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## Formulation and Evaluation of Herbal Anti-Pollution Facewash

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### ABSTRACT :

The increasing environmental pollution, skin health is at greater risk due to the accumulation of dirt, toxins, and particulate matter. The present study focuses on the formulation and evaluation of an herbal anti-pollutant face wash incorporating linseed (*Linum usitatissimum*) and activated charcoal, along with other herbal ingredients known for their cleansing and skin-nourishing properties. Linseed is rich in antioxidants and omega-3 fatty acids, which help in skin hydration and barrier protection, while activated charcoal is effective in adsorbing pollutants and excess oil from the skin. Additional ingredients such as aloe vera, neem, and green tea extract were incorporated for their anti-inflammatory, antimicrobial, and soothing effects.

The formulated face wash was evaluated for various physicochemical parameters, including pH, viscosity, foaming ability, and stability under different storage conditions. The efficacy was assessed through in-vitro and in-vivo studies to determine its cleansing action, pollutant removal efficiency, and skin compatibility. The results demonstrated that the formulated face wash effectively removed impurities, maintained skin hydration, and was non-irritating to the skin.

This study highlights the potential of herbal formulations in skincare, offering a natural and effective alternative to synthetic cleansers for pollution defense and overall skin health.

### Introduction :

The increasing environmental pollution, particularly in urban areas, the skin is subjected to various harmful pollutants such as dust, soot, and harmful chemicals. These pollutants can lead to premature aging, pigmentation, and other skin issues. As a result, there is a growing demand for natural skincare products that can provide protection against pollution while maintaining the skin's health.

Herbal skincare products have gained significant popularity due to their perceived safety, sustainability, and effectiveness. This research focuses on the formulation and evaluation of a Herbal Anti-Pollution Facewash, which combines the benefits of charcoal, flax seeds (leen seed), rice water, aloe vera, and turmeric. Each of these ingredients offers unique properties that contribute to cleansing, detoxifying, and nourishing the skin:

1. **Charcoal:** Known for its deep cleansing and detoxifying properties, charcoal helps absorb pollutants, excess oils, and toxins from the skin.
2. **Flax Seeds (Leen Seed):** Rich in omega-3 fatty acids, antioxidants, and anti-inflammatory compounds, flax seeds are known for their ability to hydrate the skin, reduce irritation, and improve skin elasticity.
3. **Rice Water:** This traditional skincare ingredient is packed with vitamins and minerals, promoting skin clarity, moisture retention, and soothing properties.
4. **Aloe Vera:** Aloe vera is renowned for its cooling, hydrating, and anti-inflammatory properties, helping to rejuvenate the skin and alleviate any irritation caused by pollutants.
5. **Turmeric:** Turmeric has been used for centuries for its antibacterial, anti-inflammatory, and antioxidant properties. It helps in healing damaged skin, reducing pigmentation, and promoting a healthy glow.

This facewash formulation is designed to remove pollutants while soothing, repairing, and moisturizing the skin. The study will also evaluate the product's effectiveness, safety, and sensory attributes to ensure it meets the standards required for everyday use. The development of this herbal anti-pollution facewash aims to offer a natural alternative for individuals looking to protect their skin from the harmful effects of environmental pollution.[1]

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**Plan of work :**

1. Selection of drug & excipients.
2. Experimental work.
3. Evaluation test.
4. Result & discussion.

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**Function of the herbal face wash :**

Herbal anti-pollution face washes are formulated to help cleanse the skin from pollutants, dust, and environmental toxins while providing nourishment and protection. Their key functions typically include:

1. **Deep Cleansing:** They help remove dirt, grime, and pollutants that accumulate on the skin's surface throughout the day.
2. **Detoxifying:** Many herbal ingredients, such as activated charcoal, aloe vera, or green tea, are used for their detoxifying properties, helping to clear impurities and free radicals from the skin.
3. **Hydration and Nourishment:** Herbal face washes are often enriched with natural moisturizers like honey, glycerin, or essential oils, which hydrate and nourish the skin, leaving it soft and smooth.
4. **Protection:** Some face washes create a barrier against further environmental pollutants, preventing damage caused by free radicals and oxidative stress.
5. **Soothing and Calming:** Ingredients like chamomile, tea tree oil, or calendula help soothe irritated or inflamed skin caused by exposure to pollution or harsh environmental conditions.
6. **Balancing Skin Tone:** The herbal ingredients often have skin-brightening properties, helping to even out the skin tone and reduce the effects of pollution-related dullness.[4]

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**Properties of the herbal face wash :**

Herbal anti-pollution face washes possess several beneficial properties that help protect and enhance skin health, particularly in polluted environments. Some of the key properties include:

1. They effectively remove dirt, pollution particles, excess oil, and other impurities from the skin's surface, leaving it fresh and clean.
2. Many herbal face washes include ingredients like activated charcoal, green tea, or neem, which help detoxify the skin by absorbing and neutralizing harmful toxins and pollutants.
3. Ingredients such as aloe vera, chamomile, and turmeric have soothing properties that reduce inflammation, redness, or irritation caused by pollution or environmental stress.
4. Many herbal ingredients, like vitamin C, green tea, or berries, are rich in antioxidants that protect the skin from oxidative stress caused by free radicals, which are often generated by pollution.
5. Natural oils like coconut oil, olive oil, or glycerin provide hydration, preventing skin dryness caused by exposure to pollution. These ingredients help maintain the skin's moisture balance.[5]

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**Objective :**

1. **Purify the Skin:** To cleanse the skin by removing dirt, dust, pollution particles, makeup, and excess oil without disrupting the skin's natural moisture balance.
2. **Detoxify and Protect:** To detoxify the skin by eliminating harmful pollutants, free radicals, and toxins that can cause premature aging, pigmentation, and other skin issues.
3. **Sooth and Calm Irritation:** To soothe the skin and reduce inflammation or redness caused by exposure to environmental pollutants, offering comfort for sensitive or irritated skin.
4. **Prevent Damage from Pollution:** To protect the skin from oxidative stress and damage caused by exposure to pollutants like smoke, dust, and UV rays, which contribute to premature aging and other skin conditions.
5. **Nourish and Hydrate:** To nourish and hydrate the skin with natural ingredients, helping to maintain the skin's moisture levels, preventing dryness, and promoting a healthy, glowing complexion.

6. **Balance Skin Health:** To maintain a balanced skin tone, reduce excess oil production or dryness, and improve overall skin health by providing essential vitamins and minerals through herbal ingredients.
7. **Promote Radiance and Brightness:** To brighten the skin, reduce dullness, and enhance the skin's natural radiance by working against the skin's loss of luster due to environmental stressors.
8. **Prevent Breakouts:** To prevent acne and other skin problems caused by clogged pores and impurities, ensuring a clearer complexion by using natural antibacterial and anti-inflammatory ingredients.[6]

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## Drug Profile :

### 1) Turmeric :



**Botanical name:** Curcuma longa

**Family:** Zingiberaceae

**Common name:** Haldi

**Chemical Constituents:** Turmeric contains curcumin, curcuminoids, diarylheptanoids, diphenylalkanooids

**Use :**

#### 1. Acne and Blemish Control:

- Turmeric contains curcumin, which has antibacterial and anti-inflammatory properties that help reduce a breakouts.

#### 2. Skin Brightening:

- Regular use of turmeric in a face wash can enhance the skin's natural glow and improve complexion.
- It helps reduce dark spots, hyperpigmentation, and uneven skin tone.

#### 3. Anti-Aging Benefits:

- The antioxidant properties of turmeric protect the skin from free radical damage, slowing down signs of aging such as fine lines and wrinkles.

### 2) Linseed :



**Biological name:** Linum Usitatissimum

**Family:** Linaceae

**Common name:** Javaz

**Geographical source:** Flaxseed is native to the Mediterranean and West Asia, and is now grown in many countries around the world

**Use :**

- a. **Hydration:** Flaxseed's fatty acids help keep skin smooth and moisturized.
- b. **Anti-aging:** Lignans and antioxidants in flaxseed can help reduce wrinkles and fine lines.
- c. **Acne:** Flaxseeds can help reduce acne by controlling oil production and soothing irritation.
- d. **Skin sensitivity:** Omega-3 fatty acids in flaxseed can help reduce skin sensitivity, roughness, and scaling.

**3) Alovera :**



**Botanical name:** Aloe berbadensis Linn .

**Family:** Liliaceae

**Common name:** Korphad, Ghritkumari

**Chemical component:** Gibberellins & Auxins

**Use :**

- a) Using an aloe vera face wash works for all skin types because it contains antibacterial, anti-inflammatory, and healing properties.
- b) It helps reverse the damage caused by pollution and UV rays.
- c) Aloe Vera deeply hydrates the skin and provides a soothing effect on the skin without making it greasy.

**4) Lemon Juice :**



**Biological name:** Citrus Limon

**Family:** Rutaceae.

**Synonym:** Linbu.

**Use :**

1. Cleanses the Skin: Natural antibacterial properties help remove dirt, oil, and impurities from the skin.

2. Brightens Skin: Vitamin C in lemon helps lighten dark spots, pigmentation, and uneven skin tone.
3. Exfoliates: Citric acid acts as a mild exfoliant, removing dead skin cells and unclogging pores
4. Prevents Acne: Helps control excess oil, reducing the likelihood of acne and blackheads
5. Anti-Aging: Antioxidants in lemon protect the skin from environmental damage, reducing fine lines and wrinkles.

#### 5. Neem :



**Common name:** Kadu Limb

**Scientific name:** *Azadirachta indica*.

**Chemical Constituents:** Neem (*Azadirachta indica*) contains many chemical constituents, including azadirachtin, nimbolide, salannin, and quercetin. These constituents are responsible for neem's medicinal properties.

**Use :**

##### 1. Fights Acne & Pimples:

Neem has antibacterial properties that help prevent and reduce acne breakouts by killing acne-causing bacteria.

##### 2. Controls Excess Oil:

Neem helps regulate sebum production, making it ideal for oily and acne-prone skin.

##### 3. Soothes Irritated Skin:

Its anti-inflammatory properties calm redness, irritation, and itchiness, making it beneficial for sensitive skin.

#### 6. Tulsi :



**Botanical name:** *Ocimum sanctum*

**Common name:** Tulsi

**Scientific name:** *Ocimum sanctum* or *Ocimum tenuiflorum*

**Uses:**

1. Deep Cleansing Removes dirt, excess oil, and pollutants from the skin.
2. Helps prevent acne and breakouts.
3. Shields skin from free radical damage caused by pollution.
4. Reduces skin irritation, redness, and inflammation.
5. Evens out the complexion and gives a natural glow.

**7. Rice :**

**Botanical name :** *Oryza sativa*.

**Common name:** Chaval, Tandul

**Scientific name:** *Oryza sativa*.

**Uses:**

1. **Deep Cleansing & Detoxification –**

Removes Dirt, pollutants, and excess oil while unclogging pores.

2. **Skin Brightening –**

Rich in vitamins B and E, Which help improve complexion and reduce dullness.

3. **Anti-Inflammatory & Soothing –**

Redness, irritation, and inflammation caused by pollution.

4. **Anti-Aging Properties –** Contains antioxidants that chat free radical damage and prev mature aging

**8. Charcoal :**

**Botanical name:** *Trema orientalis*

**Common name:** Activated carbon

**Scientific name:** orientalis

**Uses:.**

1. **Deep Cleansing & Detoxification** – Absorbs dirt, oil, and pollutants from pores.
2. **Unclogs Pores** – Helps remove blackheads and prevents breakouts.
3. **Oil Control** – Balances excess oil production, making it ideal for oily and acne-prone skin.
4. **Fights Acne & Bacteria** – Has antibacterial properties that help prevent pimples and blemishes.

**Excipient Profile :**

**1.SLS (sodium lauryl sulphate)□□**



Sodium Lauryl Sulfate (SLS) is a surfactant commonly used in face washes and other personal care products. It helps in foaming, cleansing, and removing dirt, oil, and impurities from the skin.

**Uses of SLS in Face Wash:**

1. **Foaming Agent** - Creates a rich lather, making the face wash feel more effective.
2. **Deep Cleansing** - Helps remove excess oil, dirt, and makeup residues.
3. **Emulsifier** - Allows oil and water to mix, ensuring even cleansing.
4. **Removes Pollutants** - Helps wash away dust, toxins, and other environmental impurities.
5. **Cost-Effective** - Used widely in commercial face washes due to its affordability. [7]

**2.Methyl Paraben :**

Methylparaben is a preservative commonly used in face washes and other skincare products to extend shelf life and prevent the growth of bacteria, mold, and fungi. It belongs to the paraben family, which helps maintain product stability.

**Uses of Methylparaben in Face Wash:**

1. **Preservative**-Prevents bacterial and fungal contamination.
2. **Extends Shelf Life** Keeps the product fresh and effective for a longer period.
3. **Maintains Product Stability** - Prevents changes in texture, color, and smell.

Ann4. Enhances Safety infections from co. ces the risk of skin nated products[11]

**3.Carbopol :**

Carbopol is primarily used in face washes as a thickening agent stabilizer and enhancer of texture making the product more pleasant to use It helps the face wash maintain its consistency and ensures it applies smoothly all while being safe and non- irritating for most skin types.[10]



**Uses of Carbopol in Face Wash:**

1. Cleanses the Skin: Natural antibacterial properties help remove dirt, oil, and impurities from the skin.
2. Brightens Skin: Vitamin C in lemon helps lighten dark spots, pigmentation, and uneven skin tone.
3. Exfoliates: Citric acid acts as a mild exfoliant, removing dead skin cells and unclogging pores.
4. Tightens Pores: Lemon acts as a natural astringent, tightening pores and improving skin texture.

**Material and Method:****Material:**

List of Material The herbs and powders used in the present formulation work have been procured from authenticated suppliers and are research-grade. Some material obtained from pharmacognosy lab and some are obtained from marketed as mentioned below in table

Material	Role	Quantity (50ml)
Turmeric	Anti-inflammatory	2gm
Aloe vera	Moisturizer	10ml
Neem	Anti-acene	5ml
Linseed	Soothing agent	5ml
Tulsi	Anti-aging	5ml
Rice	Oil-control	7ml
Lemon Juice	Brightening agent	5ml
Turmeric	Anti-inflammatory	2gm
Carbopol	Thickening agent	2gm
Sodium Lauryl Sulphate	Surfactant	2.5gm
Methyl paraben	Preservative	1gm
Charcoal	Detoxification	2gm
Distil water	Vehicle	(q.s)
Rose oil	Fragrance	(q.s)

**Method :**

○ **Mix the herbal extracts:**

In a small bowl, combine Tulsi extract, Neem extract, and Turmeric powder. Mix well until the turmeric powder is fully incorporated[13]

○ **Add lemon juice and rose water:**

Add the lemon juice and rose water to the herbal extract mixture. Stir well to combine.[14]

○ **Add Rice Water and Linseed extraction.**

Add Rice water and Linseed extraction to above mixture.mix it well. Add charcoal powder.[15]

○ **Mix the Aloe vera gel and Glycerin:**

In a separate bowl, mix the Aloe vera gel and Glycerin together.

○ **Add the Aloe vera-Glycerin mixture:**

Gradually add the Aloe vera- Glycerin mixture to the herbal extract mixture, stirring, continuously to avoid lumps.

○ **Mix the SLS and Carbopol:**

In a separate bowl, mix the Sodium lauryl sulfate (SLS) and Carbopol 940 together



○ **Add the SLS-Carbopol mixture:**

Gradually add the SLS-Carbopol mixture to the herbal extract mixture, stirring continuously to avoid lumps.

○ **Face wash consistency:**

The mixture should have a thick but pourable consistency. If needed, adjust the amount of Carbopol or Glycerin to achieve the desired consistency.

○ **Store the face wash:**

Transfer the face wash to a clean, sterilized container and store it in a cool, dry place.[12]

**Evaluation of prepared Herbal Anti-Pollution Facewash:**

**A] Physical Appearance:**

1. **Color:**

Visual inspection to ensure there are black color inconsistencies, discoloration, or separation of ingredients.

2. **Texture/Consistency:**

A small amount of the facewash is taken and applied to the skin or a test surface to feel its consistency. It should glide smoothly and not be overly sticky or gritty.

3. **Transparency/Opaqueness:**

Inspect under proper lighting to check for clarity or any unwanted visible particles.

4. **Presence of Sediments:**

Hold the bottle or container against a light source to check for any settling particles.

5. **Foam Formation:**

A small amount of the product is mixed with water, and foam formation is observed for quantity,

6. **Packaging Integrity:**

Inspect the packaging for any damage, leakage, or visual flaws.

7. **pH Test :** The pH of Facewash solution (10% w/v) in distilled water was determined at room Temperature. The pH of the shampoo was found to be in range of 4-5 which shows no harmful effect on skin and face. Both the formulations were shown pH nearer to skin required.[14]

**Result :**

The turmeric powder, aloe vera, Charcoal, Rice Water and Linseed Extraction containing face wash were formulated and evaluated for color, odour, Consistency, pH, Spread ability, Wash ability, Grittiness, Foam ability and obtained result are mention in above evaluation Parameter Table. Resulting evaluation result showed that all ingredients used to formulation of facewash were found to be safe. The formulated facewash was clear and appearance was good. It demonstrated good froth stability, detergency, small bubble size, and execution of good conditioning.



Evaluation Parameters. :-

Sr No.	Evaluation Test	Observation
1	Colour	The colour of the facewash was reported as <b>black</b> .
2	Odour	Aromatic and Characteristic.
3	Feel	The gel flows easily and does not feel too sticky
4	PH	Ranging Between 4.4 to 5.5
5	Spreadability	High-Spreadability
6	Viscosity	It should be Non-Sticky and Easy to Spread.
7	Skin Irritancy Test	No Skin Irritancy

### Conclusion :

The research on formulation and Evaluation of Herbal Facewash, The main purpose behind this investigation was to develop a stable functionally effective facewash. It was found to be harmless and effective. The need of herbal facewash is on demand at present due to lesser side effects, more effective than synthetic facewash. Herbal facewash was formulated with the decoction of medicinal plants that are commonly used for cleansing and smoothening skin. To provide the effective soothing effect, the present study involves the use of flaxseed, Rice water ,Charcoal, Neem, Turmeric etc.. The present work focuses on the potential of herbal extracts from cosmetic purposes. The formulation was subjected to various evaluations, including color, odor, consistency, pH, spreadability, washability, grittiness, and foam ability, which yielded acceptable results. Hence, we conclude that the formulation of herbal facewash is safe and effective. Herbal formulation more acceptable in the belief that they are safer with fewer side effects than synthetic ones.

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