



Utilization of Snapper Spinach Leaf Extract (*Amaranthus Hybridrus L*) in Peel-Off Gel Mask Preparation for Aging Face Skin Care

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Abstrak

Masker gel peel off merupakan jenis masker yang mudah dan praktis untuk digunakan. Selain itu juga dapat menghidrasi kulit dengan baik. Bayam mengandung zat kimia yang baik untuk kesehatan kulit antara lain vitamin A, vitamin E, vitamin C, dan flavonoid. Tujuan penelitian ini adalah untuk mengetahui kelayakan masker gel peel off ekstrak daun bayam kakap ditinjau dari uji laboratorium (vitamin A, vitamin C, flavonoid, homogenitas, pH, waktu pengeringan), uji organoleptik (warna, aroma, kelengketan, dan tekstur), dan uji hedonik (tingkat kesukaan). Jenis penelitian ini adalah eksperimen dengan analisis kuantitatif. Variabel bebasnya adalah daun bayam kakap. Variabel terikat adalah kandungan vitamin A, vitamin C, flavonoid, homogenitas, pH, dan waktu pengeringan yang terdapat pada masker gel peel off. Teknik analisis data adalah observasi dan dokumentasi. Formulasi yang digunakan adalah X1 (1%), X2 (3%), dan X3 (5%). Hasil penelitian menunjukkan bahwa pada masker gel peel off ekstrak daun bayam kakap terdapat kandungan vitamin A sebesar 9568,0000 ppm (9,57%), vitamin C 0,088%, (+) flavonoid, formulasi X1 dan X2 homogen, sedangkan formulasi X3 formulasi tidak homogen, pH 4,86, dan waktu pengeringan rata-rata 20 menit. Formulasi terbaik ditinjau dari uji organoleptik dan hedonik adalah X2 (3%) cukup berwarna (55,56%), cukup beraroma (66,67%), lengket (66,67%), halus (100%), suka (66,67%). Dengan demikian, masker gel peel off dengan ekstrak daun bayam kakap ini cocok sebagai perawatan kulit menua.

Kata kunci: Pemanfaatan, Ekstrak Daun Bayam Kakap, Masker Gel Peel Off, Perawatan Kulit Menua

Abstract

The peel-off gel mask is a type of mask that is easy and practical to use. Besides that, it can also hydrate the skin well. Spinach contains chemicals that are good for skin health including vitamin A, vitamin E, vitamin C, and flavonoids. The purpose is to determine the feasibility of peel-off gel masks with snapper spinach leaf extract in terms of laboratory tests (vitamin A, vitamin C, flavonoids, homogeneity, pH, drying time), organoleptic tests (color, aroma, stickiness, and texture), and hedonic test (favourability level). This type of research is an experiment with quantitative analysis. The independent variable is snapper spinach leaves. The dependent variable is the content of vitamin A, vitamin C, flavonoids, homogeneity, pH, and drying time contained in the peel-off gel mask. Data analysis techniques are observation and documentation. The formulations used are X1 (1%), X2 (3%), and X3 (5%). The results showed that in the peel-off gel mask of spinach leaf extract, there was 9568,0000 ppm (9.57%) of vitamin A, 0.088% vitamin C, (+) flavonoids, the X1 and X2 formulations were homogeneous, while the X3 formulation not homogeneous, pH 4.86, and average drying time of 20 minutes. The best formulation in terms of organoleptic and hedonic tests is X2 (3%) quite colorful (55.56%), quite flavourful (66.67%), sticky (66.67%), smooth (100%), likes (66.67%). Thus, the peel-off gel mask with snapper spinach leaf extract is suitable as an aging skin treatment.

Keywords: Utilization, Snapper Spinach Leaf Extract, Peel-Off Gel Mask, Aging Skin Care

1. INTRODUCTION

Skin aging is a decrease in the normal functioning of the skin and changes in organic functions in the skin that occur usually at the age of 20 years. The aging process of the skin becomes a dynamic process that causes changes in the skin layer. The causative factors of skin aging consist of intrinsic and extrinsic factors. Intrinsic factors of skin aging are free radicals and DNA damage. While the extrinsic factors are UV rays and smoking (Dewiastuti & Hasanah, 2016; Wong & Chew, 2021). When entering the 30s the skin begins to show

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signs of aging clearly such as the skin begins to feel dry and begins to look dull. This is due to the speed at which the body produces skin cells that are just beginning to slow down. In addition to dry skin, fine wrinkles around the mouth and eyes also begin to be seen due to collagen (which makes the skin strong) and elastin (which makes the skin elastic) which has reduced production (Li et al., 2022; Qin et al., 2021; Samalin et al., 2020). Negative effects on aging skin can affect a person's beauty and appearance. Therefore, it is necessary to take precautions to overcome the problem of aging facial skin. One of them is by using facial skin care cosmetics or skin care cosmetics. Skin care cosmetics are cosmetics that are used to maintain skin hygiene and health, as well as can eliminate abnormalities in the skin. Skin care cosmetics are needed for anti-aging facial treatments such as lotions, creams, gels, and masks (Afonso et al., 2019; Antara et al., 2022; Wu et al., 2016).

Masks are of cosmetics that have useful ingredients that are good for skin health. Systematically, face masks act to stimulate the circulation of blood flow and spleen, stimulate and improve the skin through accelerated regeneration and provide nutrients to skin tissues (Hendyana & Rahmiati, 2022; Siregar et al., 2019; Virgita & Krisnawati, 2014). The benefits of using masks include softening, conditioning, and face shielding so that facial skin will be softer and fresher, eliminating skin gloom, aborting old and dead cells, refreshing the skin, tightening the skin and preventing wrinkles on the face, closing pores and whitening the skin, normalizing the skin from acne disorders, dark blemishes and removing excess fat on the skin and improving the level of hygiene, health and, skin health, renews and re-stimulates skin cell activities.

Masks have a wide variety of dosage forms such as powder, gel, and paper. Peel-off gel masks have effectiveness in their use such as being easy to clean. This makes it easier to remove residual dirt from the surface of the facial skin. Peel-off gel masks are made with a PVA formula that is useful for creating a film that makes it easy for the mask to be lifted as it dries. In addition, this type of mask also has benefits for the skin such as overcoming the problem of wrinkles, dry skin, acne, and shrinking pores (Kashyap et al., 2022; Khan et al., 2021). Spinach is a vegetable that is often used as an ingredient in cooking in the kitchen. But besides being edible, this spinach vegetable turns out to have good content for the skin. Spinach can be classified into pulled spinach, snapper spinach, duck spinach, red spinach, thorn spinach, and wild spinach. The content in spinach includes vitamins A, C, E, and Flavonoids. Antioxidants are compounds that can fight free radicals that cause aging (Jamshidi-Kia et al., 2020; Syahara & Vera, 2020).

Previous research regarding the dosage formulation of red spinach leaf extract masks (Marques-Hueso et al., 2020; Pradana et al., 2016). The results of the study that red spinach extract can be formulated into a peel-off gel mask preparation that meets the requirements of physical evaluation of the preparation. In addition, there is still little research related to the use of snapper spinach leaves. Therefore, researchers are interested in conducting research on snapper spinach leaf masks for aging facial skin care with the research title "Utilization of Snapper Spinach Leaf Extract (*Amaranthus Hybridus L*) in Peel Off Gel Mask Preparations for Aging Face Skin Care".

2. METHODS

This type of research is experimentation with quantitative analysis. The object of study is snapper spinach leaves which are blended and then extracted and made a peel-off gel mask for aging facial skin care. This research was carried out in the laboratories of the Cosmetology and Beauty education study program FPP UNP, the Chemistry Laboratory of FMIPA UNP, and the Pioneer University of Indonesia. This research will be carried out after the proposal seminar. The free variable is a gel mask peeling off of snapper spinach leaf

extract. The bound variable is the care of aging facial skin. The feasibility of masks is in terms of the content of vitamin A, vitamin C, flavonoids, homogeneity, pH, drying time, organoleptic tests (color, aroma, adhesion, and texture), and hedonic tests (panelists' preferences). The type of data is primary with sources from 9 panelists.

3. RESULTS AND DISCUSSION

Result

Working steps of making peel-off gel mask spinach leaf extract snapper

First, the snapper spinach leaves were identified at Andalas State University to ascertain the type of spinach plant. The results of the identification of spinach plants issued from the Herbarium of Andalas University in letter no. 472 / K-ID / ANDA / IX / 2022 stated that the identification results were that the plants included the Amaranthacea family and the species *Amaranthus hybridus* L. Then prepare 4 kg of leaves then separate the damaged twigs and leaves. Obtained the weight of clean spinach leaves as much as 1.5 kg. Next spinach leaves in a blender with a little water added so that 2 liters are obtained. Then the sample is tested for the content of Vitamin A, and Vitamin C. A sample of 2 liters of spinach leaves was extracted by soaking with 96% ethanol as much as 4 liters. Simplicia ratio: the solvent is 1:2 and allowed to stand for 3 days with periodic stirring. The resulting material is then concentrated using a rotary evaporator until a thick extract is obtained. So that the extract results were obtained as much as 16 gr.

The extract of spinach snapper leaves is then processed into a peel-off gel mask. The first stage is equates heated using a stove and then mix it with HPMC. After stirring well let the mixture stand for 1 day / 24 hours (ingredient 1). PVA is mixed with equates while heated in a hot plate with a temperature of 80°C. Stir the mixture until completely homogeneous (ingredient 2). After that, mix the extract of snapper spinach leaves with propylene glycol. Then the mixture is filtered using filter paper (material 3). To make the mask more durable, use preservatives in the form of nipagin and nipasol. Nipagin and nipasol are mixed with a 70% ethanol solution (ingredient 4). After that, mix all the ingredients presented in [Table 1](#) by grinding them using lumps until homogeneous. After that preparation of the finished mask and ready to put in a container.

Table 1. Materials Used To Make Mask Preparations

No	Materials	X0	X1	X2	X3
1	Snapper spinach extract	0 %	1 %	3 %	5 %
2	Polivinil alcohol	12 %	12 %	12 %	12 %
3	hidroksipropil metilselulosa	2 %	2 %	2 %	2 %
4	Propilenglikol	15 %	15 %	15 %	15 %
5	Nipagin	0,05 %	0,05 %	0,05 %	0,05 %
6	Nipasol	0,05 %	0,05 %	0,05 %	0,05 %
7	Etanol 70%	8 %	8 %	8 %	8 %
8	Aquades	ad	ad	ad	ad
		100 %	100 %	100 %	100 %

Laboratory tests

Vitamin A & C

Vitamin A testing on samples is carried out by the UV-Vis Spectrophotometer method which has been presented in [Table 2](#). With the test results, there is a vitamin A content in fresh samples of snapper spinach leaves, which is 9568,0000 ppm (9.57%). Vitamin C testing on samples is carried out by the Iodometric Titration method. With the test

results, there is a vitamin C content in fresh samples of snapper spinach leaves, which is 0.088%.

Table 2. Vitamin A & C Test Results

No	Testing	Results	Methods
1	Vitamin A	9568.0000 ppm (9,57%)	Spektrofotometer UV-Vis
2	Vitamin C	0.088 %	Titiasi Iodometri

Flavonoid

Flavonoid testing begins with preparing as much as 0.5 g of snapper spinach leaf extract. The extract is added to 100 ml of hot water, then the material is heated for approximately 5 minutes. After that strain with filter paper. In filtrate, as much as 5 mL, add Mg powder as much as 0.05 mg and concentrated HCl as much as 1 ml. After that, the sample is shaken to see the results of UJJI. The results can be said to be positive for flavonoids if the sample shows red, yellow, or orange (David, N. S., et al. 2021). The test results on this sample show that snapper spinach leaf extract contains (+) flavonoids.

Homogeneity

The homogeneity test results showed that the formulations X0 (0%), X1 (1%), and X2 (3%) were homogeneous. While the X3 formulation (5%) is not homogeneous.

pH

pH test is useful to know whether or not the mask that has been made for the skin is good. The way to do a pH test is to start by mixing as much as 1 gr of an extract which equates to as much as 10 ml. The tool used for this test is a pH meter. The test results can be seen from the monitor pH meter. The pH value of snapper spinach leaf extract is 4.86.

Drying Time

From the results of tests conducted on the aspect of drying time of spinach leaf mask products, it was obtained that all preparations of the product dried within ± 20 minutes.

Organoleptic Test Result

Color

On the organoleptic assessment of the color aspect that has been presented in [Figure 1](#) in the X0 formulation (0%) obtained 100% choosing the colorless category. In the X1 formulation (1%) 11.11% chose the colorless category, 77.78% chose the less colored category, and the remaining 11.11% chose the moderately colored category. In the X2 formulation (3%) obtained 55.56% chose the moderately colored category and 44.44% chose the colored category. Meanwhile, in the X3 formulation (5%) obtained as much as 100% stated that the sample had a colored category.

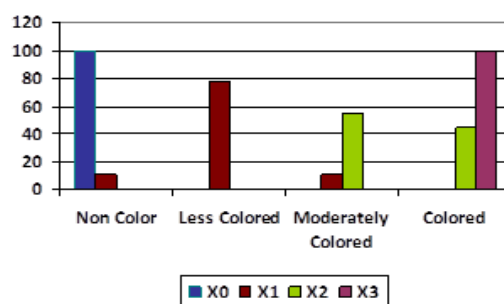


Figure 1. Color Organoleptic Test Results

Flavor

In the organoleptic aroma test assessment from 9 panelists that has been presented in Figure 2, it was stated that in the X0 formulation (0%) as many as 77.78% chose the colorless category, as many as 11.11% chose the moderately flavored category, and the remaining 11.11% chose the flavored category. In the X1 formulation (1%) as many as 66.67% chose the less flavorful category, 22.22% chose the moderately flavorful category, and the remaining 11.11% chose the flavorful category. In the X2 formulation (3%) as many as 66.67% chose the moderately flavored category and as many as 33.33% chose the flavored category. Then in the X3 formulation (5%) all panelists, namely 100% chose the flavored category.

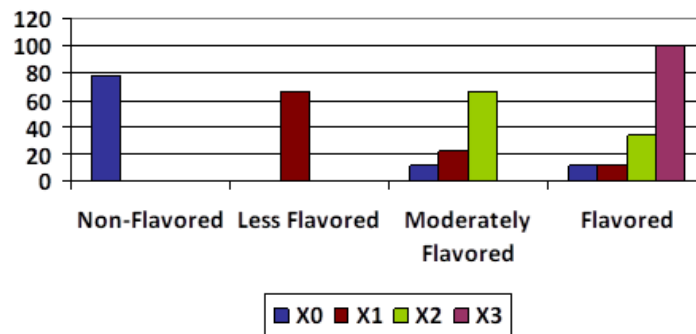


Figure 2. Flavor Organoleptic Test Results

Stickiness

From the assessment of 9 panelists on the aspect of attachment that has been presented in Figure 3, the value in the X0 formulation (0%) was obtained as many as 33.33% chose the category of being quite sticky and 66.67% chose the category of attachment. In the X1 (! %) formulation, 22.22% chose the less sticky category, 44.44% chose the moderately attached category, and 33.33% chose the sticky category. In the X2 formulation (3%) 33.33% chose the moderately attached category and 66.67% chose the sticky category. Meanwhile, in the X3 formulation (5%) 11.11% chose the less sticky category, 22.22% chose the category that is quite fixed, and 66.67% chose the sticky category.

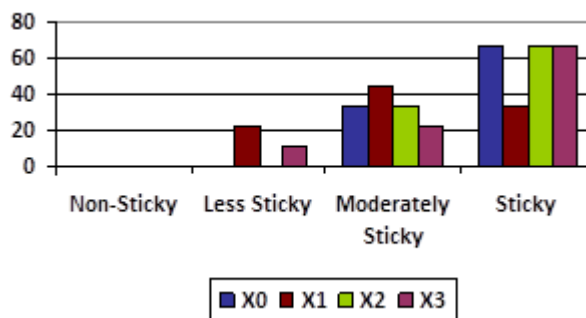


Figure 3. Stickiness Organoleptic Test Results

Texture

From the organoleptic assessment on the aspect of texture obtained from 9 panelists which have been presented in Figure 4 obtained in the X0 formulation (0%) as many as 11.11% chose the non-smooth category and 88.89% chose the fine category. In the X1

formulation (1%) 33.33% chose the fairly fine category and 66.67% chose the fine category. In the X2 formulation (3%) as much as 100% choose the fine category. While in the X3 formulation (5%) as many as 33.33% chose the less subtle category, 11.11% chose the fairly smooth category and 55.56% chose the smooth category.

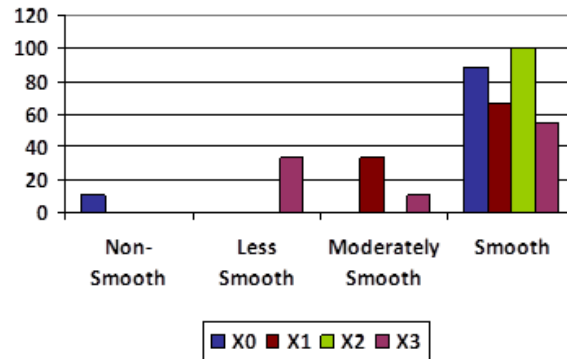


Figure 4. Texture Organoleptic Test Results

Hedonic Test Result

The results of the hedonic test assessment obtained from 9 panelists which have been presented in Figure 5 obtained results on the X0 formulation (0%) as many as 33.33% did not like, 11.11% did not like, and 55.56% liked enough. In the X1 formulation (1%) 22.22% did not like, 66.67% liked enough, and 11.11% liked. In the X2 formulation (3%) 22.22% disliked, 11.11% liked enough, and 66.67% liked. While in the X3 formulation (5%) as many as 33.33% less like, 44.44% quite like, and 22.22% like.

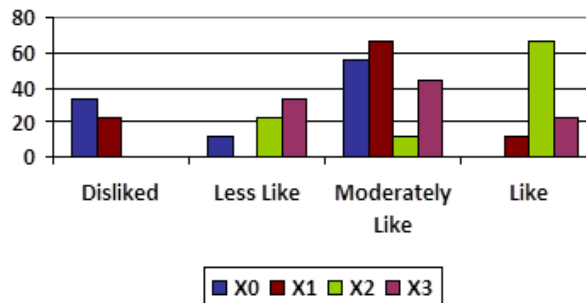


Figure 5. Hedonic Test Results

Discussion

The feasibility of peel off gel mask for spinach leaf extract is reviewed from laboratory test results. Vitamin A testing on samples is carried out by the UV-Vis Spectrophotometer method. With the test results, there is a vitamin A content in fresh samples of snapper spinach leaves, which is 9568,0000 ppm (9.57%). The content of vitamin A is good for skin health, especially for aging facial skin care. Vitamin A has benefits to make the skin look healthy and bright by helping the formation of new skin cells. Vitamin A also takes a role in the process of proliferation and differentiation of skin cells and tissues. So, vitamin A can be beneficial for the skin as an anti-acne and anti-aging. In addition, vitamin A also has other benefits, namely being able to prevent cancer (Saleh et al., 2013; Salehi et al., 2018). Previous research explained the function of Vitamin A as an anti-aging, namely by maintaining skin health and improving the rough and wrinkled skin surface (AF et al., 2016; Resende et al., 2021; Souto et al., 2022).

Vitamin C testing on samples is carried out by the Iodometric Titration method. With the test results, there is a vitamin C content in fresh samples of snapper spinach leaves, which is 0.088%. The content of vitamin C is good for maintaining healthy skin, especially for aging facial skin. Similar research stated that vitamin C can maintain collagen formation in the skin so that skin firmness is maintained (anti-aging) (Ahmed et al., 2020; Bataillon et al., 2019; Wang et al., 2022). Vitamin C is also useful in brightening the skin by reducing pigment formation. Besides being good for the skin, vitamin C can also be useful in accelerating wound healing, maintaining the immune system, and helping the regeneration of vitamin E. The same thing the main function of vitamin C in the skin is as a powerful antioxidant that protects the skin against negative influences that stimulate the formation of skin collagen, maintain suppleness, and brighten the skin (Aguirre-Cruz et al., 2020; García-Villegas et al., 2022; Kammeyer & Luiten, 2015; Taofiq et al., 2016).

Flavonoid compounds can be useful as antioxidants capable of eliminating the adverse effects of free radicals. If the mask preparation made contains flavonoids, then the mask is able to prevent damage to the skin due to premature aging. Based on the results that state that in the extract of spinach leaves positive there are flavonoids which are antioxidant activities that are classified as very strong. Flavonoids have activity as antioxidants so that they can be used to prevent skin damage and premature aging due to the negative effects of free radicals (Akbari et al., 2022; de Lima Cherubim et al., 2020). Flavonoids are polyphenol compounds that are able to stabilize free radicals by donating one hydrogen atom.

The homogeneity test results showed that the formulations X1 (0%), X2 (1%), and X3 (3%) were homogeneous. While the X4 formulation (5%) is not homogeneous. This is thought to be because the X4 formulation is a gel peel mask preparation that has the highest concentration of snapper spinach leaf extract. Snapper spinach leaf extract has a fibrous shape so that with a large amount of spinach leaf extract included in the mask preparation makes the formulation difficult to homogenize. So, it can be concluded that the formulations X1, X2, and X3 are homogeneous while X4 are not homogeneous.

This test is useful to find out whether or not the mask is safe to use on the skin of the face. If the pH value is excessive, it can cause irritation to the skin so that problems such as dry and scaly skin appear. Meanwhile, if the pH value is too low, it can reduce skin elasticity so that the skin feels slippery. The pH standard for masks is 4.5-8.0, in accordance with SNI 16-6070-1999 concerning mask preparations. The pH value of snapper spinach leaf extract is 4.86. The value has met the standards so it is good for use on the skin.

Peel-off gel mask preparations can be said to be good if they are able to dry in the time range of 15 to 30 minutes. The drying time of the three mask formulations is \pm 20 minutes. The drying time of the mask is affected by 70% ethanol. Ethanol can reduce the time it takes for a mask to dry. This is because the liquid on the mask will decrease as ethanol evaporates. So that masks are able to dry faster.

The feasibility of peel-off gel mask of snapper spinach leaf extract in terms of organoleptic test results

From the results of the study, it can be seen that the three mask preparations have different colors, this is because the variations in the snapper spinach leaf extract that are included are also different. In the X1 formulation, 1% of snapper spinach leaf extract was given so that the mask preparation was less green spinach leaves. In the X2 formulation, 3% of snapper spinach leaf extract was given so as to produce a mask preparation that is quite green spinach leaves. And in the X3 formulation, the most extract concentration is 5% so as to produce a mask preparation that is green spinach leaves. So it can be concluded that the more concentration of snapper spinach leaf extract inserted in the peel-off gel mask can make the color of the mask preparation become more intense. A good dosage standard is to have a

distinctive color. Based on this, it means that all preparations of peel-off gel masks for snapper spinach extract have met the requirements.

From the results of the study, it can be seen that the three mask preparations have different aromas, this is because the variations in the concentration of snapper spinach leaf extract that are included are also different. In the X1 formulation, 1% of snapper spinach leaf extract was given so that the mask preparation was less flavorful than typical spinach leaves. In the X2 formulation, 3% of snapper spinach leaf extract was given so that it produced a mask preparation that was quite flavorful typical of spinach leaves. And the X3 formulation is given the most extract concentration of 5% so as to produce a mask preparation that has a distinctive aroma of spinach leaves. So it can be concluded that the more concentration of snapper spinach leaf extract inserted in the peel-off gel mask can make the aroma of the mask preparation even more tasteful. A good standard preparation is to have a distinctive aroma. Based on this, it means that all preparations of peel-off gel masks for snapper spinach extract have met the requirements.

From the results of the study, it can be seen that formulation X1 (1%) has a mask preparation that is quite sticky. Formulation X2 (3%) has a mask preparation that is sticky. And in the formulation, X3 (5%) has a mask preparation that is fixed. One of the ingredients that play the most role in making the adhesive effect on the peel-off gel mask is PVA. The PVA content of 12% in masks is known to provide a sticky effect such as glue. From the results of the study, it can be seen that the three mask preparations have the same texture, which is equally smooth. This is alleged because when processing masks are carried out slowly and pay attention to the process of stirring the ingredients until they are completely homogeneous. In addition, the extract of snapper spinach leaves is also carried out by a filtering process using filter paper so that the extract inserted into the mask preparation is really smooth and not powdered.

The feasibility of peel-off gel mask of spinach leaf extract is reviewed from hedonic test results

From the results of the hedonic test assessment, it is stated that the X1 mask preparation is quite preferred, X2 is preferred, and X3 is quite preferred. So it can be known that there are no masks that are not liked by panelists and the most preferred mask preparation is X2 with a concentration of snapper spinach leaf extract of 3%. X2 has a fairly green assessment of spinach leaves, quite scented with spinach leaves, sticky, and smooth. While the preparation that has a higher concentration is X3 with a 5% extract of snapper spinach leaves. X3 has a green assessment of spinach leaves, the distinctive aroma of spinach leaves, is sticky, and smooth. However, X3 has a lower score than X2 in hedonic assessments. This is alleged because the X3 panelists don't really like the color and the intense aroma of the peel-off gel mask preparation. So most of the panelists gave a pretty-like value to the X3 preparation mask. And choose the X2 mask preparation (3%) as much as the most preferred and demanded mask.

4. CONCLUSION

The process of making peel-off gel masks is Hydroxypropyl methylcellulose is developed in hot aqua dest, stirred, then closed, and allowed to stand for 24 hours (mixture 1). Polyvinyl alcohol is dispersed in hot aqua dest with heating to 80°C while continuing to stir 3 until completely dispersed (mixture 2). Propylene glycol is mixed with snapper spinach extract (mixture 3). Nipasol and nipagin are dissolved in 70% ethanol (mixture 4). Mixtures 1 and 2 are mixed until homogeneous, then mixtures 3 and 4 are added and ground until a homogeneous mass of gel mask is obtained. The feasibility of peel-off gel mask of spinach

leaf extract in terms of laboratory tests showed results that there was vitamin A as much as 9568,0000 ppm (9.57%), vitamin C 0.088%, there were (+) flavonoids, X1 and X2 formulations were homogeneous, while X3 formulations were inhomogeneous, pH 4.86, and the drying time of the preparation averaged 20 minutes. The feasibility of a peel-off gel mask of snapper spinach leaf extract in terms of organoleptic tests shows the results that the best product is the X2 formulation (3%). The assessment results are quite colorful (55.56%), quite flavorful (66.67%), sticky (66.67%), and smooth (100%). The feasibility of peel-off gel masks of snapper spinach leaf extract in terms of hedonic tests obtained results that the most popular products are X2 mask preparations (3%) with a like assessment category (66.67%).

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