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Formulation and Evaluation of Face Mist Preparations from Plant Extracts: A Literature Review

Elsa Oktavia Angelica[1*], Eliah Herawati[1], Melisa Puspitasari[1], Nia Yuniarsih[1]

[1]Faculty of Pharmacy, Universitas Buana Perjuangan Karawang, Karawang, Indonesia

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***Corresponding author:**
Elsa Oktavia Angelica

E-mail address:
fm19.elsaangelica@mhs.ubpkarawang.ac.id

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A B S T R A C T

Face mist is a skin care product containing a liquid that can be sprayed on the facial skin. The preparation of face mist preparations is carried out starting from the extraction process, followed by the process of making face mist, and finally, the evaluation of the preparation. In making face mist, several testing conditions must be carried out, namely organoleptic test (including shape, color, and odor), spray dispersion test, viscosity test, skin irritation test, specific gravity, facial moisture, pH test, and dry time test. Some plants have been tested or formulated in the form of face mist preparations, namely aloe vera, cucumber, honey, yam, purple cabbage, and apple skin. This literature review aims to discuss various formulations and preparations of face mist from plant extracts.

1. Introduction

Indonesia is the third-largest country with tropical forests in the world and is the first country in Asia and Africa. About 80% of medicinal plants in the world are in the tropical forests of Indonesia. Indonesian people have long used plants for medicinal purposes. This is because the ancient life of Indonesian ancestors blended with nature which created awareness that nature provides various kinds of medicine.[1]

Medicinal plants are plants that have medicinal properties that can relieve pain, increase endurance, and inhibit the growth of abnormal cells such as cancer and tumors. This is what makes people use medicinal plants to be used as alternative medicine.[2] Previous studies stated that medicinal plants are plants that are useful as medicines, cosmetics, and health that are used from plant parts such as fruit, roots, leaves, tubers, and stems.[3]

Face mist is a cosmetic product to freshen skin (toner) or skincare in the form of a lotion or spray preparations in the form of solutions, suspensions, and emulsions. Face mist is produced according to the type of cleanser that refers to the type of facial skin. Face mist functions to refresh facial skin, moisturize skin, maintain facial skin health, clean residual oil on facial skin, and can help close pores on the face.[4]

Extraction is a process of separating the content of chemical compounds from plant and animal tissues by

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using certain filters to obtain an extract. The extract is a concentrated preparation obtained from the extraction of the active substance using a solvent, then the solvent is evaporated, and the remaining mass is treated in such a way until it meets the requirements set by the Ministry of Health.[5]

Making face mist must meet the test requirements, namely the organoleptic test (covering shape, color, smell).[6] The pH test is carried out using a universal pH indicator and must meet the pH of the skin in the interval 4.5 – 6.5, the spray dispersion test, the spray condition test, and the dry time test of the preparation. This is done so that the face mist product can be used safely. Table 1 shows the formulation and evaluation of face mists made from plant extracts.

Table 1. Formulation and evaluation of face mist from natural ingredients.

Reference	Formulation	Evaluation	Results
Formulation and evaluation of herbal face mist[7]	- Bromelain Extract 10mL - Quercetin Extract 10mL - Vitamin C Extract 2 mL - Aloe Vera Extract 15mL - Apple Cider Vinegar 2 ml - Rose Water QS	- pH - Viscosity - Irritation to skin - Temperature	5.5 1.6 cps None 45ºC and -10ºC
Basic parameters of herbal toner mist for skin[8]	- Cucumber Extract 10% - Aloe Vera Extract 5% - Rosewater QS - Honey 5%	- pH - Surface Tension - Viscosity - Stickiness - Conditioning Skin - Temperature variation - Light exposure test - Cleaning	5.6 53.5 dyne/cm^2 1.6 cps Not too sticky. The skin becomes moist, soft, and supple. This product is stable at extreme temperatures with room temperature No visible discoloration/physical/chemical changes Easily removed
Purple cabbage and Yam bean extracts as antioxidants and facial moisturizers[4]	- Purple cabbage extract - Yam bean extract - Glycerin - PVP - Aquadest	- Organoleptic - Specific gravity - pH - Facial moisture	Liquid form, yellow color, characteristic smell like candied fruit 1.0357 g/mL 4.5 Moisturizing at 20% Gilserin Concentration Ethanol
Extract of apple peel[9]	- Ethanol extract of apple peel - Menthol - Ethanol - Aquadest	- Organoleptic - pH	Brown color, in solution form, cold taste, and odor apple specialty. 4
Ethanol extract of Yam bean (*Pachyrhizus erosus (L.) Urb*) using natural dye saffron (*Crocus sativus L.)*[6.10]	- Yam bean extract 7 grams - Saffron water immersion 7 mL - Glycerin 20 mL - PVP 4 grams - Aquadest ad 100 mL	- Organoleptic - pH - Specific gravity test - Spray dispersion test - Dry time test	Slightly thick, golden yellow, and characteristic fruit odor 6 1.062 g/mL 6 cm 03.30 minutes

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Phytochemical and pharmacological activity on facial skin

Aloe vera

Aloe vera is known as a plant that has many benefits because all parts of this plant can be used both for body care and to treat various diseases. Aloe vera is a plant that has been used for wound healing and skin care for thousands of years. Aloe vera contains a phytochemical, namely a *mannose-6-phosphate* and polysaccharides, saponins, sterols, acemannan, alkaloids, flavonoids and quinones, quinones, aminoglycosides, lupeol, salicylic acid, tannins, urea nitrogen, cinnamic acid, phenol, sulfur and essential oils that function as antimicrobials. Flavonoids can help in inhibiting or slowing down the damage caused by the oxidation process as well as counteracting free radicals from sunlight which are used to prevent aging.[11-12]

Cucumber

The Latin name for cucumber is *Cucumis sativa* L. Cucumber (*Cucumis sativa L*) is known as a plant belonging to the *Cucurbitaceae* or pumpkin plant, which is very popular with everyone because the fruit can be consumed in fresh form, as a dessert, cosmetic ingredient and can be used as medicine.[13] Cucumber is a plant that is used as a raw material in the beauty industry. Cucumbers contain phytochemicals, namely alkaloids, phenolics, flavonoids, and antioxidants. Cucumber benefits for whitening the face, removing wrinkles on the face, overcoming acne problems and removing eye bags, shrinking facial pores, tightening facial skin, and removing black spots and acne scars.[14]

Honey

Honey is known as a natural product that comes from bees because it contains nutrients that are good for health. Honey is a natural substance produced by honey from flower nectar and plant secretions. Honey contains phytochemicals, namely phenolics, ascorbic acid, enzymes (catalase and peroxidase), and carotenoids. Flavonoids and amino acids can act as skin moisturizers. Honey antioxidants are mainly flavonoid compounds, polyphenols, and vitamin C. Polyphenols in honey contain hydroxyl groups that enhance humectant properties.[15-17]

Yam bean (*Pachyrhizus erosus*)

Yam bean (*Pachyrhizus erosus*) is a plant belonging to the Leguminosae family which generally produces tubers.[10] Yam bean is one of the tuber plants that contain inulin. Yam bean contains phytochemicals, namely vitamin C, flavonoids, polyphenols, and saponins. Polyphenols are able to neutralize free radicals that are damaging to cells and body tissues.[18-19]

Purple cabbage (*Brassica oleracea* var. *capitata* L.)

Purple cabbage has been widely used in traditional medicine because of its antioxidant, anticholesterol, anti-inflammatory, and antibacterial properties.[20] Purple cabbage is a vegetable with a high amount of antioxidants and is also very rich in minerals, vitamins, polyphenols, anthocyanins, and glucosinolates. Purple cabbage contains phytochemicals, namely anthraquinones, glycosides, flavonoids, carbohydrates, proteins, and phenols. Anthocyanins can help prevent signs of premature aging, keep skin fresh, firm, and elastic, and reduce wrinkles and dark spots that are common on the skin.

Apple peel (*Malus domestica* Borkh.)

Apple peel has been widely used in traditional medicine because it is efficacious as an antioxidant, anticholesterol, anti-inflammatory, and antibacterial. Apple plants are fruit plants that are easy to grow in tropical areas, including Indonesia. Apple peel contains phytochemicals, namely polyphenol derivatives, namely catechins, quercetin, phloridzin, and chlorogenic acid.[21-22] Apple peel is useful as a natural antioxidant that is needed by the skin to fight free radicals from the outside.[9]

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Face mist as a skincare preparation

The preparation of face mist preparations is carried out starting from the extraction process, followed by the process of making face mist, and finally, the evaluation of the preparation. Face mist should be made according to the pH of the skin. The pH of the skin of good topical preparation is in the pH range of 4.5-6.5.[23] pH that is too alkaline will increase the pH of facial skin significantly so that it can increase the potential for the growth of acne-causing bacteria such as *Staphylococcus epidermidis*. If a pH that is too alkaline is used on facial skin that is prone to acne, it can cause an inflammatory reaction and irritation of the facial skin. Therefore, the preparation must be made by following the requirements of a good pH range.

Good dispersion of face mist spray is between 5-7 cm and a good standard of dry time is less than 5 minutes.[6] In the previous study's formulation of face mist [and] dry time of face mist obtained were in the range of spray dispersion and a good standard of dry time for face mist, with spray dispersion of 6 cm and dry time of 3 minutes 30 seconds. Based on the results of the above face mist formulations, almost all of them produce face mist preparations that can make facial skin moist, soft, and supple and give a fresh sensation to facial skin.

2. Conclusion

Face mist can make facial skin moist, soft, and supple and give a fresh sensation to facial skin. The preparation of face mist preparations is carried out starting from the extraction process, followed by the process of making face mist, and finally, the evaluation of the preparation. Evaluation of face mist preparations included organoleptic tests (including shape, color, and odor), spray spreadability test, viscosity test, skin irritation test, specific gravity, facial moisture, pH test, and dry time test.

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