

## **Formulation Of Peel-Off Mask From Ethanol Extract Of Water Spinach Leaves As Anti Aging**

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**Abstract :** Aging is a natural process that would be experienced by everyone. Water spinachleaves have a high antioxidants such as flavonoids and cinnamic acid compounds that can be used to prevent premature aging caused by free radicals. Peel-off mask is easy to use and able to clean dead skin cells and dirt in the pores quickly compared to other types of masks. The aim of this research is to formulate and evaluate the effectiveness of peel-off mask from the ethanol extract of water spinach leaves as anti-aging. Evaluation of peel-off 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 results showed concentration ethanol extract of water spinach leaves 3% had best effect on increasing skin moisture and improve skin evenness, minimized pores, reduced the number spots and wrinkles after 4 weeks of treatment.

**Keywords :** water spinach leaves,aging, free radical, antioxidant, peel-off mask.

### **Introduction**

Aging is a physiological process and occurs in all organs of the human body, including skin. Many methods are used to prevent or repair of aging effects. The using of antioxidants is one effort that often done to prevent aging<sup>1</sup>. 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<sup>2</sup>.

Antioxidants are substances that neutralize and reduce free radicals and inhibiting the oxidation of cells, so that reducing the occurrence of cell damage, such as premature aging. Natural antioxidants can be obtained from vegetables, one of that is a water spinach (*Ipomoea aquatica* Forsk.). Water spinach (*Ipomoea aquatica* Forsk.) is an aquatic plant found in marshy or wet sandy areas or floating on water spinach<sup>3</sup>. Green leafy vegetables have been recognised as rich source of micronutrients (minerals and vitamins) and antioxidants<sup>4</sup>.

Masks are cosmetic products that apply the principle of Occlusive dressings Treatment (ODT), the science of dermatology was called percutaneous absorption technology by attaching a membrane of the skin to form a semi-enclosed space between the mask and the skin to increased absorption of the active substance 5-50 times<sup>5</sup>.

The principle of a peel-off mask is utilizing a filming agent attached to the skin, so that when the mask is dry, will form a thin film layer. When released, dead skin cells and dirt in pores will come apart with a layer of the film<sup>6</sup>.

## Experimental

### Instruments

The instruments used in this research include laboratory glassware (Pyrex), a water bath, percolator, analytical scales (Boeco), pH meter (Hanna Instruments), Brookfield viscometer, skin analyzer (Aramo).

### Materials

Ethanol extract of water spinach leaves, polyvinyl alcohol, carbomer 940, propylene glycol, ethanol, methyl paraben, sodium lauryl sulfate, distilled water, and perfume.

### Extraction Process

The method of extraction was percolation. Water spinach leaves was extracted using ethanol 96%.

### Preparation of Peel-Off Mask

Polyvinyl alcohol was dissolved with distilled water, then heated over a water bath at temperature  $\pm 80^{\circ}\text{C}$ . Carbomer 940 was dissolved in 20 parts hot water, then added to polyvinyl alcohol and mixed. Admixed propylene glycol, methyl paraben, and sodium lauryl sulfate, ethanol 96% and perfume then homogenized it. The components of the formulation were shown in Table 1.

**Table 1. Formula of Water Spinach Leaves Ethanol Extract Peel-Off Mask**

Component	Concentration (%)				
	F0	F1	F2	F3	F4
Ethanol extract of water spinach leaves	-	0.5	1.5	2.5	3
Polyvinyl alcohol	10	10	10	10	10
Carbomer 940	0.5	0.5	0.5	0.5	0.5
Propylene glycol	10	10	10	10	10
Methyl paraben	0.2	0.2	0.2	0.2	0.2
Sodium Lauryl Sulfate	2	2	2	2	2
Ethanol 96 %	20	20	20	20	20
Perfume	1 drop	1 drop	1 drop	1 drop	1 drop
Distilled water ad	100	100	100	100	100

### Physical Quality Evaluation of The Preparation

#### Homogeneity test

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

#### pH measurements

Determining pH of the preparation is done by using a pH meter.

#### Viscosity measurements

Determination of viscosity is made by using a Brookfield viscometer with 64 as the number of spindle and 12 as the speeds.

#### 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.

### Irritation test

Irritation test conducted on 15 volunteers with patch test technique by attaching the preparation on the back of the ear. The irritation symptoms observed were redness, itching and swelling.

### Anti-Aging Effect test

Using Aramo SG<sup>®</sup> skin diagnosis system. Treatment conducted for 4 weeks by applying the mask once a week. Parameters measured including moisture, evenness, pore, spot and wrinkles. Each formula consists of 3 volunteers.

### Volunteer

15 volunteers were used to conduct this experiment who have been analyzed beforehand for having signs of premature aging, such as dry skin, wrinkles and black spots.

### The criterias of volunteers are :

1. Women
2. Age between 25-30 years
3. No medical history associated with allergies
4. Not using any other cosmetic that functioning as anti-aging in facial area

## Results And Discussion

### Physical Quality Evaluation of the Preparation

The result of physical quality evaluation of the preparation were shown in table 2.

**Table 2. Physical quality evaluation of the preparation**

Parameter	Formula				
	F0	F1	F2	F3	F4
Homogeneity	✓	✓	✓	✓	✓
pH (After Preparation)	6.10	5.95	5.84	5.76	5.64
pH (After 12 weeks)	6.10	5.86	5.77	5.68	5.56
Viscosity (cps) (After Preparation)	11250	11000	10875	10750	10500
Viscosity (cps) (After 12 weeks)	11125	10800	10750	10625	10125
Stability	Stable	Stable	Stable	Stable	Stable
Irritation	-	-	-	-	-

Note: ✓ = homogeneous, - = no irritation

Based on data in Table 2 above shows that each formula was homogenous, pH value was 5.56-6.10 which was within the range of permitted pH requirements for cosmetics (5-8). From the data it can be seen that the quantity of the ethanol extract of water spinach leaves is added caused the pH more acidic. It can be caused by pH of ethanol extract of water spinach leaves is acidic. The observation of the viscosity for storage 12 weeks indicated that the decreased viscosity. It can be caused the storage was too long, so it affected by the environment such as air. Peel-off mask contained propylene glycol which is hygroscopic with high affinity to attract and hold water molecules and maintain stability by absorbing humidity from the environment. Each formula were stable during storage and shown no irritation reactions to the skin such as, redness, itchy and swelling.

### Anti-aging test

The result of the effect of anti-aging using peel-off mask of ethanol extract from water spinach leaves on volunteer's skin were shown in Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5.

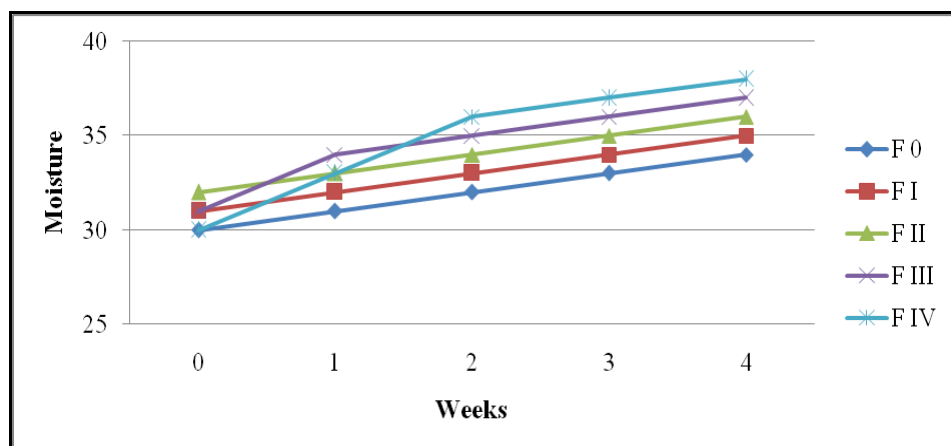


Figure 1. Improvement of moisture in 4 weeks treatment

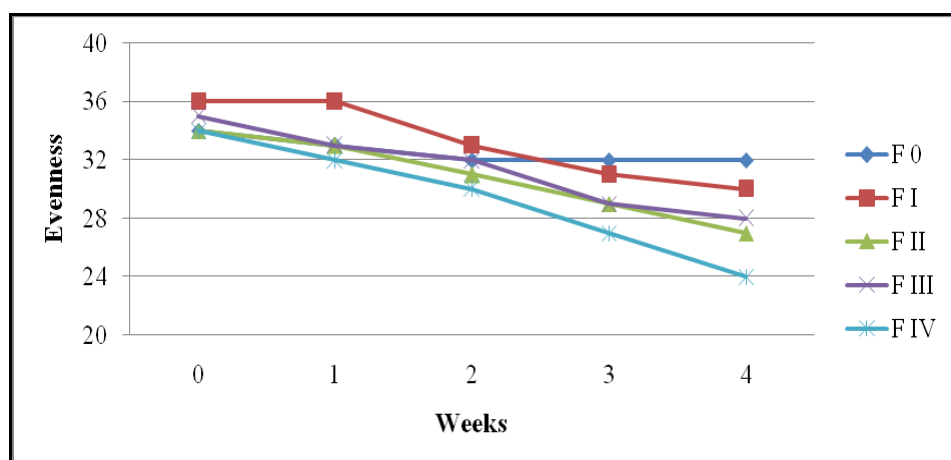


Figure 2. Improvement of evenness in 4 weeks treatment

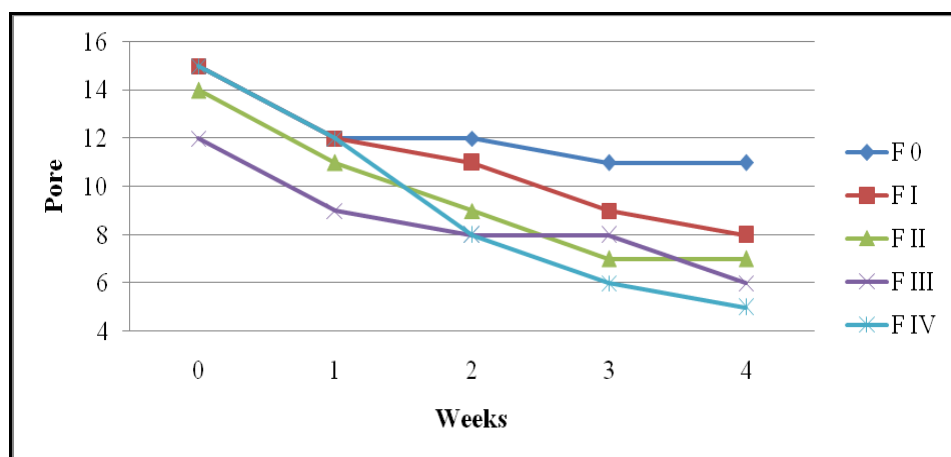
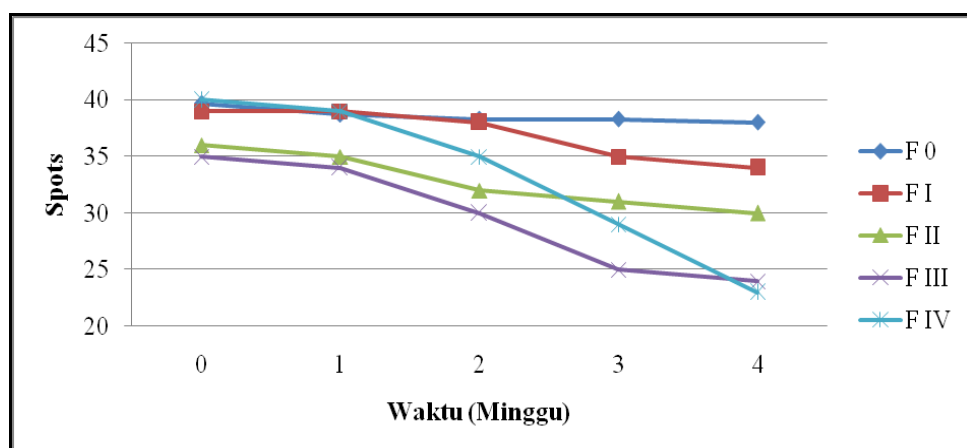
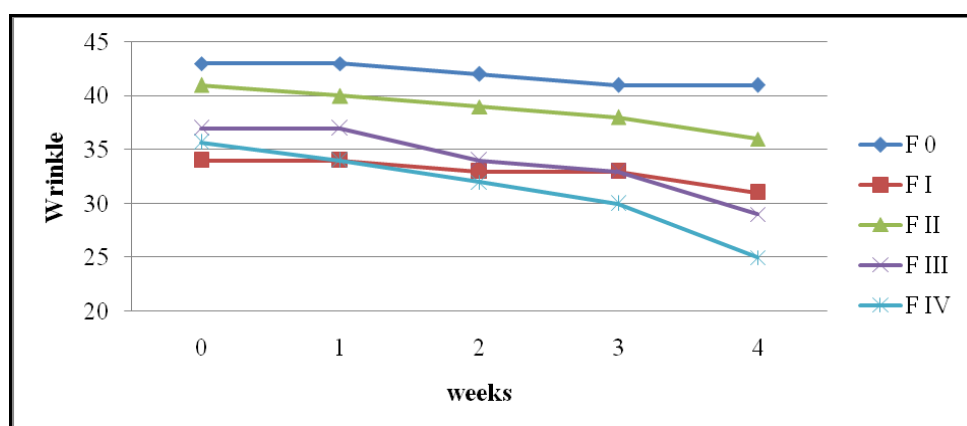


Figure 3. Improvement of pore in 4 weeks treatment



**Figure 4. Improvement of spots in 4 weeks treatment**



**Figure 5. Improvement of wrinkle in 4 weeks treatment**

From Fig 1, Fig 2, Fig 3, Fig 4, and Fig 5, shown that ethanol extract of waterspinach leaves can improve skin condition after 4 weeks treatment.

### Moisture

Moisture related to the protective of the stratum corneum. Flavonoid compounds in ethanol extract of water spinach leaves resulting in increased extracellular collagen. The synthesis of collagen caused increasing the skin more moisture and elastic<sup>7</sup>.

### Evenness

When the skin is too often exposed to the sun, collagen and elastin, which located in dermal layer will be damaged, so that the dead cells that accumulate in the stratum corneum causes the skin becomes less smooth, as a result the skin looks rough. Flavonoids are able to stimulate the formation and increase the skin's collagen production. Flavonoid compounds resulting in increased extracellular collagen that will maintain elasticity, flexibility, and smoothness of the skin<sup>8</sup>.

### Pore

Flavonoids as antioxidants can inhibit lipid peroxidation reaction and a reducing compound which was good. Flavonoids apply as a good inhibitory for hydroxyl and superoxide radicals thus protected lipid membrane. it can cause a diminution of pore size and improving the texture of skin<sup>9</sup>.

### Spots

Flavonoids have an effect as competitive inhibitors that inhibit the enzyme tyrosinase that change tyrosine into DOPA and Dopakuinon, so it can inhibit the increase in the number of melanocytes and melanin in the cells<sup>10</sup>. It also have antioxidant effects that may function to protect the skin from free radicals<sup>11</sup>.

## Wrinkle

Flavonoids as antioxidants can inhibit the increase levels of MMP-1 (Matrix Metalloproteinase-1), which will cause an increase in the amount of collagen. Matrix metalloproteinase-1 is a key mediator that degrade collagen in skin that has photoaging. Barriers to MMP-1 is one way to prevent skin damage from UV exposure. Flavonoids inhibit and prevent skin damage by free radicals that caused by exposure ultra violet rays on the skin, by binding to singlet oxygen and inhibit lipid peroxidation. By the occurrence of these barriers, the synthesis of MMP-1 will decrease and the process of collagen degradation is inhibited so that the skin is protected from aging process from exposure ultra-violet B<sup>10</sup>.

## Conclusion

1. The ethanol extract of water spinach leaves can be formulated in peel-off mask.
2. The ethanol extract of water spinach leaves that formulated in dosage peel-off mask shown the effect of anti-aging with a pH of 5.64 to 6.10, the viscosity was 10125-11250 cp, time for dried 13-16 minutes, no irritate and stable during 12 weeks of storage.
3. Peel-off mask containing ethanol extract of water spinach leaves 3% showed an increase of skin condition becomes better, including moisture, evenness, pores, spots and wrinkles during 4 weeks of treatment

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