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Formulation of Aloe Juice (*Aloe vera* (L) Burm.f.) Sheet Mask as Anti-Aging

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Abstract : Anti-aging is a process to prevent or slow the effects of aging resulting in looking fresh, more beautiful, and younger. Various substances contained in aloe is believed to provide anti-aging effects. Sheet mask has this Occlusive Dressing Treatment (ODT) mechanism that made a good absorption and penetration profile. The aim of this research is to formulate aloe juice as an anti-aging sheet mask and testing its effectiveness against the skin of volunteers. The method was experimental method. Preparations of sheet mask was made by adding aloe juice with various concentration, to the essence base. Evaluation of sheet mask preparation includes homogeneity test, viscosity test, pH test, stability test, irritation test, and anti- aging effect using the skin analyzer device. Parameters measured include moisture, evenness, pores, spots and wrinkles. The result showed that the aloe juice can be formulated into sheet mask. The increasing concentration from aloe juice that was formulated in the sheet mask showed the ability as anti-aging shown by the increased of moisture and evenness level, minimized pores, reduced the number of spots and wrinkles.
Keywords: aloe vera, sheet mask, anti-aging, skin analyzer.

Introduction

Aging is a process characterized by the decreasing of sweat and sebaceous glands production, followed by decreasing of moisture and elasticity of the skin because the skin's ability to hold water is reduced, and the pigmentation increase faster than it should. Visible wrinkle, dry, rough skin, spots/pigmentation, and decreasing of skin elasticity were shown on the face[1].

Anti-aging is a process to prevent or slow the effects of aging. Anti-aging therapy would be better if it is done as early as possible, when the body's cells is still healthy and functioning properly. With advances in technology and science cosmetics, degradation and inhibition of aging can be done so that the skin can look younger[2].

Aloe vera has been used for over five thousand years. Throughout history, it has been considered a magical plant, almost a panacea, capable of remedying many of mankind'sailments[3].

Aloe vera contains many beneficial substances such as polysaccharides, lignin, enzymes, vitamins, minerals, amino acids, and salicylic acid[4]. Many of these substances that can inhibit premature aging, such as vitamin B2, B6, C, E, and minerals such as manganese and selenium, non-essential amino acids proline that can make your skin smoother, constantly hydrated, more elastic, and protect it from the free radical and degenerative effects[3].

Sheet mask is one of the latest and newest trend which is popular in Asia. Compared with another form of the masks, sheet mask has this Occlusive Dressing Treatment (ODT) mechanism that made a good absorption and penetration profile, the efficient and hygienic (disposable) packaging, and does not need to clean after usage[5].

Experimental

Instruments

The instruments used in this research include laboratory glassware, mortar and pestle, porcelain dish, object glass, stirring rod, spatula, plastic pots, pipettes, a water bath, analytical scales (Boeco), pH meter (Hanna Instruments), skin analyzer and moisture checker (AramoHuvis).

Materials

The sample used in this research are aloe gel, PEG-40 Hydrogenated Castor Oil, sodium poliacrylate, glycerin, butylene glycol, methyl paraben, sodium metabisulfite, etanol, distilled water, foil bag and blank sheet mask (Beyond).

Processing aloe juice

Fresh aloe were cultivated, washed and filleted. The gel were blendered and filtered. The juice obtained were then going through blanching process at45-70°C for 10 minutes, continued by flash cooling.

Preparation of sheet mask's essence

Sodium polyacrylate was dissolved little by little with most of distilled water in a mortar (mass I). Butylene glycol, glycerine and PEG-40 Hydrogenated Castor Oil included in the porcelain dish and homogenized (mass II). Dissolved Methyl Paraben in hot water with a temperature of 70ºC (mass III).Mass I, II and III were homogenized, followed by adding ethanol and perfume. Essences were made in 4 formulations and each essence was containing of 0%(F0/blank), 4%(F1), 8%(F2), and 12%(F3) of aloe juice in the same base composition.The components of the formulation were shown in Table 1.

Table 1.Formula of sheet mask's essence

Component	Concentration (%)			
	F0	**F1**	**F2**	**F3**
Aloe juice	-	4	8	12
PEG-40 *Hydrogenated castor oil*	0.2	0.2	0.2	0.2
Butylene glycol	5	5	5	5
Glycerin	5	5	5	5
Sodium polyacrylate	0.2	0.2	0.2	0.2
Methyl paraben	0.3	0.3	0.3	0.3
Ethanol	3	3	3	3
Perfume	1 drop	1 drop	1 drop	1 drop
Distilled water ad	100	100	100	100

Packaging of Sheet Mask

Sheet mask were folded and inserted according to the size of the packaging foil bag. Weighed 20 grams of the mask essence and then poured into the foil bag. Sealed the foil bag with sealing appliance and labeled it.

Physical Quality Evaluation of the Preparation

Homogeneity test

A certain amount of preparations when applied on a piece of glass or other suitable transparent material, preparations should show a homogeneous composition and no visible coarse grains.

Stability test

Each formula were put into plastic pots. Furthermore, the observations are in the form of changes in consistency, color and scent at the time of the preparation is finished as well as in storage for 12 weeks at room temperature.

pH and viscosity measurements

Using pH meter and Brookfield viscometer

Irritation Test

Place the mask which has been cut ±2,5cm^2 behind the ear. The irritation symptoms observed were redness, itching and swelling

Anti-Aging Test

Using AramoSG®skin diagnosis system. Treatment conducted for 4 weeks by applying the mask once a week. Parameters measured including moisture, evenness, pore, spot and wrinkles.

Volunteers

12 volunteers were used to conduct this experiment who has been analyzed before hand for having signs of premature aging, such as dry skin, wrinkles and black spots.

The terms used are :

1. Women
2. Age between 20-25 years
3. No medical history associated with allergies.
4. Not using any other cosmetic that functioning as anti -aging in facial area.

Result and Discussion

Sheet mask's essence

The result of preparation of *Aloe vera* sheet mask's essence were shown in Fig 1 and Fig 2.The result of physical quality evaluation of the preparation were shown in Table 2.

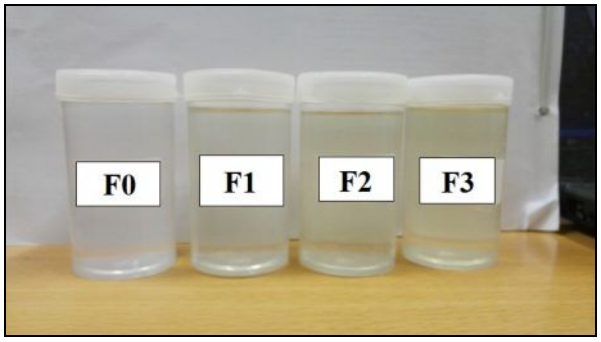

Figure 1.*Aloe vera*Sheet Mask's Essence

Note:

F0: 0% aloe juice sheet mask's essence
F1: 4% aloe juice sheet mask's essence
F2: 8% aloe juice sheet mask's essence
F3: 12% aloe juice sheet mask's essence

Figure 2. Sheet Mask

Table 2.Physical quality evaluation of the preparation

Parameter	Formula			
	F0	F1	F2	F3
Homogeneity	✓	✓	✓	✓
pH (After Preparations)	6.98	6.90	6.83	6.71
pH (After 12 Weeks)	6.98	6.91	6.83	6.72
Viscosity (cps) (After Preparations)	275	200	150	137.5
Viscosity (cps) (After 12 Weeks)	275	200	137.5	125
Stability	Stable	Stable	Stable	Stable
Irritation	-	-	-	-

Note: ✓ = Homogenous, - = No Irritation

From the data it can be seen that the more of aloe vera juice contained in the essence, the more acidic the pH is. Average pH of aloe juice is 4.5. However, pH obtained is within the range of permitted pH requirements for cosmetics (5-8). The essence shown no irritation reaction such as redness, itchy and swelling.

Results showed that there is a slightly decreased in viscosity. This is due to the characteristics of aloe vera juice in which viscosity decreases as time passes and becomes equal to the viscosity of water[6]. It can also be seen that the viscosity of the essence mask sheet is getting lower with the increasing concentration of aloe juice . Sodium polyarylate, which act as thickener, is an anionic polymer. When it contacts with the salt present in aloe juice, the swelling capacity will decrease resulting in lower viscosity[7].

Anti-aging test

The result of the effect of anti-aging using *Aloe vera* on volunteers' skin were shown in Fig 3, Fig 4, Fig 5, Fig 6, and Fig 7.

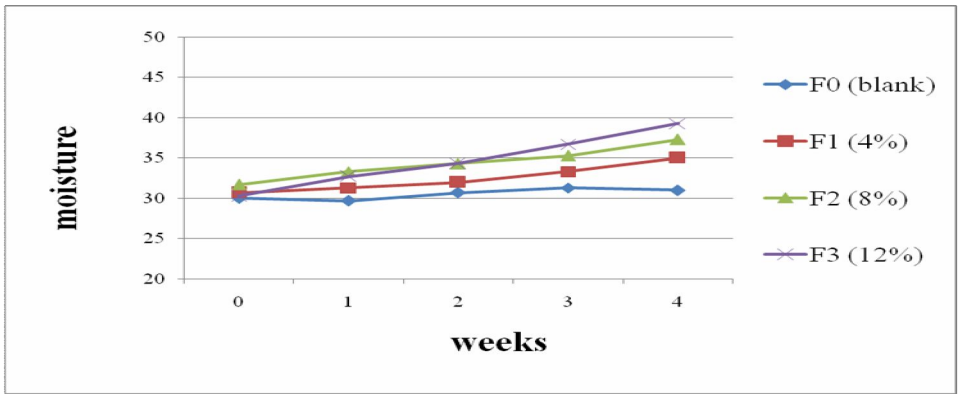

Figure 3. Improvement of moisture in 4 weeks treatment

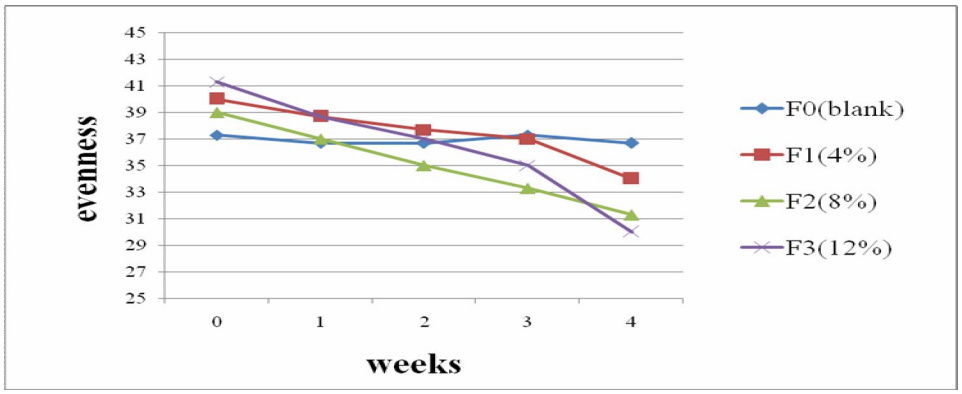

Figure 4. Improvement of evenness level in 4 weeks treatment

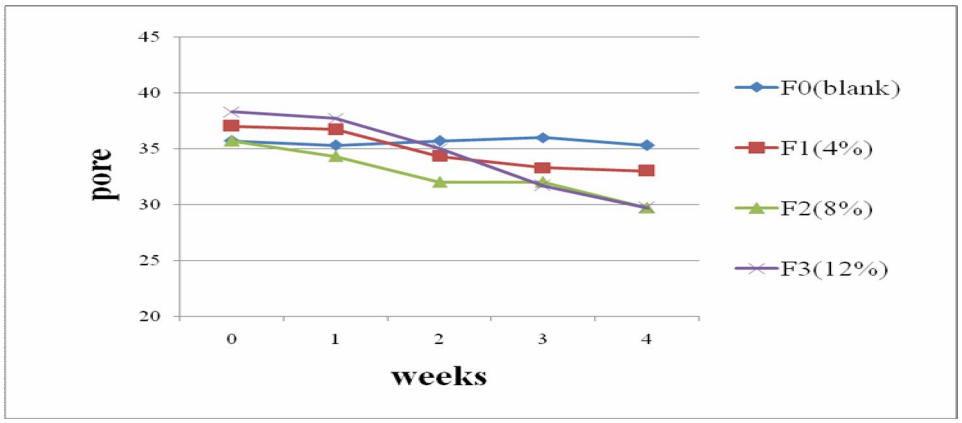

Figure5. Improvement of pore size in 4 weeks treatment

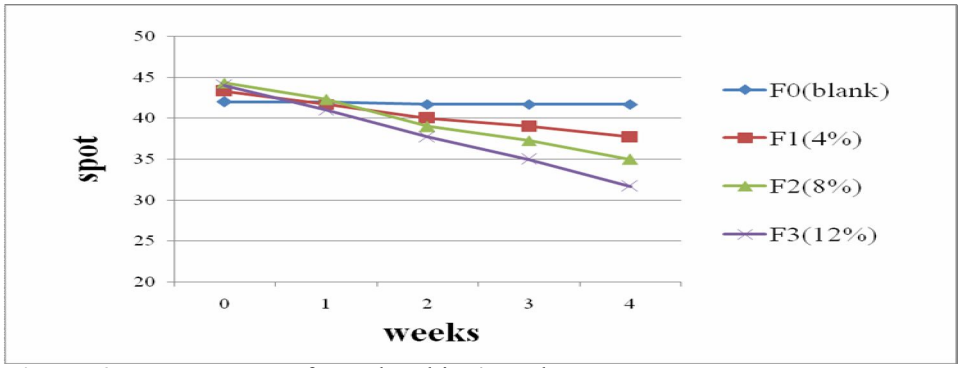

Figure 6. Improvement of spot level in 4 weeks treatment

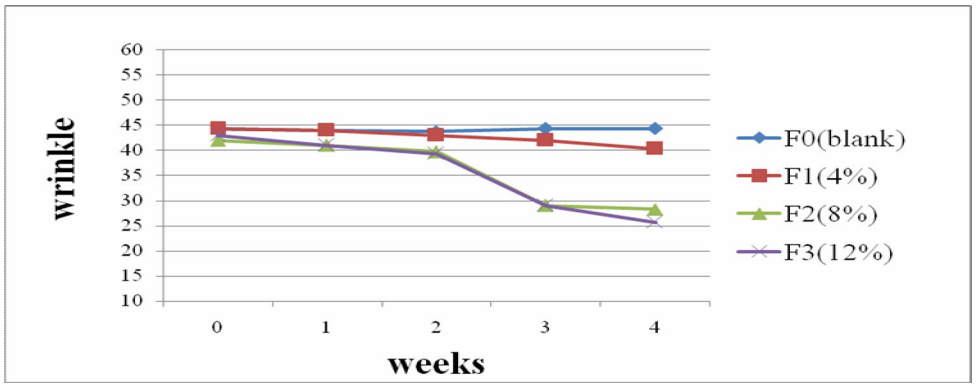

Figure7.Improvement of wrinkle level in 4 weeks treatment

From Fig 3, Fig 4, Fig 5, Fig 6, and Fig 7, shown that Aloe vera juice can improve skin condition after 4 weeks treatment.

Moisture

Aloe sap has substances similar to hyaluronic acid, whichact like a moisture shield on the skin, called glucomannans. When Aloe gel is applied to the skin, the long-chained mucopolysaccharides become polymerized and form a thin semi-permeable film that produces a hydrating effect, leaving the skin with a soft and delicate sensation[3].

Evenness

Aloe gel has cohesive effects on the superficial flaking epidermal cells by sticking them together, which softens the skin. Salicylic acid has been known as keratolytic agent and may serve also as an anti-inflammatory and anti-microbial. Salicylic acid peels are choices to treat acne caused by blackheads because it has minimal inflammatory effects[8].

Pore

Pores may be enlarged if exposed to the sun is too hot, the increase in temperature causes the opening of the pores on the skin. Excessive sebum and dead skin can clog pores . If the pores clogged, it can appear a variety of skin problems such as acne and blackheads. Zinc contained in aloe vera can shrink pores in the skin of the face[4].

Spot

Hyperpigmentation is a condition in which melanin is synthesized excessively. This occurs because of exposure to sunlight (UV rays) so the melanocyte cells initiate the synthesis of melanin. Increased synthesis of melanin results in dark spots on the skin. Aloe vera has a property to reduce pigmentation and dark spots on the skin[10].

Wrinkle

Wrinkles are creases in the skin that develop with advancing age, due to the skin's loss of collagen, whereby its elasticity and structure begins to cede. This phenomenon relates to the whole body but, prinicipally, the face, neck, neckline and hands – the areas of the body exposed to the sun and the damaging effects of UV rays. Aloe's various nutritive substances, with their marked astringent effect, as well as its acemannan, serve to stimulate the production of collagen and aid in the fight against wrinkles[3].

Conclusion

1. Aloe vera juice can be formulated as an anti-aging sheet mask. Effectiveness is best seen in the concentration of aloe vera juice 12 % were able to improve skin condition, in terms of moisture, evenness, pore, spot and wrinkles.
2. The higher concentration of aloe vera juice in the preparation can enhance the effects of anti-aging.

Acknowledgements

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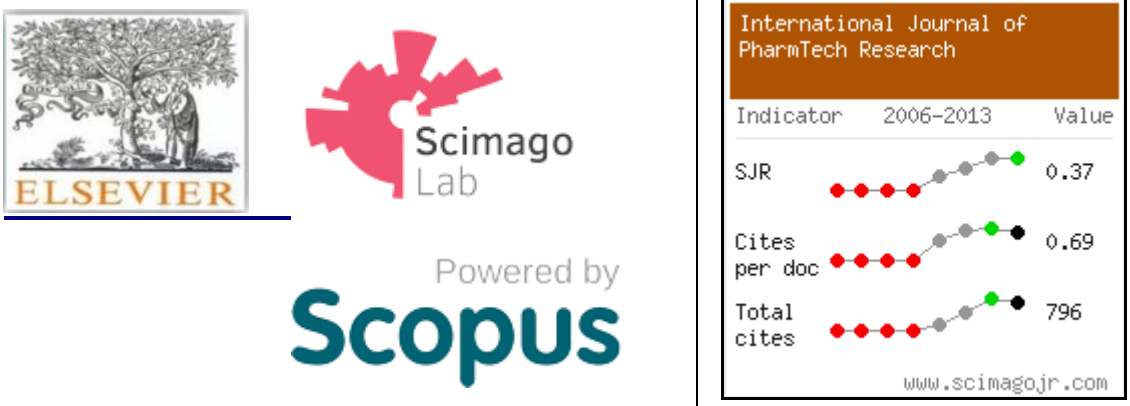

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