Formulation and physical evaluation sheet mask from red rice (*Oryza nivara*) and virgin coconut oil (*Cocos nucifera L*)

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Abstract---Sheet Mask has been widely used by East Asians, sheet masks are generally made of non-woven fabric, paper fibers, bio-cellulose, and so on. Red rice with a slightly purplish red color is very suitable for normal to dry skin. As in the analysis of red rice content, there are protein levels, fat content, water content, vitamin C in brown rice which is very good for moisturizing the facial skin. One of the natural ingredients studied is Virgin Coconut Oil (VCO). In this study, a physical evaluation test was carried out on red rice and VCO samples. The purpose of this research is to find out what formulation produces good physical properties. Red rice was extracted coldly using 96% ethanol solvent and VCO using the fermentation method. The results of the phytochemical test of red rice extract contained flavonoids, saponins, terpenoids, and quinones. Based on research results, brown rice extract and VCO have stronger antioxidant activity compared to VCO. Based on the results that have been done on the preparation of sheet mask of red rice extract and VCO, it can be concluded that the most optimal formula in F1 with an active substance concentration of 0.5% more preferred by respondents in hedonic testing with the resulting odor, color and texture parameters.
Keywords---brown rice, hedonics, physical evaluation, sheet mask, VCO.

1 Introduction

Exposure to sunlight that releases ultraviolet radiation (UV) may trigger wrinkles on the face. Wrinkles arise due to decreased collagen production and abnormal elastin accumulation. Collagen is a long-chain protein compound composed of amino acids namely alanine, arginine, lysine, glycine, proline, and hydroprolin. Dry skin is defined to describe the loss or decrease in moisture content in *stratum corneum* (SC). In the aging process, drought occurs due to the reduced ability of SC to bind water, so the skin looks shiny, wrinkled, and rigid (Ayustaningwarno, 2014; Darwati, 2013; Tranggono & Latifah, 2007). Cosmetics are preparations or alloys of material that are ready to be used in the outer parts of the body (epidermis, hair, nails and external genitalia), teeth and oral cavity to cleanse, enhance attraction to change the appearance, protect to keep it in good condition, to make body odor better but it doesn't intend to treat or cure an illness.

The process of skin aging is characterized by the appearance of wrinkles, scales, dry and chapped skin. Besides looking dull, the skin looks older and black spots appear (Lee, 2013; Donna Partogi, 2009). Compounds that can counteract free radicals are antioxidants. As an active ingredient, antioxidants are used to protect the skin from oxidation damage to prevent premature aging (*anti-aging*). Following the origin of the word, *anti* means to hold or fight against, while *aging* means aging, when interpreted *anti-aging* is to hold or fight against the aging (Kusumawati

et al., 2020; Maysuhara, 2009). *Anti-aging* is a process to prevent or slacken the effects of aging so that someone becomes fresher, beautiful, and youthful.

Masks are cosmetic preparations for facial skincare that have benefits to provide moisture, give skin texture, rejuvenate the skin, tighten skin pores, brighten skin tone, relaxing facial muscles, and cure acne and its scars. Brown rice is slightly purplish red rice which is suitable for normal to dry skin. As in the analysis of red rice content, there are protein levels, fat levels, water levels, vitamin C in brown rice which is very good for moisturizing the facial skin (Fauzi *et al.,* 2012; Harborne, 1987).

The rapid technological progress spurred the cosmetics industry companies to compete to create formulations in the manufacture of face masks. Formulation of making a natural face mask needs to be done as an alternative option. Importantly, the natural formulation is the background of formulating natural masks made from brown rice extracts and *Virgin Coconut Oil* (VCO) (Setiaji & Prayugo, 2006; Santika & Rozakurniati, 2010).

2 Method

Tools and materials used in research

The tools used in this research are macerator, *Eyela rotary evaporator*, beaker glass, test tube rack, porcelain cup, *water bath*, *homogenizer*, stirring rod, watch glass, measuring cup 10 ml; 50 ml; 100 ml, filter paper, and spatula. The materials used in this research are Brown rice (*Oryza nivara*) obtained in Loji Village and Coconut (*Cocos nucifera L*) obtained in Batujaya Village, HPMC, Na-Benzoate, Propylene glycol, Glycerin, Tween 80, Span 80, Ethanol 96, Aquadest (Bagchi *et al.,* 2016; Thakur & Gupta, 2006).

The Production of Brown Rice Extract

The Production of brown rice extract is done by extracting the cold way that is maceration, by make brown rice mashed and weighed then extracted using 96% ethanol by maceration for few days and stirring few times (Suriani, 2019; Komatsuzaki *et al.,* 2007). Every 24 hours the filtrate is collected then extracted filtered using filter paper and the first filtrate is obtained. After that, the residue was extracted again for 24 hours using 96% ethanol solvent and obtained second filtrate and its equivalent. Furthermore, the filtrate is collected and evaporated using an evaporator at temperatures below 50°C, and followed by thickening the extract which is carried out using a water bath at 60°C until it becomes thick extract.

Physical Evaluation
Organoleptic Test
Organoleptic test of the preparations is carried out visually on the odor, color, shape of each preparation *(Sonego et al.,* 1995; Mouyen *et al.,* 1989).

Homogeneity Test
A homogeneity test is carried out using glass objects. A certain amount of the preparation if applied to a piece of glass or other suitable transparent material, the preparation must show the homogeneous arrangement, and no coarse grains are visible.

Preparation of pH Test

Testing the pH of the preparation is carried out using a pH meter. Several masks were put on the pH meter. Each formula must fill the pH range with a skin pH range of 4.5-6.5.

Preparation of Viscosity Test

A viscosity test is carried out using a viscometer. By weighing 100 grams of *sheet mask* ethanol extract mask then the spindle is set, the speed used and the viscometer is run, then the viscosity of the *sheet mask* will be read.

Hedonic Test

The preference test is conducted to determine the level of preference of panelists toward the preparations produced. Panelists are members involved in the organoleptic assessment of various subjective impressions and analysis of the sensory properties of a product presented (Roininen *et al.,* 1999; Clapp & Giaccotto, 1998).

Irritation Test against Volunteers

The irritation test is carried out on volunteers using the patch test technique by sticking it behind the ear. The symptoms observed were redness, itching, and swelling that appeared briefly and within 24 hours. Volunteers who will use cosmetics or will use cosmetics can use a test (*usage test*) by using cosmetics in a place that is easily seen as the way used. Volunteers who are afraid that side effects will occur so that they feel less namely the use of cosmetics directly on the face can be tested using the forearm or back of the ear.

Making Sheet Masks

The production of brown rice and VCO masks was done by mixing HPMC with the aqua dest is crushed ad homogeneously. Dissolve sodium benzoate and glycerin inhomogeneous crushed glass. Then put into a mortar that contains homogeneous crushed HPMC (Wellner *et al.,* 2006). Add propylene glycol into homogeneous crushed ad mortar. Put in tween 80 and span 80 and VCO homogeneous crushed ad. Add homogeneous crushed ad brown rice extract.

3   Results and Discussion

The Organoleptic Test is intended to see sheet masks that have dancing colors, odors that are acceptable by the user, and shapes that are comfortable to use. The result of this research is there is a change in color of each F1, F2 and F3, aromatic distinctive odor, and semi-liquid form. The results of items examination aim to see the pH of the preparation, whether it is safe for use on the skin or not. The pH situation must be adjusted so that it does not interfere with the function of the cell membrane and does not irritate the skin. From the tests conducted F1, F2, and F3 items are still in the range of pH values 6.0 to 6.2, the items are still safe to use, the pH of the items is still in the physiological pH of the skin, namely pH 4.5-6.5.

Sheet Mask Formulation

Table 1
Ingredients in Red Rice Extract Mask and VCO Sheet Formulation

Material	F1	F2	F3	Note
Brown Rice extract	0,25%	0,5%	1%	Active substance
VCO	8%	8%	8%	Active substance
Glycerin	15%	15%	15%	Humectant
Sodium benzoate	0,2%	0,2%	0,2%	Preservative
Propylene glycol	10%	10%	10%	Surfactant
HPMC	3%	3%	3%	*Gelling agent*
Tween 80	15%	15%	15%	Emulgator
Span 80	4,3%	4,3%	4,3%	Emulgator
Aquadest	qs	qs	qs	Solvent

Production of Sheet Masks

The production of brown rice and VCO masks was done by mixing HPMC with homogeneous, adhered hot water. Dissolve sodium benzoate and glycerin inhomogeneous crushed glass (Al-Edresi & Baie, 2009; Ling *et al.,* 2010). Then put into a mortar that contains homogeneous crushed HPMC. Add propylene glycol to homogeneous crushed

ad mortar. Put in tween 80 and span 80 and the VCO has to be homogeneous. Add homogeneous crushed ad brown rice extract.

Phytochemical Test
Based on the phytochemical test of brown rice extract, obtained as follows:

Table 2
Phytochemical Test Results

No	Type of test	Result	Note
1	Alkaloids	-	Mayer: No white sediment are formed
		-	Dragendorf: No red sediment are formed
2	Flavonoids	+	Orange color is formed
3	Tannin	-	No green/blue-black color is formed
4	Saponin	+	Formed foam as high as 1 cm
5	Kuinon	+	Solid red color is formed
6	Phenolic	+	Blackish green formed

Note: (+) Exist, No Exist (-)

The Organoleptic Test is intended to see sheet masks that have dancing colors, odors that are acceptable to the user, and shapes that are comfortable to use. Its result, there is a change in color of each F1, F2 and F3, aromatic distinctive odor, and semi-liquid form.

The results of items examination aim to see the pH of the preparation, whether it is safe for use on the skin or not. The pH situation must be adjusted so that it does not interfere with the function of the cell membrane and does not irritate the skin. From the tests conducted F1, F2, and F3 preparations are still in the range of pH values 6.0 to 6.2, the preparations are still safe to use, the pH of the preparations is still in the physiological pH of the skin, namely pH 4.5-6.5.

4 Conclusion

a) Based on the results of research on testing the physical properties of the mask *sheet* which is consist of organoleptic tests, homogeneity, pH test, viscosity test and hedonic test on each formula with different concentration of the active substance.

b) Based on the results that have been done on the *sheet mask* of brown rice extract and VCO, it can be concluded that the most optimal formula in F1 with an active substance concentration 0.5% more preferred by respondents in hedonic testing with odor, color and texture parameters that are generated.

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