2018; 8(3): 26–30.
10. Stieber, MA; Hegel, JK x. "Azelaic acid: Properties and mode of action". Skin pharmacology and physiology 27 (Supplement 1) (2013): 9–17.
11. Simpson, Nicholas B.; Cunliffe, William J. (2004). "Disorders of the sebaceous glands". In Burns, Breathnach, Stephen Malden, Mass.: Blackwell Science. pp. 43.1–75.
12. Holzmann R, Shakery K. "Postadolescent acne in females". Skin pharmacology and physiology 27 (Supplement 1) (2013): 3 – 8.
13. Simonart T. "Newer approaches to the treatment of acne vulgaris". America Journal of Clinical Dermatology 13.6 (2012): 357–64.
14. CK. Yamini and T. Onesimus "Preparation and Evaluation of Herbal Anti-Acne Gel". Int J Pharm Bio Sci ; 4.2 (2013): 956 – 960.
15. "Development and Evaluation of Herbal Anti-Acne Formulation". Research Journal of Pharmaceutical, Biological and Chemical Sciences 3.3: 334-339
16. Shinkafi, S.A and Ndanusa, H. "Antibacterial Activity of Citrus Limonon Acne vulgaris (Pimples)".International Journal of Science inventions Today, 2.5 (2013): 397-409
17. E.O. Erhirhie and NE. Ekene "Medicinal Values on Citrulluslanatus (Watermelon): Pharmacological Review". International Journal of Research in Pharmaceutical and Biomedical Sciences.4.4 (2013): 1305-1312
18. "An Overview on Vetiveria Zizanioides". Research Journal of Pharmaceutical, Biological and Chemical Sciences. 4.3 (2013): 777-783. Source of support: Nil Conflict of interest: None Declared CITE THIS ARTICLE AS:
19. 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.
20. Holetz, F. B., Ueda-Nakamura, T., DiasFilho, 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 Herpetomonassamuelpessoai (Kinetoplastida,Trypanosomatidae) cultivated.
21. Fouqiya Butool, C. Rekha, A. Gnaneswar Rao. Clinical Study on Serum Zinc ,Levelsin Patients with Acne Vulgari
22. Sowmya KV, Darsika CX, Grace F, Shanmuganathan S, "Formulation and Evaluation of Poly-herbal Face wash gel", World

Journal of Pharmacy and Pharmaceutical sciences. 2015; 4
23. (6): 585588.
24. Singh HP, Samnhotra N, Gullaiya S, Kaur I, "Anti-acne synergistic Herbal face wash
25. gel Formulation, Evaluation, and Stability study", World Journal of Pharmaceutical Research. 2015; 4 (9): 1261-1273.
26. Kanlayavattanakul M, Lourith N, "Therapeutic agents & herbs in topical applications for acne treatment", International Journal of cosmetic Science. 2011; 33: 289-297.
27. J. Insira Sarbeen. Preliminary phytochemical analysis of Peppermint Oil and Tulsi Oil. Research J. Pharm. and Tech. 2015; 8 (7): 929-931.
28. Pradnya H. Pawar, Sharmila R. Chaudhari. Size controlled Bio-directed synthesis of Ag Metal Nanoparticles using Tulsi (Ocimum tenuiflorum) leaves extract. Asian J. Research Chem. 2017; 10 (5): 646-650.
29. Kapoor VP, Joshi H, Chaubey M, "Applications of seed gums in pharmaceutical formulations", J Med Arom Plant Sci. 2000, 22/4A and 23/1A, 42-44.
30. Dureja H, Kaushik D, Gupata M, Kumar V, Lather V, "Cosmeceuticals: An Emerging Concept", Indian Journal of Pharmacology. 2005; 37 (3): 155-159.
31. A, Reddy G, Mohanalakshmi S, Kumar CK, "Formulation and Comparative evaluation of Poly-herbal anti-acne face wash gel", Pharmaceutical Biology. 2011 ; 49 (8): 771-774.
32. Aburijat T, Natsheh FM, "Plants used in cosmetics", Phytother Res. 2003; 17: 9871000.
33. Ashawat MS, Banchhor M, "Herbal Cosmetics: Trends in skin care formulation" Pharmacognosy Rev. 2009 ; 3 (5): 82-89.
34. Yam T. S. Shah S., Hamilton Miller J. M.; Microbiological activity of whole and fractionated crude extracts of green tea (Camellia sinensis), and of tea components; FEMS Microbiol. Lett. Volume 152, 1997, Pageno. 169-174.
35. Kaur H.P., Kaur S., and Rana S.; "Antibacterial Activity and Phytochemical Profile of Green Tea, Black Tea and Divya Peya Herbal Tea";Int. J. of Pure and Applied Bioscience; Volume3(3), 2015, Page no. 117-123
36. Adcocks C., Collin P., Buttle D. J.; " Catechins from Green Tea (Camellia sinensis) inhibitovine and human cartilage proteoglycan and type II collagen degradation in vitro" J. of Nutr. Volume 132, 2002, Page no. 341-346.
37. McDaniel DH, Newman J, Farris P. Clinical efficacy of caffeine in treating under-eye circles and puffiness: A review. J Drugs Dermatol. 2014;13(5):588-92.
38. Mukherjee PK, Maity N, Nema NK, Sarkar BK. Bioactive compounds from natural resources against skin aging. Phytomedicine. 2011;19(1):64-73.
39. Nayak BS, Nalabothu P, Sandiford S, Patel KN, Bai S. Evaluation of wound healing activity of Allamanda cathartica L. and Laurus nobilis L. extracts on rats. BMC Complement Altern Med. 2006;6:12.
40. Arulmozhi S, Mazumder PM, Narayanan LS. Evaluation of anti-inflammatory activity of turmeric extract (Curcuma longa L.) using in vivo models. Int J Pharm Pharm Sci. 2013;5(1):101-4.
41. Kapoor VP. Herbal cosmetics for skin and hair care. Nat Prod Radiance. 2005;4(4):306-14.
42. Sahu AN, Jha SB, Dubey SD. Formulation and evaluation of curcumin ointment. Int J Pharm Biol Arch. 2011;2(2):734-9.
43. Yadav N, Bhutani KK. Quality standards of herbal cosmetics. J AOAC Int. 2014;97(5):1343-50.
44. Dureja H, Kaushik D, Gupta M, Kumar V, Lather V. Cosmeceuticals: An emerging concept. Indian J Pharmacol. 2005;37(3):155-9.
45. Kaur GJ, Arora DS. Antibacterial and phytochemical screening of Anethum graveolens, Foeniculum vulgare and Trachyspermum ammi. BMC Complement Altern Med. 2009;9:30.
46. Dash S, Murthy PN, Nath L, Chowdhury P. Kinetic modeling on drug release from controlled drug delivery systems. Acta Pol Pharm. 2010;67(3):217-23.
47. Indian Pharmacopoeia Commission. Indian Pharmacopoeia. Ghaziabad: Ministry of Health and Family Welfare, Government of India; 2018.
48. Singh A, Duggal S. Natural preservatives in cosmetics: Recent developments and future prospects. J Cosmet Sci. 2010;61(2):145-60.
49. Saraf S. Development of phytocosmetic formulation containing Aloe vera extract. Int J Green Pharm. 2010;4(4):244-9.
50. Barel AO, Paye M, Maibach HI. Handbook of Cosmetic Science and Technology. 3rd ed. Boca Raton: CRC Press; 2009.
51. Mortimer SN, et al. Evaluation techniques for spreadability of semi-solid formulations. Pharm Technol. 2003;27(4):62-8.