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Formulation & Evaluation of Herbal Facewash Containing Plantain Extract

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ABSTRACT

The present study focuses on the formulation and evaluation of a herbal facewash containing plantain extract (*Plantago major*), a medicinal plant known for its anti-inflammatory, antimicrobial, and skin-soothing properties. The increasing consumer demand for herbal skincare products has encouraged the development of formulations that are free from harmful synthetic chemicals.

In this study, plantain extract was obtained through [mention extraction method if known—e.g., aqueous or ethanolic extraction] and incorporated into a gel-based facewash along with other natural ingredients such as glycerin, aloe vera, and essential oils. The formulated facewash was subjected to various evaluation parameters including organoleptic characteristics, pH, viscosity, foamability, spreadability, skin irritancy, and microbial load.

The results revealed that the formulation was stable, non-irritant, and suitable for regular use. The pH was found to be within the acceptable range for skin application, and the facewash exhibited good cleansing and foaming properties. The presence of plantain extract contributed to the potential antimicrobial and soothing effects, making it a promising candidate for use in natural cosmetic formulations.

The study concludes that a herbal facewash containing plantain extract can be effectively formulated with desirable physicochemical properties and potential benefits for maintaining healthy skin.

Keywords: Plantain extract, Herbal facewash, *Plantago major*, Formulation, Evaluation, Natural cosmetics, Skin care, Anti-inflammatory, Antimicrobial, pH, Viscosity, Herbal formulation

INTRODUCTION

Facial cleansers are products designed to cleanse the face while preserving its moisture. Often referred to as "cleansers," these products are deemed appropriate for all skin types. They are particularly effective in eliminating dirt, oil, and moisture from dry skin. Both face washes and cleansers serve the purpose of removing impurities, oil, and environmental pollutants from the skin. A cleanser effectively eliminates excess oil, makeup, and dirt, which are primarily oil-soluble contaminants. While face washes can also remove these impurities, they may not always achieve complete effectively perform their function without irritating the skin, resulting in a youthful and vibrant appearance. The primary goals of a face wash include cleansing, reducing wrinkles, combating acne, providing moisture, and promoting skin fairness. Products aimed at skin whitening are believed to influence melanin production and metabolism by inhibiting melanin synthesis in melanocytes, thereby decreasing overall melanin levels in the skin.

Aloe vera, rose water, raw honey, peppermint oil, lavender essential oil, soap base, and glycerol are examples of substances that inhibit melanin production. The Indian herbal medicine industry is recognized as one of the oldest healthcare systems globally, with origins tracing back to ancient India, where the medicinal use of herbs was documented in the Vedas, an ancient sacred text. Ayurveda and Unani, two traditional healing practices, employed herbs and natural substances to treat various health issues. Although Western medical professionals may view it as a modern trend, plant extracts remain prevalent in many contemporary prescriptions. The global community is increasingly acknowledging the advantages of this traditional medicine, leading to a notable increase in the demand for Indian herbal products. This sector has seen an annual growth rate of nearly thirty percent, particularly in the areas of herbal remedies, skincare items, and cosmetics. The rising interest in natural products has become evident in recent years.

The skin is a crucial and extensive organ of the body, significantly influencing human identity, particularly the facial skin, which is sensitive and often regarded as a key indicator of one's appearance. The state of a person's skin can also reflect their overall health. The skin's composition consists of various components, including carbohydrates, amino acids, and lipids. Cosmetics have been formulated to tackle various skin issues, such as minimizing wrinkles, combating acne, and regulating oil production. These products aim to enhance the skin's appearance and texture, contributing to a more youthful and

healthier complexion. However, it is vital to select cosmetics that are both safe and effective, as some products may contain harmful chemicals that could adversely affect the skin over time. Face wash refers to products designed to cleanse the face without causing dryness, and it is also commonly known as a "cleanser." Face wash has been found to be suitable for maintaining skin health.

Facial cleansers can effectively remove impurities, although they may not always achieve complete results. Regular soaps can strip moisture from the delicate facial skin, which is particularly sensitive. In contrast, a face wash acts as a mild cleanser that effectively cleanses without irritating the skin, resulting in a youthful and vibrant appearance. The primary purposes of a face wash include cleansing, reducing wrinkles, combating acne, providing moisture, and promoting skin fairness. Skin whitening products are believed to influence melanin production and metabolism by inhibiting melanin synthesis in melanocytes, thereby decreasing overall melanin levels. Ingredients such as aloe vera, rose water, raw honey, peppermint oil, lavender essential oil, soap base, and glycerol are known to inhibit melanin production.

The facial skin plays a crucial role in reflecting overall health and is composed of amino acids, lipids, carbohydrates, and other essential components. To maintain its firmness, shine, and health, the skin requires a well-balanced diet. Historically, women have prioritized skincare, enhancing their appearance to showcase their beauty. This tradition continues today, particularly in rural and mountainous areas, where natural ingredients like neem, aloe vera, tulsi, and orange rose are favored in cosmetic formulations. Herbal cosmetics are utilized for cleansing and beautifying the skin.

Acne can be categorized into several types, including comedonal, infectious, pustular, cystic, and nodular acne. Non-inflammatory acne is further divided into whiteheads and blackheads. Whiteheads, or closed comedones, manifest as small white bumps, while blackheads, or open comedones, appear as darkened pores filled with melanin, sebum, and follicular cells. Papules are characterized by red, hard, raised lesions typically measuring less than 5 mm in diameter. For centuries, the effectiveness of plants in promoting healthy, radiant skin has been widely acknowledged. Cosmetics, which serve to enhance one's appearance, are readily available products.

The practice of using various herbs for skincare has its roots in ancient civilizations, where it was common to address skin-related concerns, cleanse, and enhance beauty. The face, being the most prominent and exposed part of the body, acts as a visible representation of a person's overall health. Historically, women paid particular attention to their appearance, showing great care for their unique skin types. In modern times, the use of natural remedies, including plant extracts such as neem, aloe vera, orange peel, tulsi, and rose, continues, especially in rural and mountainous regions. Despite the ongoing quest for beauty, contemporary society faces widespread skin issues like acne, blackheads, pimples, and dark circles, particularly among the youth. Ayurveda links these skin conditions to impurities in the blood, advocating for a holistic approach to skincare.

The skin, the body's largest organ, constitutes approximately 15% of an adult's total body weight and performs essential functions, including protection against external physical, chemical, and biological threats, as well as preventing excessive water loss and aiding in thermoregulation. The skin is a continuous structure, with mucous membranes covering the body's surface. To maintain healthy, clear, and radiant skin, a balanced diet is essential. In addition to proper nutrition, hormonal fluctuations, particularly during puberty in both genders, lead to various bodily changes, with Acne vulgaris being the most prevalent. This common skin condition carries significant physical and psychological burdens. Products designed to cleanse the face without causing dryness are referred to as face washes.

The term "cleanser" is commonly used to refer to this product, which has been found to be suitable for all skin types. A cleanser effectively eliminates dirt, makeup, and excess oil from the face, as these impurities are oil-soluble. While a facial wash can also be employed to remove these contaminants, its efficacy may not be complete. Regular soaps can lead to dryness in facial skin due to its delicate nature. In contrast, a face wash serves as a gentle cleanser that moisturizes the outer layer of the skin without causing harm, fulfilling the essential role of keeping the skin clean, sterile, smooth, and fresh, thereby promoting a vibrant and youthful appearance.

Cosmetics encompass a broad array of products designed for application on the human body through various methods such as rubbing, pouring, sprinkling, or spraying. Their purposes include cleansing, beautifying, enhancing attractiveness, or altering one's appearance. Examples of cosmetics range from toothpaste, shampoo, and conditioners to mascara, after-shave lotion, styling gel, creams, lotions, powders, perfumes, lipsticks, nail polish, and makeup for the eyes and face, as well as hair wavers, dyes, sprays, deodorants, and antiperspirants.

Cosmetics serve multiple functions. Personal care and skincare products are intended to cleanse and protect the body or skin, while makeup cosmetics aim to enhance or modify one's appearance by covering imperfections, accentuating natural features such as eyebrows and eyelashes, adding color to the face, or transforming one's look to resemble another person or object. Additionally, some cosmetics are formulated to impart fragrance to the body. Herbal cosmetics are those that incorporate phytochemicals sourced from various plants.

These components play a significant role in skin functions and supply essential nutrients for maintaining healthy skin and hair. Herbal cosmetics frequently incorporate natural herbs and their extracts for their fragrant qualities in cosmetic products. These cosmetics are derived from readily available herbs found in nature and are free from harmful synthetic chemicals. Although they are formulated using plant materials and extracts, they can be as effective as their synthetic counterparts. Notable examples of herbal cosmetics include aloe vera gel and coconut oil, both of which are rich in natural nutrients such as Vitamin E and Vitamin C, contributing to skin enhancement and nourishment. Aloe vera, a member of the Liliaceae family, is one such readily accessible herbal plant. Many consumers express concerns regarding the presence of toxic synthetic chemicals and mineral oils in cosmetic products. Natural cosmetics are not necessarily costly; in fact, some are more affordable than synthetic alternatives. They are often available at discounted rates and can be found at lower prices during promotional sales.

According to the World Health Organization (WHO), around 80% of the global population depends on natural products for healthcare, largely due to the side effects and increasing costs associated with modern medicine. The WHO actively promotes and supports traditional herbal remedies within natural

healthcare initiatives, as they are easily accessible, economical, and relatively safe. The skin acts as a barrier against water and various pathogens. Injuries and wounds compromise this barrier, which typically protects against the invasion of bacteria, fungi, and viruses. Aloe vera, classified within the Liliaceae family, is a perennial succulent plant known for its healing properties.

Common herbal ingredients found in herbal face wash formulations include aloe vera, green tea extract, chamomile, neem, turmeric, and rosehip oil, among others. These ingredients are selected for their cleansing, moisturizing, antioxidant, and anti-inflammatory benefits.

Numerous advantages exist for the skin, such as providing a mild cleansing experience that does not deplete natural oils, alleviating irritation and redness, enhancing hydration and moisture retention, and offering protection against environmental stressors. Furthermore, the incorporation of natural ingredients is particularly appealing to those with sensitive skin or individuals in search of eco-friendly and sustainable skincare alternatives.

In today's climate of increased awareness regarding ingredient transparency and environmental sustainability, herbal facewash has become a favored option for discerning consumers who are looking for effective and natural skincare solutions. As the popularity of herbal skincare products continues to grow, herbal facewash stands out by delivering a gentle and nourishing cleansing experience that is deeply rooted in natura's benefits. The significance of herbal facewash is underscored by its capacity to offer effective cleansing and skincare advantages through the use of natural ingredients sourced from plants and botanical extracts. Here are several key reasons that highlight the importance of herbal facewash.

1. Gentle Cleansing: Herbal facewash offers gentle yet effective cleansing without harsh chemicals or synthetic additives. It helps to remove dirt, oil, and impurities from the skin while maintaining its natural moisture balance.

2. Skin Nourishment: Herbal facewash formulations are enriched with botanical extracts, vitamins, and antioxidants that nourish and rejuvenate the skin. These natural ingredients provide essential nutrients and hydration, promoting healthy and radiant skin.

3. Soothing Properties: Many herbal facewash formulations contain ingredients with soothing and anti-inflammatory properties, such as aloe vera, chamomile, and calendula. These ingredients help to calm irritation, redness, and sensitivity, making herbal facewash suitable for individuals with sensitive or reactive skin.

4. Antioxidant Protection: Herbal facewash often contains plant-based antioxidants, such as green tea extract, vitamin C, and rosehip oil, which help to neutralize free radicals and protect the skin from environmental damage. Regular use of herbal facewash can help to prevent premature aging and maintain youthful-looking skin.

5. Natural Fragrance: Herbal facewash is often scented with natural essential oils and botanical extracts, providing a pleasant and uplifting aroma without artificial fragrances or synthetic additives. This natural fragrance enhances the sensory experience of using herbal facewash.

6. Eco-Friendly: Herbal facewash formulations prioritize natural and sustainable ingredients, making them environmentally friendly alternatives to conventional skincare products. By choosing herbal facewash, consumers can support eco-conscious brands and reduce their environmental footprint.

7. Suitability for All Skin Types: Herbal facewash is suitable for all skin types, including dry, oily, combination, and sensitive skin. Its gentle and nourishing formula makes it ideal for daily use and can help to address a variety of skincare concerns.

8. Transparency and Ingredient Safety: Herbal facewash formulations often prioritize ingredient transparency, with clear labeling and disclosure of key ingredients. This transparency allows consumers to make informed choices about their skincare products and ensures that they are using safe and natural ingredients on their skin. Overall, the importance of herbal facewash lies in its ability to provide effective cleansing, nourishment, and skincare benefits using natural and sustainable ingredients. By incorporating herbal facewash into their skincare routines, individuals can achieve healthy, glowing skin while supporting their commitment to natural beauty and environmental sustainability.

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	Plantain	3 gm	Anti-inflammatory
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 Plantain, 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

- Ethanoic extract of Turmeric, plantain and extract of aloe Vera was prepared by hot Extraction method using water condenser.
- Required quantity of methyl paraben dissolve in distilled water by heating on water bath.
- Then the solution should be cooled and required amount of sodium lauryl sulphate should be added.
- Then add rose oil drop wise for fragrance and made the gel with required quantity of water.

EVALUATION TEST OF HERBAL FACE WASH (containing plantain):

1. Rheological characteristic:

We were studied for some physical properties colour, clogging, viscosity change and sensation test.

2. Determination of pH:

The pH of formulations was determined using digital pH meter. One gram of face wash was dissolved in 100 ml of demineralised and stored for two hours. The measurements of pH of each formulation were done in triplicate. Instrument was calibrated before use with standard buffer solutions at pH 4.

3. Spread ability: Spread ability determination of formulations was determined by an apparatus suggested by Mortimer et al. which was fabricated in laboratory & used for study. The apparatus consists of a wooden block with a fixed glass slide with one end tied to weight pan rolled on the pulley which was in horizontal level with fixed slide. An excess of whitening face wash sample 1.5 gm was placed between two glass slide and a 1000 gm weight was placed on slide for 5 minutes to between compress the sample to uniform thickness weight (60gm) was added to the pan. It was calculated using the formula; S= ml /t Where, s= spread ability in gm.cm/sec m= weight tied to upper slide 1= length of glass slide t= time in seconds Length of glass slide was 11.2 cm and weight tied to upper slide was (60gm) throughout the experiment.

4. Wash ability: The product was applied on hand and was observed under running water.

5. Stability study: The instant whitening face wash were also subjected to the following condition of temperature and relative humidity during stability ages fit sediment temperature.

6. Grittiness: The product was checked for the presence of any gritty particles by applying it on the skin.

7. Physical evaluation test:

- 1) Appearance & Color \rightarrow Check for uniformity and any discoloration.
- 2) Odor \rightarrow Should be pleasant and characteristic of the herbal ingredients.
- 3) **Texture** \rightarrow Smooth, non-gritty, and easy to spread on the skin.
- 4) **pH Determination** \rightarrow Should be between 4.5 to 6.5 (suitable for skin).

RESULT & DISCUSSION:

The prepared formulation was evaluated for the various evaluation parameter. The result of evaluation was

1.PHYSICAL PARAMETERS:

The prepared acne face wash was evaluated for its color, odor, consistency.

FORMULATION CODE	ODOUR	COLOUR	CONSISTENCY
Marketed Himalaya aloe Vera face wash	pleasant	Green	Semi solid
F1	Mild herbal fragrance	Light Green	Semi solid
F2	Mild herbal fragrance	Light Green	Semi solid

2. PH: The PH of formulation was found to be satisfactory, and in the range of 5.5 to 5.8 which is near to the skin PH, in turn indicates that the prepared formulation can be compactable with skin. Here comparing other formulations F3 formulation found to have better PH.

FORMULATION CODE	рН
Marketed	5.5
F1	5.3
F2	5.2

3. WASHABILITY

Prepared formulations were easily washed with water.

Formulation Code	Washability
Marketed	Good
F1	Good
F2	Good

4. SKIN IRRITABILITY TEST:

Small amount of the formulation was applied on the skin and kept for few minutes and found to show no redness, oedema, inflammation and irritation during the studies .This formulation is safe to use for skin.

FORMULATION CODE	IRRITABILITY TEST	IRRITABILITY TEST
F1	No	No
F2	No	No

SUMMARY & CONCLUSION:

Herbal formulations are more acceptable in the belief that they are safer with fewer side effects than synthetic ones. The world market is also moving towards polyhedral medicines for health care, health, and for cosmetic purposes including dermal preparations like poly herbal anti-acne face washes. Etc. The consumer use of herbal products has significantly increased over the past years according to a survey of Global skincare market trends. In the present study, an attempt was made to formulate poly herbal anti-acne face wash using natural ingredients like coffee powder, lemon juice, Turmeric,

Aloe Vera leaf, and Orange pill and to evaluate the prepared formulations for the desired parameters. Prepared formulation polymers were evaluated for physical parameters like color, odor, grittiness, PH, viscosity, consistency, spread ability, wash ability, and stability studies. Gum tragacanth produces desired gel strength in formulations. Glycerin produces humectants activity during stability studies. Thus the preparations will have good spread ability results. It indicates easy application on the skin. This study revealed that the developed herbal formulation of batch F2 was comparatively better than other formulations.

Herbal formulation had a growing demand in world market. Formulations like face wash and hand wash are prepared separately. We try to formulate a single skin

cleanser having a dual action for hand washing and as a face wash due to the ingredients used in it and optimized pH of formulation. It is inferred from result formulation have good appearance, homogeneity and spredability. The results of antimicrobial activity show gel F2 having a better zone of inhibition. And the optimized

Formulation after stability study is formulation F2. After all evaluations it is conclude that F2 formulation having good effect like marketed formulation neither show any side effect on skin like skin irritation.

REFERENCE:

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. & amp; 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 physiology27 (Supplement 1) (2013): 9-17.

11. Simpson, Nicholas B.; Cunliffe, William J. (2004). "Disorders of the sebaceous glands". In Burns, Tony; Breathnach, Stephen; Cox, Neil; Griffiths, Christopher. Rook's textbook of dermatology (7th ed.). 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. K. 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.

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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., 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 Herpetomonassamuelpessoai (Kinetoplastida, Trypanosomatidae) cultivated in ined medium.

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 (6): 585-588.

23. Singh HP, Samnhotra N, Gullaiya S, Kaur I, "Anti-acne synergistic Herbal face wash gel Formulation, Evaluation, and Stability study", World Journal of Pharmaceutical Research. 2015; 4 (9): 1261-1273.

24. Kanlayavattanakul M, Lourith N, "Therapeutic agents and herbs in topical applications for acne treatment", International Journal of cosmetic Science. 2011; 33: 289-297.25. Kubo I, Muroi H, Kubo A, "Naturally occurring anti-acne agents", J Nat Prod. 1994; 57 (1): 9-17.

26. J. Insira Sarbeen. Preliminary phytochemical analysis of Peppermint Oil and Tulsi Oil. Research J. Pharm. and Tech. 2015; 8 (7): 929-931.

27. 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.

28. 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.

29. Dureja H, Kaushik D, Gupata M, Kumar V, Lather V, "Cosmeceuticals: An Emerging Concept", Indian Journal of Pharmacology. 2005; 37 (3): 155-159.30. 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.

31. Rashmi MS, "Topical Gel: A review", Pharm Rev. 2008; 1-3.

32. Aburijat T, Natsheh FM, "Plants used in cosmetics", Phytother Res. 2003; 17: 987-1000.

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