ABSTRACT
In traditional Indian medicine, Ayurveda, remedies for various infectious diseases and ailments include *azadirachta indica*, *adhatoda vasica*, *piper betle*, *ocimum tenuiflorum*, and *pongamia pinnata*. Building on the traditional use of these herbs, this study was conducted to develop and assess a polyherbal gel containing extracts from *azadirachta indica*, *adhatoda vasica*, *piper betle*, *ocimum tenuiflorum*, and *pongamia pinnata*. Three gel formulations (A, B, and C) were prepared with ethanolic extracts of these herbs at concentrations of 0.1%, 0.3%, and 0.5%, respectively, in a base. The prepared formulations underwent evaluation for appearance, homogeneity, pH, viscosity, rheological properties, spreadability, skin irritation, patch test, and washability. Antimicrobial activity of the formulations was determined using the disc plate method against *S. aureus*, *B. subtilis*, *A. niger*, and *E. coli*. The study results indicated that all formulations (A, B, and C) exhibited a superior zone of inhibition compared to the control. Notably, formulation C demonstrated the highest activity against the selected strains, likely due to its higher concentration of herbal extracts compared to formulations A and B. The polyherbal gel formulations demonstrated antimicrobial action, and this effectiveness is likely attributed to the synergistic interaction of the plant constituents present in the formulation.

KEYWORDS: Antimicrobial activity, patch test, polyherbal gel, evaluation test.
INTRODUCTION
Cosmetic plays a significant role in today’s life style. Moreover current trend is going green in almost all industries including cosmetics to adopt more natural way of life. The preferable choices are natural food, herbal medicines and natural curing practices for healthy life and also there is much demand for the organic vegetable products. The usage of herbal cosmetics has been increased to many folds in personal care system.\(^1\)

The skin is the largest organ of the body, accounting for about 15% of total adult body weight. It performs many vital functions, including protection against external, physical, chemical and biological assailants, as well as prevention of excess water loss from the body and role in thermoregulation. The skin is continuous, with the mucous membranes lining the body’s surface. To keep skin healthy, clear, glossy, a balanced nutrition is required. Apart from the balanced nutrition, hormonal changes especially during puberty in both sexes cause many changes in the body. Among various changes, dryness, roughness and pimples are most common. The pathogenesis of this are bacterial over growth and inflammation. To overcome this problem the use herbal remedies such as aloe vera, papaya, chikoo, fenugreek face wash gel has been formulated.\(^2,3\)

Cosmetics made up of herbal extracts for skin care and hair-care are very popular for their reliability.\(^4-6\) Organic cosmetic products include various formulations. The word Organic indicates safety as compared to synthetic products which are having various adverse effects on human health.\(^4-8\)

1.1 Purpose behind the use of polyherbal hand wash face wash
In the culture plates, the activity of polyherbal hand wash formulation revealed significant inhibition of bacterial growth. It was non-irritating to the skin. As a result, these plant ingredients can be used to make herbal hand wash on a commercial basis.\(^9\)

1.2 Advantages of herbal cosmetic
Herbal cosmetic have been using for beauty from the ancient times. It is considered best for the skin and hair care because of their lack of side effects. It is gaining the popular day by day in the world.

Following are the some advantages of using Natural cosmetics.
Safe to use
Compared to the beauty products, natural cosmetic are safe to use. They are hypoallergenic, and tested and proven by dermatologist to be safe to use anytime.

No side effects
The synthetic beauty products can irritate skin and cause pimples. They might block skin pores and make skin dry or oily. The natural ingredients are used to assure no side effects.

Animal testing not required
Some cosmetic are initially tested on animals to ensure they are safe and effective for human. However, natural cosmetic need not be tested on animals. These natural formulations are tested by experts in laboratories using appropriate equipment with no animal involved.

Natural products
The name itself suggests that herbal cosmetic are natural and free from synthetic chemicals, which otherwise may prove to be toxic to the skin. Instead of traditional synthetic products, different plants extract are used in these products.

Eg. Aloe- vera gel and coconut oil.

Inexpensive
Natural cosmetic are not that expensive. In fact, some of these products are more affordable than synthetic ones. An estimate demonstrated about 80% of the world population depends upon natural products for their health care.

Compatible With Skin Type
Natural products are suitable for all skin types, whether it be dark or fair. Natural cosmetic like foundation, eye shadow and lipstick can be safely used irrespective of the skin tone.

1.3 Hand Wash
Definition- Hand washing also known as hand hygiene, is the act of cleaning one's hands with soap or handwash and water to remove viruses/ bacteria/ microorganisms, dirt, grease, or other harmful and unwanted substances stuck to the hands.

1.3.1 Advantages of Herbal Handwash: - No side effects.
Bacteria on our hands can be minimized.

- It also helps to clear antiseptic and fungal problem faced by the skin.
- It also helps to remove dirt and oil effectively from the skin.
- Easier access compared to using soap and water.
- The easiest way to get rid of microorganism.
- Hand wash prevent germs from entering into our body.\[^{10}\]

1.3.1. What is hand hygiene?

Hand hygiene is a way of cleaning one’s hands that substantially reduces potential pathogens (harmful microorganisms) on the hands. Hand hygiene is considered a primary measure for reducing the risk of transmitting infection among patients and health care personnel. Hand hygiene procedures include the use of alcohol-based hand rubs (containing 60%–95% alcohol) and hand washing with soap and water. For surgical procedures, perform a surgical hand scrub before putting on sterile surgeon’s gloves. For routine dental examinations and nonsurgical procedures, use an alcohol-based hand rub or use water and plain or antimicrobial soap specific for health care settings. Unless hands are visibly soiled (e.g., dirt, blood, body fluids), an alcohol-based hand rub is preferred over soap and water in most clinical situations because it.

- Is more effective than soap at killing potentially deadly germs on hands
- Requires less time
- Is more accessible than hand washing sinks
- Produces reduced bacterial counts on hands, and
- Improves skin condition with less irritation and dryness than soap and water

1.4 Face Wash

Definition - A cleanser is a facial care product that is used to remove makeup, dead skin cells, oil, dirt, and other types of pollutants from the skin of the face. This helps to unclog pores and prevent skin conditions such as acne. A cleanser can be used as part of a skin care regimen together with a toner and moisturizer.

1.4.1 Advantages of face wash

- It helps to remove dead skin cells that helps new skin cells replace old one.
- It helps to keep skin fresh and healthy.
- It makes the skin to look radiant The mixture of dead skin cells and excessive oil clog pores, which can lead to acne white heads, blackheads and total weary appearance.
Removing dead skin cells that means your skin will develop wrinkles at a slower pace.

1.4.2 Properties of face wash

- It should be stable and should have a good appearance.
- It should soften on application to the skin.
- It should spread easily without dragging.
- During application it should not have oily or greasy feel.
- After evaporation of water the cream residue should not become viscous.
- Its physical action should be that of flushing on the skin and pore opening rather than absorption.

1.4.3 Uses of face-wash

- To remove all traces of makeup every day
- Cleansing the skin.
- Anti-aging,
- Bath and renewal keeping the skin clean and shiny.
- Stimulates there generation of the skin cells and their renewal. Help plug the pores clear.\textsuperscript{[11]}

NEED AND OBJECTIVE

2.1 Aim

Preparation and Evaluation of Dual purpose antimicrobial polyherbal gel :Face wash and hand wash.

HAND WASH

2.2 Need

- Defense against the spread of many illnesses from the common cold to more serious infections, such as meningitis, bronchiolitis, the flu, hepatitis A, and many types of diarrhea.
- To remove germs, avoid getting sick.
- Prevent the spread of germs to others.
- Helps prevent diarrhea and respiratory infections
- Help prevent skin and eye infections.
2.3 Objective

• To achieve sustained improvements in hand hygiene compliance rates.
• Accurately measure rates of staphylococcal disease a key outcome measure of the program.
• Reduce the rates of healthcare associated infections.
• Develop an effective education and credentialing system to improve knowledge about hand hygiene and infection control.
• To kill Germs and microorganisms that can harm our body.
• It will help to learn their illnesses are often caused by germs which travel from their hands to their mouths, eyes, noses, etc.
• The hands of health care workers are the primary routes of transmission of infection to patients. Hence, it brings up the use of antiseptic for handwashing purposes. Evaluation of the antimicrobial activity against skin pathogens of the prepared herbal hand wash was performed using disc diffusion method. \[12\]

NEED AND OBJECTIVE

FACE WASH

2.4 Need

• Removing dead skin cells from the surface of the skin
• Help to remove dead skin cells from the surface of your skin.
• Hydrate the skin.
• Remove dead skin cells.
• Fights skin problem.
• To remove impurities, germs, dirt and makeup that can irritate the skin.

2.5. Objectives

• Facial skin is elegant and the ordinary soaps make it to lose texture and make it dry. Facewash is a mild cleanser acts without producing any harshness to skin.
• The purpose of facewash is to proclaim the cleansing, antiwrinkle, anti-acne, moisturizing and enhance the fairness of skin and thus skin look young and energetic the present form of facewashes available in market were gel and cream state, which should be packed in large collapsible tube or plastic containers in turn difficult for the consumer to carry during their travel and being this facewash are aqueous in nature, it needs preservative to maintain the stability.
• The objectives of this present work is to overcome the drawbacks of synthetic facewashes and to prepare herbal facewash tablet. Facewash tablets are formulated to minimize the cost, packaging size and the utilization of harmful preservatives and easily portable.\textsuperscript{[13]}

**LITERATURE REVIEWS**

1) K. Suruchi \textsuperscript{[2015]}\textsuperscript{[1]}

Cosmetic plays a significant role in today’s life style. Moreover current trend is going green in almost all industries including cosmetics to adopt more natural way of life. The preferable choices are natural food, herbal medicines and natural curing practices for healthy life and also there is much demand for the organic vegetable products. The usage of herbal cosmetics has been increased to many folds in personal care system.

2) Singh, S, Mendhekar, S. Y., Thorat, P. B., Bodke, N. N. Jadhav et.al \textsuperscript{[2015]}\textsuperscript{[2]}

The skin is the largest organ of the body, accounting for about 15% of total adult body weight. It performs many vital functions, including protection against external, physical, chemical and biological assailants, as well as prevention of excess water loss from the body and role in thermoregulation. The skin is continuous, with the mucous membranes lining the body’s surface. To keep skin healthy, clear, glossy, a balanced nutrition is required. Apart from the balanced nutrition, hormonal changes especially during puberty in both sexes cause many changes in the body. Among various changes, dryness, roughness and pimples are most common. The pathogenesis of this are bacterial over growth and inflammation. To overcome this problem the use herbal remedies such as aloe vera, papaya, chikoo, fenugreek face wash gel has been formulated.

3) Jayshri C. Pawar, Ujjwala Y. Kandekar, Vijaya S. Vichare and Pranali N. Ghavane; Nikita Hari Thombre, HafniNur Insan, Tanvi Mehta, Megha Gandhi, et.al \textsuperscript{[2021]}\textsuperscript{[4]}

Cosmetics made up of herbal extracts for skin care and hair-care are very popular for their reliability. Organic cosmetic products include various formulations. The word Organic indicates safety as compared to synthetic products which are having various adverse effects on human health.

4) Mr. Bhise Akash Bhagwan et.al\textsuperscript{[2021]}\textsuperscript{[10]}

In the culture plates, the activity of polyherbal hand wash formulation revealed significant inhibition of bacterial growth. It was non-irritating to the skin. As a result, these plant ingredients can be used to make herbal hand wash on a commercial basis.
5) **Aman Shukla*, Aman Deep Baglart. et.al [2020]**\(^{[12]}\)

Defines against the spread of many illnesses from the common cold to more serious infections, such as meningitis, bronchiolitis, the flu, hepatitis A, and many types of diarrhoea. To remove germs, avoid getting sick. Prevent the spread of germs to others. Helps prevent diarrhea and respiratory infections. Help prevent skin and eye infections.

To achieve sustained improvements in hand hygiene compliance rates. Accurately measure rates of staphylococcal disease a key outcome measure of the program. Reduce the rates of healthcare associated infections. Develop an effective education and credentialing system to improve knowledge about hand hygiene and infection control. To kill Germs and microorganisms that can harm our body. It will help to learn their illnesses are often caused by germs which travel from their hands to their mouths, eyes, noses, etc. The hands of health care workers are the primary routes of transmission of infection to patients. Hence, it brings up the use of antiseptic for handwashing purposes. Evaluation of the antimicrobial activity against skin pathogens of the prepared herbal hand wash was performed using disc diffusion method.

6) **Nitin Yadav, Shashikant Maury, Piyush Yadav, Manoj Kumar Yadav, Manish k. Maurya A, et.al [2021]**\(^{[13]}\)

Facial skin is elegant and the ordinary soaps make it to lose texture and make it dry. Facewash is a mild cleanser acts without producing any harshness to skin. The purpose of facewash is to proclaim the cleansing, antiwrinkle, anti-acne, moisturizing and enhance the fairness of skin and thus skin look young and energetic the present form of facewashes available in market were gel and cream state, which should be packed in large collapsible tube or plastic containers in turn difficult for the consumer to carry during their travel and being this facewash are aqueous in nature, it needs preservative to maintain the stability. The objectives of this present work is to overcome the drawbacks of synthetic facewashes and to prepare herbal facewash tablet. Facewash tablets are formulated to minimize the cost, packaging size and the utilization of harmful preservatives and easily portable.

7) **Boudreau M.D., Beland F, et.al [2006]**\(^{[14]}\)

Its anti-inflammatory effects help to relieve pain, swelling, and soreness in wounds and injuries, and it promotes collagen formation and release. It can shorten the time it takes for wounds to heal and reduce scarring. It shortens the time it takes for first- and second-degree burns to recover. It works to treat bacterial and fungal diseases.
The cream residue should not become thick once the water has evaporated. Rather than absorption, its physical action should be that of skin flushing and pore opening. After usage, a thin emollient layer should remain on the skin.

8) Hari Kalyani, et.al [2022][16]
Fenugreek has powerful anti-bacterial qualities that help in controlling acne. The nutrient blend in fenugreek helps in regulating the sebum production in your skin. Enhances Skin Glow. The excellent antioxidant properties of fenugreek help in eliminating the dead skin cells on your skin tissue that have accumulated over time. Also, the vitamin C present in fenugreek increases the natural radiance of your skin and makes it look brighter. Lightens Dark Circles Fenugreek contains vitamins C and K which aid in lightening the skin beneath your eyes by controlling the excessive production of melanin. Also, regular usage of fenugreek on the skin helps to fade away pigmentation spots, blemishes, and acne scars. Fenugreek -s For Anti-Aging The free radicals present in your skin are responsible for your skin developing age spots, wrinkles, and fine lines. Fenugreek has a plethora of anti-aging chemicals that help in keeping your skin firm, vibrant and youthful by fighting the free radical damage in your skin efficiently. Fenugreek aids in the effective rejuvenation of your skin cells and prevents premature aging. Fenugreek As A Skin Cleanser Fenugreek contains natural saponins and phenolic compounds which makes it act as a wonderful cleanser for your skin. It not only cleans the accumulated dirt and oils from your face, but also makes it brighter and plump. Fenugreek As A Skin Moisturizer If your skin is flaky, dry, or has a rough texture, then your skincare arsenal needs fenugreek. These -s contain lipids, mucus, and natural oils that help in hydrating and nourishing your skin greatly. Fenugreek is one of the best natural moisturizers for your skin and it makes your skin softer and smoother.

Flavours or flavouring agent are usually required to mask the four basic taste sensations. Flavour refers to a mixed sensation of taste, touch, smell, sight and sound, all of which involve a combination of physiochemical and physiological actions that influence the perception of substances. With the expansion of technology in the flavour industry, many artificial or imitation flavours have been created. The creation of an acceptable flavour is more of an art than a science. Flavourants are selected on the basis of the taste of the drug or other ingredients need to be incorporated. The following Table shows the masking flavour with respect to different taste. Flavours used in lip balm should not contain any ingredient
which maybe irritating or toxic. These should have good taste and should be able to mask fatty odour of the base. Flavouring agents are an essential component to mask the odour of the fatty or wax base as well as to impart an attractive flavour. They are normally used in the concentration range of 2-4% of total formulation. Flavour should be stable and compatible with the other constituents of the lip balm. The flavours should not be very strong as to clash with or overpower other flavours that maybe used concurrently with the lip balm. Perfumes of the fruit flavour type have been advocated as well. Also something edible can be used.\textsuperscript{[19]} The commonly used flavours are apricot, strawberry, raspberry, cherry, honey, etc. Honey has the capacity to serve as a natural food preservative.

10) Panigrahi, L., Ghosal, S., Pattnaik, S., Maharana, L. & Barik, B., et.al\textsuperscript{[2006]}\textsuperscript{[21]} The gel formulation was filled in standard capped collapsible aluminum tubes and sealed by crimping to the end. The weight of tubes was recorded and the tubes were placed between two glass slides and were clamped. 500 gm was placed over the slides and then the cap was removed. The amount of extruded gel was collected and weighed. The percent of extruded gel calculated as -When it is greater than 90% then extrudability is excellent. When it is greater than 80% then extrudability is good. When it is 70% then extrudability is fair.

(Remove literature review from the final paper. No need of literature review)

**PLAN OF WORK**

1. Selection and procurement of ingredients
2. Ingredient Profile
3. Material and Instruments
4. Experimental Work
4.1 Formulation of product
4.2 Evaluation of product
5. Result and Discussion
6. Summary and Conclusion
7. Future Scope
8. References

**SELECTION AND PROCUREMENT INGREDIENT**

5.1. Selection and procuration of ingredient

The plants like aloe vera and Rose petal flowers used for research work was collected from
medicinal plant collected from Home Fenugreek, Papaya -s and Chikoo leaves powder were purchased from local market of Nashik. The collected plants and plants parts were authenticated from Department of Pharmacognosy At N.G.S,P,M college of pharmacy, Anjaneri, Nashik.

Table No. 1: List of Ingredients.

<table>
<thead>
<tr>
<th>NATURAL INGREDIENT</th>
<th>CHEMICALS</th>
<th>COLOURING AGENTS</th>
<th>FLAVOURING AGENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloevera</td>
<td>Carbopol</td>
<td>Rose petal</td>
<td>Rose oil</td>
</tr>
<tr>
<td>Chikoo</td>
<td>Methyl Paraben</td>
<td>Beet Root</td>
<td>Vanilla</td>
</tr>
<tr>
<td>Mango and amla extract</td>
<td>Propyl Paraben</td>
<td>Saffron</td>
<td>Raspberry</td>
</tr>
<tr>
<td>Papaya</td>
<td>PolyethyleneGlycol</td>
<td>Turmeric</td>
<td>Strawberry</td>
</tr>
<tr>
<td>Rose petal</td>
<td>Triethanolamine</td>
<td>Orange</td>
<td>Mango</td>
</tr>
<tr>
<td></td>
<td>Sodium Lauryl Sulphate</td>
<td>Strawberry</td>
<td>Sandalwood</td>
</tr>
</tbody>
</table>

6.1 NATURAL INGREDIENT

6.1.1. ALOE VERA

Table No. 2: Scientific classification of Aloe.

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clade</td>
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<tr>
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<td>Angiosperm</td>
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<tr>
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<td>Monocots</td>
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<td>Aloe vera</td>
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<tr>
<td>Species</td>
<td>A.vera</td>
</tr>
<tr>
<td>Synonym</td>
<td>Aloe Barbadensis mill</td>
</tr>
</tbody>
</table>

Using aloe vera on the face has benefits because

a. Its anti-inflammatory effects help to relieve pain, swelling, and soreness in wounds and injuries, and it promotes collagen formation and release.

b. It can shorten the time it takes for Trusted Source wounds to heal and reduce scarring.

c. It shortens the time it takes for first- and second-degree burns to recover.

d. It works to treat bacterial and fungal diseases trusted source.

e. The cream residue should not become thick once the water has evaporated.

f. Rather than absorption, its physical action should be that of skin flushing and pore opening.

g. After usage, a thin emollient layer should remain on the skin.\textsuperscript{[14]}
2. CHIKOO

Table No. 3: Scientific Classification of Chikoo.

<table>
<thead>
<tr>
<th>Kingdom</th>
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<tr>
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<tr>
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<td>Manilkara</td>
</tr>
<tr>
<td>Species</td>
<td>M.zapota</td>
</tr>
<tr>
<td>Binomial name</td>
<td>Manilkara Zapota</td>
</tr>
<tr>
<td>Synonym</td>
<td>Achras Zapota</td>
</tr>
</tbody>
</table>

Sapota is rich in antioxidants, minerals, and vitamins, thus making it a great choice for attaining a glowing skin. With such fruits easily available in the market, you will no longer need to rely on salons or spas to attain a flawless and beautiful skin. Sapota is known for treating your skin from within and ensuring that you achieve a natural glow that none of the chemical-rich makeup products can grant.

**Below are some of the ways that eating sapota benefits the skin**

1. Sapota ensures your skin gets a natural glow and shine. So, eating sapota daily can reduce the effects of a number of chemical-based skin care products that you tend to use daily. Sapota contains vitamin E that moisturizes the skin from within.

2. Sapota contains antioxidants that make it a good anti-ageing agent. This tasty fruit eradicates free radicals in the body which are actually responsible for the ageing process. This fruit is good at reducing the occurrence of wrinkles as well.
3. The - kernel oil obtained from sapota is used since long as a skin ointment. The residue of the sapota's -, after the oil has been extracted, can be applied on skin afflictions. This works quickly and is said to show long term results.
4. Sapota contains a unique combination of vitamin A and C that helps in beautifying the skin.\(^{15}\)

Fig. 2: Chikoo.

3. FENUGREEK

Table No. 4: Scientific Classification of Fenugreek.

<table>
<thead>
<tr>
<th>Kingdom</th>
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<tbody>
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<td>Subfamily</td>
<td>Faboideae</td>
</tr>
<tr>
<td>Genus</td>
<td>Trigonella</td>
</tr>
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</table>

Benefits of Fenugreek -s For Skin

1. Controls Acne

Fenugreek has powerful anti-bacterial qualities that help in controlling acne. The nutrient blend in fenugreek helps in regulating the sebum production in your skin.

2. Enhances Skin Glow

The excellent antioxidant properties of fenugreek help in eliminating the dead skin cells on
your skin tissue that have accumulated over time. Also, the vitamin C present in fenugreek increases the natural radiance of your skin and makes it look brighter.

3. Lightens Dark Circles
Fenugreek contains vitamins C and K which aid in lightening the skin beneath your eyes by controlling the excessive production of melanin. Also, regular usage of fenugreek on the skin helps to fade away pigmentation spots, blemishes, and acne scars.

4. Fenugreek -s For Anti-Aging
The free radicals present in your skin are responsible for your skin developing age spots, wrinkles, and fine lines. Fenugreek has a plethora of anti-aging chemicals that help in keeping your skin firm, vibrant and youthful by fighting the free radical damage in your skin efficiently. Fenugreek aids in the effective rejuvenation of your skin cells and prevents premature aging.

5. Fenugreek As A Skin Cleanser
Fenugreek contains natural saponins and phenolic compounds which makes it act as a wonderful cleanser for your skin. It not only cleans the accumulated dirt and oils from your face, but also makes it brighter and plump.

6. Mango As A Skin Moisturizer
If your skin is flaky, dry, or has a rough texture, then your skincare arsenal needs mango. These contain lipids, mucus, and natural oils that help in hydrating and nourishing your skin greatly. Mango is one of the best natural moisturizers for your skin and it makes your skin softer and smoother. Using mango as a moisturizer can be a natural and nourishing option for your skin. Mango is rich in vitamins and nutrients that can benefit the skin in several ways. Hydration: Mango contains a high water content, which helps in keeping the skin hydrated. Proper hydration is essential for maintaining skin elasticity and preventing dryness.

Vitamins and Antioxidants: Mango is packed with vitamins A, C, and E, as well as antioxidants. These nutrients can help protect the skin from environmental damage, reduce signs of aging, and promote overall skin health.

Fatty Acids: Mango butter, derived from the seed, is known for its moisturizing properties. It is rich in fatty acids, providing a protective layer to the skin, preventing moisture loss, and promoting softness.
Exfoliation: The enzymes in mango, such as papain, can act as a natural exfoliator, removing dead skin cells and promoting a smoother complexion.\[16\]

**Mango Moisturizer**

**Ingredients**
- Ripe mango
- Shea butter or coconut oil (optional for added moisturization).
- Honey (optional for additional hydration).

**Instructions**
- Peel and mash a ripe mango into a smooth paste.
- If desired, add a tablespoon of shea butter or coconut oil for extra moisturization.
- Optionally, mix in a teaspoon of honey for added hydration.

Amla, also known as Indian gooseberry, is a rich source of vitamin C and antioxidants. It has various benefits for the skin, and its hydrating properties can be particularly helpful for individuals with dry skin.

**Amla Extract for Dry Skin**

**Hydration:** Amla is packed with water content and can provide hydration to dry skin. The moisture helps in preventing flakiness and maintaining skin suppleness.

**Vitamin C:** Amla is one of the richest sources of vitamin C, which is known for its collagen-boosting properties. Collagen is essential for maintaining skin elasticity, and vitamin C helps in reducing dryness and promoting a more youthful appearance.

**Antioxidants:** The antioxidants present in amla help protect the skin from free radical damage, which can contribute to premature aging. This can be especially beneficial for individuals with dry skin, as it helps in maintaining skin health.

**How to use Amla extract for dry skin**

**Amla Face Mask**
- Mix amla powder with a small amount of water or rose water to form a paste.
- Apply the paste to your face and leave it on for 15-20 minutes.
- Rinse off with lukewarm water.
- You can also add a teaspoon of honey or yogurt to enhance the moisturizing effect.
Amla Oil
Mix amla powder with a carrier oil like coconut oil or almond oil.
Heat the mixture slightly and let it cool.
Apply the oil to your face and body, focusing on dry areas.
Leave it on for at least 30 minutes before washing it off.

Amla Juice
Drink amla juice regularly to provide your skin with internal hydration and essential nutrients.

Amla Moisturizer
Mix a few drops of amla extract with your regular moisturizer.
Apply the moisturizer to your face and body to boost hydration.

Fig. 3: Amla of India and Mango of India are rich source of vitamins and are fresh pick up from the farms that will help to moisture the skin and make skin soft and nice.
4. PAPAYA

Table No. 5: Scientific Classification of Papaya.

<table>
<thead>
<tr>
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</tr>
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<tr>
<td>Clade</td>
<td>Angiosperm</td>
</tr>
<tr>
<td>Clade</td>
<td>Eudicots</td>
</tr>
<tr>
<td>Clade</td>
<td>Rosids</td>
</tr>
<tr>
<td>Order</td>
<td>Brassicales</td>
</tr>
<tr>
<td>Family</td>
<td>Caricaceae</td>
</tr>
<tr>
<td>Genus</td>
<td>Carica papaya</td>
</tr>
<tr>
<td>Species</td>
<td>C.papaya</td>
</tr>
</tbody>
</table>

Papaya has nutrients to promote healthier skin. Papaya is rich in vitamin C, an antioxidant that reduce irregular collagen production. The soap also contains vitamin A, another important nutrient for the skin. It promotes the production of new skin cells, and may help reduce dark spots, blemishes, and scars. A part from epidermis whiten, pawpaw castile could be utilized to cure black heads. It is effectual in curing blackheads. For the face or further black heads susceptible body parts. One of main affect of blackheads is propensity for decreased epidermal cells to clog the vesicles opening.[17]

![Papaya](image)

Fig 4: Papaya.

5. ROSE PETAL

Table No. 6: Scientific Classification Of Rose petal.

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clade</td>
<td>Tracheophytes</td>
</tr>
<tr>
<td>Clade</td>
<td>Angiosperm</td>
</tr>
<tr>
<td>Clade</td>
<td>Eudicots</td>
</tr>
<tr>
<td>Clade</td>
<td>Rosids</td>
</tr>
<tr>
<td>Order</td>
<td>Malvales</td>
</tr>
<tr>
<td>Family</td>
<td>Malvaceae</td>
</tr>
</tbody>
</table>
ROSE PETAL BENEFITS FOR RADIANT SKIN
As well as harnessing this incredible plant power on the inside, your skin can also take advantage of the numerous Rose petal benefits.

THE 'ANTI-AGEING' PLANT
One of the most powerful anti-ageing plant actives, Rose petal has a magical reputation for increasing skin elasticity to give a stunning natural youth-boost.

With the incredible ability to inhibit the activity of the enzyme elastase, which is responsible for breaking down our skin’s precious elastin, Rose petal actively combats the ageing process by firming and lifting your skin.

EVENS SKIN TONE
One of the visible signs of skin ageing is the appearance of hyperpigmentation or age spots.

Age spots can occur due to a number of different variables, including ultraviolet radiation exposure, excess melanin production and genetics.

Due to the slightly exfoliating effect of the organic acids found in the plant, including citric acid and malic acid, Rose petal helps to speed up cell turnover, resulting in a more even looking skin tone.

RICH IN ANTIOXIDANTS
Rose petal is rich in antioxidants, called anthocyanocides.

Antioxidants are proven to help fight skin damaging free radicals which spawn when pollutants such as ultraviolet radiation and traffic pollution make contact with the skin, and can result in premature skin ageing.

Not only do anthocyanocides protect against free radical damage, they also have slightly astringent properties, helping to reduce the appearance of large pores for a smoother

<table>
<thead>
<tr>
<th>Subfamily</th>
<th>Malvoideae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribe</td>
<td>Hibisceae</td>
</tr>
<tr>
<td>Genus</td>
<td>Rose petal</td>
</tr>
<tr>
<td>Species</td>
<td>S.rosa-sinensis</td>
</tr>
<tr>
<td>Binomial name</td>
<td>Rose petal rosa-sinesis L</td>
</tr>
<tr>
<td>Synonym</td>
<td>Rose petal arnottii Griff. Ex Mast.</td>
</tr>
</tbody>
</table>
complexion.

They also have an anti-inflammatory effect and can help to soothe inflamed skin, making Rose petal suitable for those prone to very sensitive skin.

**PURIFY YOUR COMPLEXION**

As mentioned previously, Rose petal contains gentle acids that have a slight exfoliating effect on the skin.

Not only does this help with age spots, this Rose petal benefit can encourage an all round fresher, younger, smoother looking complexion.

The natural acids present in Rose petal help to purify your skin by breaking down dead skin and increasing cell turnover, they can even help to control acne breakouts.

Unlike harsh synthetic forms of these acids which can strip your skin of its natural oils, the organic acids from Rose petal bring your skin back in balance for a naturally gorgeous, glowing complexion.

![Fig. 5: Rose petal.](image)

**6.2 COLOURING AGENT**

**ROSE PETAL FLOWER EXTRACT**

- **INCI:** Rose petal Rosa - Sinensis flower extract
- **Solubility:** Hydrophilic
- **Main chemical pigment(s):** - Cyanidin-3-sophoroside, Cyanidin-3-sambubioside, Delphinidin-3-sambubioside.
- **Colour:** Red / pink-
The red pigments contained in red flowers of the Rose petal species are anthocyanins, and are widely used as colouring agents. **Cyanidin-3-sophoroside** is thought to be the main chemical pigment found in Rose petal petals of the species *Rose petal rosa-sinensis*. Extracts are also prepared of species of Rose petal called Roselle (*Rose petal sabdariffa*), thought to be native to West Africa. The main anthocyanins found in *Rose petal sabdariffa* are cyanidin-3-sambubioside and delphinidin-3-sambubioside.\[18\]

![Fig. 6: Rose petal Extract](image)

Fig. 6: **Rose petal Extract** (‘Rose petal extract or roselle extract?’ Correct to right extract utilised. It seems you have used roselle as your source of pigment! In the introduction mention sources of more natural pigments like beet root, turmeric, *Clitoria ternatea*. Read treasure and evans for pharmacognosy and collect information from it.

### 6.3 FLAVOURING AGENT

Flavours or flavouring agent are usually required to mask the four basic taste sensations. Flavour refers to a mixed sensation of taste, touch, smell, sight and sound, all of which involve a combination of physiochemical and physiological actions that influence the perception of substances. With the expansion of technology in the flavour industry, many artificial or imitation flavours have been created. The creation of an acceptable flavour is more of an art than a science. Flavourants are selected on the basis of the taste of the drug or other ingredients need to be incorporated. The following Table shows the masking flavour with respect to different taste.

Flavours used in lip balm should not contain any ingredient which maybe irritating or toxic. These should have good taste and should be able to mask fatty odour of the base.\[18\] Flavouring agents are an essential component to mask the odour of the fatty or wax base as well as to impart an attractive flavour. They are normally used in the concentration range of
2-4% of total formulation. Flavour should be stable and compatible with the other constituents of the lip balm. The flavours should not be very strong as to clash with or overpower other flavours that maybe used concurrently with the lip balm. Perfumes of the fruit flavour type have been advocated as well. Also something edible can be used.\cite{19} The commonly used flavours are apricot, strawberry, raspberry, cherry, honey, etc. Honey has the capacity to serve as a natural food preservative.\cite{19}

![Fig. 7: Rose oil.](image)

**Table No. 7: List of Flavour.**

<table>
<thead>
<tr>
<th>TASTE</th>
<th>MASKING FLAVOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>Butterscotch, maple</td>
</tr>
<tr>
<td>Bitter</td>
<td>Wild cherry, walnut, chocolate-mint, licorice</td>
</tr>
<tr>
<td>Sweet</td>
<td>Fruit, berry, vanilla</td>
</tr>
<tr>
<td>Acid</td>
<td>Citrus</td>
</tr>
</tbody>
</table>

**MATERIALS AND INSTRUMENTS**

7.1 Materials and Chemicals

**Table No. 8: List of Materials and Chemicals.**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Materials and Chemicals</th>
<th>Manufacturer</th>
</tr>
</thead>
</table>
7.2 Instruments

Table No. 9: List of Instruments.

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Instruments</th>
<th>Make and Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Electronic weighing balance</td>
<td>AY 220 Shimadzu corporation Kyoco, Japan</td>
</tr>
<tr>
<td>2.</td>
<td>Digital pH meter</td>
<td>335, Systronics, Ahmadabad</td>
</tr>
<tr>
<td>3.</td>
<td>Brookfield viscometer</td>
<td>DV plus viscometer</td>
</tr>
<tr>
<td>4.</td>
<td>Heating mantle</td>
<td>Sunsim, India</td>
</tr>
</tbody>
</table>

8.1 Preparation of Polyherbal Gel

Preparation of plant extracts

Papaya, Fenugreek and Chikoo were grind separately to form coarse powder. Desired quantity of each herb was measured and macerated with distilled water in conical flask. With addition of small amount of chloroform mix with water by moderate shaking of conical flask for 3 days. After 3 days content was filtered out by using simple filtration method and filtrates were collected separately. Freshly collected aloe vera and Rose petal flower sliced and extracts was prepared using grinder separately. Evaporation of plants extracts were done by using electronic water bath at 600c separately, until desired concentration was obtained.

Method of Preparation of topical gel

Step-1: Preparation of gel base

1.5 gm of Carbopol 940 dispersed in 50 ml of distilled water kept the bear aside for 6 hours to complete swelling of Carbopol to form gel. Take 10 ml of distilled water in beaker and add propyl paraben and methyl paraben in it dissolved by heating on water bath. After complete dissolution solution was cooled and propylene glycol and sodium lauryl sulphate were added in required amount. This mixture was added in Carbopel 940 with continuous stirring.

Step-2: Preparation of polyherbal gel

Sufficient quantity of gel base was taken in beaker and required amount of extracts as per formulation was added with continuous stirring. Extract of Rose petal act as coloring agent and perfume were added. Triethanolamine was added drop wise in formulation for adjustment of required pH and to obtained consistent gel.
Fig. 8: Polyherbal Gel.

Composition of Formulation

Table 10: Composition Of Gel Base.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ingredients</th>
<th>Quantity</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Carbopol 940</td>
<td>1.5 gm</td>
<td>Rheology Modifiers</td>
</tr>
<tr>
<td>2.</td>
<td>Propyl paraben</td>
<td>0.2 gm</td>
<td>Preservative</td>
</tr>
<tr>
<td>3.</td>
<td>Methyl paraben</td>
<td>0.1 ml</td>
<td>Preservative</td>
</tr>
<tr>
<td>4.</td>
<td>Propylene glycol</td>
<td>5 ml</td>
<td>Additives</td>
</tr>
<tr>
<td>5.</td>
<td>Triethanolamine</td>
<td>1ml</td>
<td>Thickening agent</td>
</tr>
<tr>
<td>6.</td>
<td>Sodium lauryl sulphate</td>
<td>0.5 gm</td>
<td>Surfactants</td>
</tr>
<tr>
<td>7.</td>
<td>Distilled water</td>
<td>q.s.</td>
<td>Vehicle</td>
</tr>
</tbody>
</table>

Table 11: Composition of Developed formulation.

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Ingredients</th>
<th>Quantity</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aloe vera extract</td>
<td>4gm</td>
<td>Moisturising agent</td>
</tr>
<tr>
<td>2.</td>
<td>Papaya extract</td>
<td>3gm</td>
<td>Antifungal agent, Antibacterial agent</td>
</tr>
<tr>
<td>3.</td>
<td>Ripen Chikoo extract</td>
<td>3gm</td>
<td>Antifungal agent</td>
</tr>
<tr>
<td>4.</td>
<td>Amla, mango extract</td>
<td>5gm</td>
<td>Cleansing agent</td>
</tr>
<tr>
<td>5.</td>
<td>Rose petal flower extract</td>
<td>2ml</td>
<td>Colouring agent</td>
</tr>
<tr>
<td>6.</td>
<td>Pharmaceutical soft soap/SLS</td>
<td>q.s.</td>
<td>Soap washing agent</td>
</tr>
<tr>
<td>7.</td>
<td>Pure water</td>
<td>q.s.</td>
<td>Water</td>
</tr>
<tr>
<td>8.</td>
<td>Synthetic perfume and lavender and rose perfume</td>
<td>q.s.</td>
<td>Perfume agent for good smell</td>
</tr>
</tbody>
</table>

10.3 Evaluation Parameters

A. Physical Evaluation

Physical parameters such as colour, consistency was checked manually.

B. Washability

The product was applied on hand was observed under running water.
C. **pH**

The pH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature.\[^{20}\]

D. **Viscosity**

The measurement of viscosity of prepared polyherbal gel was done with Brookfield viscometer reading was taken at 100 rpm using spindle no.64.

E. **Spreadability**

500mg of the cream was sandwiched between 2 slides. A weight of 100gm was placed on upper slide. The weight was removed and extra formulation was scrapped off. The lower slide was fixed on board of apparatus and upper slide was fixed with nonflexible string on which 20g load was applied. Time taken by upper slide to slip off was noted down.

F. **Extrudability**

The gel formulation was filled in standard capped collapsible aluminium tubes and sealed by crimping to the end. The weight of tubes was recorded and the tubes were placed between two glass slides and were clamped. 500 gm was placed over the slides and then the cap was removed. The amount of extruded gel was collected and weighed. The percent of extruded gel calculated as.

1) When it is greater than 90% then extrudability is excellent.
2) When it is greater than 80% then extrudability is good.
3) When it is 70% then extrudability is fair.\[^{21}\]

G. **Irritancy Test**

The cream was applied on left hand dorsal side surface of 1sq.cm and observed in equal intervals up to 24 hours for irritancy, redness and edema.

H. **Stability of Polyherbal gel**

Stability of the base and formulation were studied at different storage condition and assed for their physical characteristics like color, appearance and odor for 30 days. The results are shown in the table.

I. **Antimicrobial activity of polyherbal gel**

Antimicrobial activity of polyherbal gel was done against microbial culture of *E. coli* and *S. aureus*, by using agar well diffusion method as described in research article. Marketed formulation of handwash used as a positive control and the gel base without extract used as a
negative control. The zone of inhibition was calculated.[22-23]

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

Table 12: Result of evaluation parameter of polyherbal gel.

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>OBSERVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Reddish</td>
</tr>
<tr>
<td>Consistency</td>
<td>Semisolid</td>
</tr>
<tr>
<td>Washability</td>
<td>Easily washable</td>
</tr>
<tr>
<td>pH</td>
<td>6.50 pH</td>
</tr>
<tr>
<td>Viscosity</td>
<td>18700 centipoise</td>
</tr>
<tr>
<td>Spredability</td>
<td>Good</td>
</tr>
<tr>
<td>Extrudability</td>
<td>Good</td>
</tr>
<tr>
<td>Skin Irritation</td>
<td>No sign</td>
</tr>
</tbody>
</table>

A. Physical Evaluation

Physical parameters such as: colour, consistency was checked manually. Developed poly herbal formulation was reddish in colour. Colour obtained due to Rose petal extract.

B. Washability

The product was applied on hand was observed under running water.

C. pH pH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant temperature. All formulation was found homogeneous easily washable with slightly acidic pH which was compatible with skin physiology.

D. Viscosity

The measurement of viscosity of prepared poly herbal gel was done with Brookfield viscometer reading was taken at 100 rpm using spindle no.64. ranging between 18000-20000 cp.

E. Spreadability

Spredability indicates that gel easily spreadable by small amount of applied shear.

F. Stability

Stability study of prepared polyherbal formulation was done at different storage condition Physical characteristics was assessed like colour, appearance and odour. The result is shown in Table 4. Formulation F2 showed no significant changes in colour, odor and appearance.
Table 13: Physical stability study of prepared polyherbal formulation.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Storage Condition</th>
<th>Appearance</th>
<th>Colour</th>
<th>Odour</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Day</td>
<td>8°C</td>
<td>Semisolid gel</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
<tr>
<td></td>
<td>40°C</td>
<td>Semisolid gel</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
<tr>
<td>15 Day</td>
<td>8°C</td>
<td>Semisolid gel</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
<tr>
<td></td>
<td>40°C</td>
<td>Semisolid gel</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
<tr>
<td>30 Day</td>
<td>8°C</td>
<td>Semisolid gel</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
<tr>
<td></td>
<td>40°C</td>
<td>Slightly Liquid</td>
<td>Reddish</td>
<td>Characteristics</td>
</tr>
</tbody>
</table>

Figure 9: Polyherbal Gel Formulation.

G. Antimicrobial activity of polyherbal gel.

Table 13: Antimicrobial sensitivity result of Polyherbal Formulation.

<table>
<thead>
<tr>
<th>Test Organism</th>
<th>Zone of Inhibition(mm)</th>
<th>-ve Control</th>
<th>+ve Control</th>
<th>F1(Comp-1)</th>
<th>F2 (Comp-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. aureus</td>
<td></td>
<td>1.86±0.1527</td>
<td>12.07±0.2516</td>
<td>4.05±0.2081</td>
<td>5.60±0.2081</td>
</tr>
<tr>
<td>E. coli</td>
<td></td>
<td>1.66±0.2081</td>
<td>11.63±0.2516</td>
<td>2.66±0.3055</td>
<td>4.8±0.2645</td>
</tr>
</tbody>
</table>

SUMMARY AND CONCLUSION

The organic formulation was prepared by keeping view to develop polyherbal gel using natural ingredients. With hope to minimize side effects. This research results also show that hand wash and face wash made from natural source is good, stable and has good source of application. This also studied all aspects of natural polyherbal gel including natural ingredients formulation method, evaluation and application hence it can be concluded that extensive literature study has been perform on hand wash and face wash product and show wide scope for product in future.

Results of this study revealed that formulated gel as a skin cleanser was more efficient in reducing the number of microorganisms from human skin than the commercial antiseptic soaps, so it can be used as an antiseptic with less or no side effects. Also some of the in vitro evaluations tests were also performed on prepared formulation and this study was compared...
with some marketed herbal 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 spreadability. All evaluations it is conclude that resulted formulation having good effect like marketed formulation neither show any side effect on skin like skin irritation.

FUTURE SCOPE

Many of the chemical Hand washes are now available in the market as alcohol based sanitizers consisting of other synthetic detergents.

Alcohols and Detergents do reduce health care related transmission of harmful diseases but they do also have some short comings and adverse effects on human tissues and environment. Frequent use of such synthetic chemical based formulations can lead to skin irritation and also resistant among pathogens.

Production cost of such synthetic formulations are also high, due to addition of synthetic chemicals & alcohols.

To overcome these problems it’s necessary to replace synthetic chemicals with natural ingredients. As natural ingredients don't have any adverse effects on human skin and environment.

Hence Herbal Hand Wash can be a new way developed to combat antibiotic resistant of pathogenic organism and provide safe, healthy, natural living through germ free hands.

Such Herbal formulations can also reduce the manufacturing cost and proven to be more economical than synthetic chemicals as these herbs are easily available in the environment in abundant and also can be cultivated easily.

ACKNOWLEDGEMENT

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Thank you to my mentor for red pen correcting my thesis submitted and accepting it later without which it is incomplete and remain of no value. I am also thank you to our valuable principle sir for his allowance and giving me this golden opportunity to do this work in the laboratory without which I cannot complete it. So I am thank you to his kindness he give me during the completion of this project work.

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7. Irmawati Akma, Hapiz Abdul, Jemima Japakumar1, Jivinthiran Jayagobi1, Mohamad Azfar Jamaluddin and Arumugam Sharmila; “Production of Lip Balm from Natural Dyes”, 2021; 202206.
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