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Formulation and Evaluation of Face Mist Spray

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Abstract: *Face mist sprays are increasingly popular in skincare due to their convenience, refreshing properties, and ability to deliver active ingredients directly to the skin. The present study focuses on the formulation and evaluation of a face mist spray designed to hydrate, soothe, and revitalize the skin. Various formulations were prepared using ingredients such as humectants, herbal extracts, and preservatives, ensuring compatibility and stability. The prepared formulations were evaluated for key physicochemical parameters including pH, viscosity, spray pattern, drying time, and stability under different environmental conditions. Microbial testing and skin irritation studies were also conducted to ensure safety and efficacy. The optimized formulation exhibited desirable characteristics such as uniform spray distribution, quick absorption, skin-friendly pH, and no signs of irritation or instability. The study concludes that the developed face mist spray is effective, safe, and suitable for regular skincare use, offering hydration and a refreshing effect.*

Keywords: Face mist spray, formulation, evaluation, skincare, hydration, stability studies, spray pattern, skin compatibility, herbal extracts, cosmetic formulation

I. INTRODUCTION

A face mist spray is a lightweight skincare essential designed to instantly refresh, hydrate, and revitalize the skin. Packed with soothing ingredients like floral waters, vitamins, and antioxidants, it delivers a fine, cooling mist that helps restore moisture and maintain the skin's natural balance. Whether used as part of a daily skincare routine, to prep the skin before makeup, or to revive a tired complexion throughout the day, a face mist spray offers a quick and convenient boost of hydration anytime, anywhere.

A face mist spray is more than just a quick refresh—it's a versatile skincare companion that supports healthy, glowing skin throughout the day. Formulated with hydrating agents like hyaluronic acid, calming botanicals such as rose or aloevera and skin-loving nutrients, it helps replenish moisture, soothe irritation, and protect against environmental stressors like heat, pollution, and dryness.

Its ultra-fine mist absorbs quickly without disturbing makeup, making it perfect for setting or reviving your look on the go. Face mists can also enhance the effectiveness of serums and moisturizers by prepping the skin for better absorption. Suitable for all skin types, from dry to oily and sensitive, a face mist spray is an effortless way to keep your skin feeling soft, balanced, and radiant—anytime you need a boost.

A face mist spray works in harmony with the skin's natural structure, supporting its ability to stay hydrated, balanced, and protected. Our skin is made up of multiple layers, with the outermost layer (the epidermis) acting as a barrier that retains moisture and shields against environmental damage. Factors like heat, pollution, air conditioning, and stress can weaken this barrier, leading to dryness, dullness, and irritation. A well-formulated face mist helps reinforce this barrier by delivering a burst of hydration and essential nutrients directly to the skin. From a skincare perspective, hydration is key to maintaining skin elasticity, smooth texture, and a healthy glow. Face mists typically contain humectants that attract water, along with soothing and antioxidant ingredients that calm the skin and fight free radical damage. This makes them an excellent addition to both basic and advanced skincare routines.

Benefits of using a face mist spray:

- Instant hydration: Replenishes moisture levels, keeping skin soft and plump.
- Strengthens the skin barrier: Helps protect against dryness and environmental stress.

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- Soothes and calms: Reduces redness, irritation, and sensitivity.
- Enhances product absorption: Prepares the skin to better absorb serums and moisturizers.
- Refreshes and revitalizes: Provides a cooling effect, especially in hot or dry conditions.
- Sets and revives makeup: Keeps makeup looking fresh without smudging.
- Balances oil production: Helps maintain a healthy skin equilibrium for both dry and oily skin types.

II. LITERATURE REVIEW

Kumar et al. (2022) studied the formulation of herbal face mist using plant extracts and reported that natural ingredients such as aloe vera and rose water provide significant hydration and soothing effects. Their evaluation included pH, stability, and skin irritation tests, confirming the formulation was safe and effective for topical use.

Sharma and Verma (2021) investigated the use of Aloe vera in cosmetic formulations and concluded that it possesses anti-inflammatory, moisturizing, and wound healing properties, making it ideal for facial sprays and skin-care products.

Patel et al. (2020) evaluated the antioxidant potential of Green tea in topical applications. Their findings indicated that green tea extract helps in reducing oxidative stress and delaying skin aging, supporting its inclusion in face mist formulations.

Singh et al. (2019) highlighted the importance of Glycerine as a humectant in cosmetic products. They reported that glycerine enhances skin hydration by attracting moisture, improving skin smoothness and elasticity.

Gupta and Jain (2018) studied the role of Vitamin C in skincare formulations. They found that vitamin C acts as a powerful antioxidant, promotes collagen synthesis, and helps in skin brightening and pigmentation reduction.

Khan et al. (2021) reported that Rose water has mild astringent and anti-inflammatory properties, making it useful as a natural toner in face mist formulations.

Mehta et al. (2023) emphasized the importance of preservatives in aqueous cosmetic products. Their study showed that preservatives are essential to prevent microbial contamination and enhance shelf life, especially in formulations containing natural extracts.

Reddy et al. (2022) conducted evaluation studies on face mist formulations and concluded that parameters such as pH, spray pattern, viscosity, stability, and skin irritation tests are critical for ensuring product quality and user safety.

Bissett et al. (2005) reported that Vitamin C improves photoaged skin, enhances collagen production, and reduces fine lines, supporting its use in topical cosmetic formulations like face mists.

Katiyar et al. (2007) studied Green tea polyphenols and found strong antioxidant and photoprotective effects, helping to protect skin from UV-induced damage.

Surjushe et al. (2008) evaluated Aloe vera and concluded that it has anti-inflammatory, antimicrobial, and moisturizing properties, making it beneficial for skincare products.

Fluhr et al. (2008) demonstrated that Glycerine improves skin barrier function and hydration, making it one of the most effective humectants used in cosmetics.

Dweck (2002) highlighted that Rose water has soothing, anti-inflammatory, and mild antiseptic properties, widely used in facial toners and sprays.

Pillai et al. (2005) studied antioxidants in skincare and reported that combining natural extracts with vitamin C enhances protection against oxidative stress.

Barel et al. (2014) emphasized that proper formulation and preservation of cosmetic products are essential to maintain stability, safety, and efficacy, especially in water-based products like face mists.

III. SCOPE OF STUDY

Aim

To formulate and evaluate a herbal face mist spray using natural ingredients such as aloe vera, green tea, rose water, glycerine, vitamin C, distilled water, and suitable preservatives for skin hydration, soothing, and refreshing effects.

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Objectives

1. To select appropriate natural ingredients with moisturizing, antioxidant, and soothing properties for the formulation of face mist spray.
2. To prepare the face mist formulation using aloe vera, green tea extract, rose water, glycerine, vitamin C, distilled water, and preservatives.
3. To evaluate the physicochemical properties of the prepared formulation such as:
   - pH
   - Appearance
   - Odor
   - Viscosity
4. To assess the spray characteristics, including spray pattern and ease of application.
5. To conduct stability studies under different environmental conditions.
6. To perform skin irritation/sensitivity tests to ensure safety for topical application.
7. To analyze the moisturizing and refreshing effect of the face mist on skin.

MATERIALS AND METHODS

Ingredients of formulations:

Aloevera (Aloe barbadensis miller)

Family: Asphodelaceae

Aloevera

Aloe vera extract is widely used in face mist formulations because of its excellent moisturizing and soothing properties. It contains vitamins, minerals, amino acids, and polysaccharides that help hydrate the skin, reduce irritation, and

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provide a cooling effect. In the face mist, aloe vera helps maintain skin moisture and keeps the skin soft, smooth, and refreshed.

Greeen tea (Camellia sinensis)

Family :Theaceae

Green Tea

Green tea extraction

Green tea extract is rich in antioxidants such as catechins and polyphenols, which help protect the skin from free radical damage and environmental stress. In the face mist spray, green tea works as an anti-inflammatory and refreshing agent that helps calm irritated skin, control excess oil secretion, and provide anti-aging benefits while improving overall skin health.

Distilled Water

Distilled water is used as the main base or solvent in the face mist formulation. It is purified water free from impurities and minerals, which makes it safe and suitable for cosmetic preparations. In the formulation, distilled water helps dissolve and evenly distribute all the active ingredients while also providing a light hydrating and refreshing effect on the skin.

Glycerin

Glycerin is an effective humectant commonly used in skincare products. It attracts moisture from the environment and retains it in the skin, helping to prevent dryness and dehydration. In the face mist spray, glycerin improves skin hydration, enhances softness, and keeps the skin moisturized for a longer period after application.

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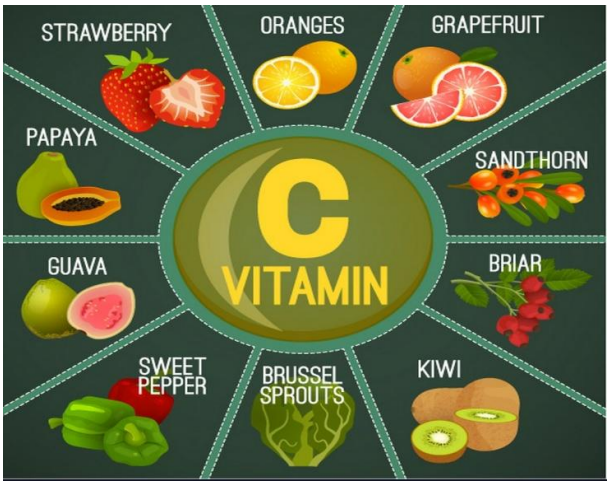
Rose Water

Rose Water

Rose water is a natural aromatic liquid obtained from rose petals. It is widely used in cosmetic formulations because of its soothing, refreshing, and mild toning properties. In the face mist spray, rose water provides a pleasant fragrance, cools and refreshes the skin, reduces mild irritation, and helps maintain skin freshness and smoothness.

Vitamin 'C'



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Source of vitamin C

Vitamin C (Orange)

Vitamin C is a powerful antioxidant used in skincare products for its brightening and protective effects. In the face mist spray, vitamin C helps reduce dullness, pigmentation, and dark spots while promoting collagen production and improving skin glow. It also protects the skin from oxidative stress caused by environmental pollutants and sunlight, making the skin appear healthier and more radiant.Rose water is a natural aromatic liquid obtained from rose petals. It is widely used in cosmetic formulations because of its soothing, refreshing, and mild toning properties. In the face mist spray, rose water provides a pleasant fragrance, cools and refreshes the skin, reduces mild irritation, and helps maintain skin freshness and smoothness.

The source commonly used for Vitamin C in cosmetic and face mist formulations is **Ascorbic Acid**, which is the pure and active form of vitamin C. It is usually obtained commercially through the fermentation of glucose and is available as a white crystalline powder.

Natural sources rich in vitamin C from which ascorbic acid is originally found include:

- Orange
- Lemon
- Amla
- Guava
- Strawberry
- Kiwi

Phenoxyethanol

Phenoxyethanol is used in the face mist spray as a preservative to prevent the growth of microorganisms such as bacteria, fungi, and yeast in the formulation. Since the preparation contains water, aloe vera extract, green tea extract, and rose water, it is highly susceptible to microbial contamination during storage and use. Phenoxyethanol helps to improve the stability, safety, and shelf life of the product by protecting it from spoilage. It is widely used in cosmetic and skincare formulations because of its broad-spectrum antimicrobial activity, good compatibility with herbal ingredients, and low skin irritation potential at recommended concentrations. In this formulation, phenoxyethanol is used at a concentration of 0.5%, which is considered safe and effective for topical application in face mist sprays.

Formula

Sr. No	Name of Ingredients	Quantity(ml)
1	Aloe vera extract	10 ml
2	Green tea extract	5 ml
3	Rose water	20 ml
4	Glycerin	3 ml

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5	Vitamin C	1 g
6	Phenoxyethanol	0.5 ml
7	Distilled water	60.5 ml

Methods of preparation

Preparation

Procedure

Step 1: Preparation of Green Tea Extract

Take dried green tea leaves.

Add hot distilled water (70–80°C).

Allow steeping for 15–20 minutes.

Filter using muslin cloth or filter paper.

Collect the filtrate and cool.

Step 2: Preparation of Aloe Vera Extract

Wash fresh aloe vera leaves thoroughly.

Remove outer rind and collect inner gel.

Blend the gel to obtain uniform liquid.

Filter to remove fibers.

Step 3: Preparation of Face Mist

Measure distilled water in a clean beaker.

Add rose water and mix gently.

Add aloe vera extract slowly with stirring.

Add green tea extract.

Add glycerin and stir until uniform.

Dissolve vitamin C separately in a small quantity of distilled water and add to the mixture.

Add preservative.

Make up the final volume with distilled water.

Stir continuously for homogeneous mixing.

Filter if necessary.

Fill into sterilized spray bottles.

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EVALUATION OF FACE MIST SPARY

Method of evaluation:

Physicochemical Properties

Organoleptic Properties: Visual inspection to determine color, clarity, and odor.

pH Testing: Mists must be compatible with the skin's natural acid mantle. The pH is typically measured using a calibrated digital pH meter and should fall between \(4.5\) and \(6.5\).

Viscosity and Surface Tension: Ensures the liquid flows easily through the nozzle without clogging. This is evaluated using instruments like an Ostwald viscometer and a stalagmometer.

Homogeneity & Clarity: Visual inspection to check for the absence of lumps, phase separation, or coarse particles.

Spray Performance Analysis

Spray Pattern & Angle: Assessed by spraying the formulation with an added dye (e.g., methylene blue) onto solvent-sensitive or filter paper. This visualizes the droplet distribution shape and angle.

Spray Dispersion & Dry Time: Measures the uniformity of the mist over a targeted area and the time it takes for the droplets to dry on the skin (usually expected to dry within (1) to (3) minutes).

Dose Uniformity: Evaluates the weight of the product dispensed per pump to ensure consistent dosage.

Stability Testing

Accelerated Stability: The product is subjected to extreme temperature fluctuations (e.g., multiple cycles between (-10^c and 45^c) to ensure it doesn't degrade or separate over its shelf life.

Light Exposure Test: Monitored to check for discoloration or breakdown of active ingredients when exposed to UV light.

Safety and Efficacy

Skin Irritation Test: Also known as a patch test, a small amount of the mist is applied to human volunteers (or animal skin models) to observe any redness, swelling, or allergic reactions.

Hydration/Moisture Test: Uses a Skin Analyzer to objectively measure improvements in skin hydration, elasticity, or sebum levels before and after application.

Antioxidant/Efficacy Testing: If formulated with botanical extracts, efficacy is evaluated in-vitro using the DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenging method.

Evaluation parameters for formulation:

Organoleptic property

Sr. No	Parameter	Observation
1	Colour	Light green to pale pink
2	Odour	Pleasant rose fragrance
3	Appearance	Clear and transparent
4	Consistency	Liquid

Physicochemical property

Sr. No	Parameter	Method
1	PH	Digital pH meter
2	Viscosity	Viscometer
3	Specific gravity	Specific gravity bottle
4	Spray pattern	Manual spray test
5	Spreadability	Surface spreading test
6	Stability	Storage study

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APPLICATION AND PRECAUTION

Application of face mist spray

Wash your face properly with a mild cleanser and pat it dry with a clean towel. Hold the face mist spray bottle approximately 15–20 cm away from the face and close your eyes before spraying. Spray 2–3 pumps evenly over the face and neck area to allow a fine mist to settle on the skin. Leave the mist to absorb naturally without rubbing, or gently pat the skin using fingertips for better absorption. The face mist can be used anytime during the day to refresh and hydrate the skin, especially in hot weather, after sun exposure, before moisturizer application, or over makeup for a fresh appearance. For best results, store the spray in a cool place or refrigerator to provide an additional cooling and soothing effect during use.

Application of face mist spray

Precautions to Be Taken While Using Face Mist Spray

Perform a patch test before regular use to check for allergy or irritation.
Use the face mist only on clean skin.
Avoid contact with eyes, mouth, and other sensitive areas.
Rinse immediately with water if the spray enters the eyes.
Do not apply on cuts, wounds, or severely irritated skin.
Shake the bottle gently before use if ingredients settle.
Store the spray in a cool and dry place away from direct sunlight.
Keep the bottle and spray nozzle clean to prevent contamination.
Discontinue use if redness, itching, or burning sensation occurs.
Use the product within the recommended shelf-life period.

II. RESULT AND DISCUSSION

The herbal face mist spray was successfully formulated using natural ingredients. The formulation showed good clarity, pleasant odor, and acceptable pH suitable for skin application.

Aloe vera and glycerin provided moisturizing effects, while green tea extract and vitamin C contributed antioxidant activity. Rose water improved the sensory properties of the product.

The spray pattern was uniform and easy to apply. No skin irritation was observed during the patch test, indicating that the formulation is safe for topical use.

Stability studies demonstrated that the formulation remained stable without significant changes in color, odor, or pH over 30 days. The preservative effectively prevented microbial contamination and enhanced shelf life.

Overall, the developed herbal face mist spray showed satisfactory physicochemical stability, safety, and cosmetic acceptability.

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III. CONCLUSION

The formulated herbal face mist spray containing aloe vera extract, green tea extract, vitamin C, glycerin, rose water, distilled water, and preservative was found to be stable, safe, and effective. The preparation exhibited good moisturizing, refreshing, and antioxidant properties with no signs of irritation or instability.

This formulation can be used as a natural skincare product for daily hydration and skin rejuvenation.

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[1]. Kumar et al. (2022) studied the formulation of herbal face mist using plant extracts and reported that natural ingredients such as aloe vera and rose water provide significant hydration and soothing effects. Their evaluation included pH, stability, and skin irritation tests, confirming the formulation was safe and effective for topical use.

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