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FORMULATION AND ANTIOXIDANT ACTIVITY TEST OF PEEL-OFF MASK FROM ETHANOLIC EXTRACT OF BUAS-BUAS LEAF (*PREMNA SERRATIFOLIA* L.) WITH DPPH METHOD (2,2-DIPHENYL-1PICRYLHYDRAZYL)

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ABSTRACT

The ethanol extract of Buas-buas (*Premna serratifolia* L.) has a very high antioxidant activity, where antioxidants for facial skincare will be better formulated in topical form compared to oral because the active substances will interact longer with facial skin. One of topical product is Peel off gel mask. The purpose of this study was to determine that the ethanol extract of Buas-buas can be formulated into a peel-off facial mask, and to determine antioxidant activity of peel-off face mask of Buas-buas leaf ethanol extract. The antioxidant activity test was tested using the DPPH (2,2-diphenyl-1picrylhydrazyl) method. Buas-buas were extracted using the maceration method with 70% ethanol. The extract obtained was then added into a peel-off gel mask preparation with variations concentrations 1% (F1), 2% (F2), and 3% (F3). The result showed that the ethanol extract of Buas-buas leaf could be formulated into a gel peel-off facial mask preparation. The organoleptic tests of F3 show that F3 has a typical odor of oleum citri, brownish-green color, a thick texture, and homogen with a pH value of 5.53 ± 0.16, viscosity 66.67 ± 5.77 dPas, spreadability 5.9 ± 0.05 cm, and drying time 25.41 ± 0.16 minutes. Antioxidant activity of F3 is 70.206 ± 0.636%.

KEYWORDS: antioxidant activity, gel peel-off mask, *Premna serratifolia* L.

INTRODUCTION

The development of the technology of medicinal preparations from natural ingredients in Indonesia is currently increasingly rapid, one of which is the formulation of cosmetic preparations from natural ingredients that can increase comfort in use and acceptance in the community. So scientists have researched the efficacy of medicinal plants, one of which is a useful plant as an antioxidant. The use of antioxidants is effective in preventing skin damage due to exposure to ultraviolet light or due to the aging process (Sayuti and Yenrina, 2015). So that antioxidants can help rejuvenate body cells and slow down premature aging (Widyastuti et al, 2016). One natural ingredient that has potential as an antioxidant is Buas-buas (Isnindar et al, 2016).

Buas-buas (*Premna serratifolia* L.) contain secondary metabolites of flavonoids, saponins, tannins, and triterpenoids/steroids, in which flavonoids are known to have antioxidants effect (Liya, 2016). This plant has high levels of flavonoids with total flavonoids of 4.67 mg / g and 0.47% w / w (Palpon, 2017). Besides that, the ethanol extract of Buas-buas has a very high antioxidant activity that is 24.40 µg / mL (Isnindar et al, 2016), where antioxidants for facial skincare will be better formulated in topical compared to oral because the active substances will interact for longer with facial skin (Draelos and Thaman, 2006), one of the topical preparations is a gel peel-off mask which has the advantage of easily drying by forming a film layer easily washed, and giving a cold feel to the skin (Lachman et al., 1986).

The skin is the part that covers the surface of the body and has a function as a natural protector against the effects of sunlight, but it is not effective to withstand excessive exposure to sunlight (Agustin et al, 2013). Excessive exposure to sunlight can cause sunburn and the harmful effects of free radical synthesis which triggers erythema, skin wrinkles, tumors, and skin cancer (Sutriningsih et al, 2017). So that the leaves of wild ethanol extract can be used as a compound that can protect the skin from damage caused by sun exposure, namely as an antioxidant that can help rejuvenate body cells and slow down aging. Based on the background description above, this research needs to be done to find out that the ethanol extract of Buas-buas can be formulated into a gel peel-off facial mask that is useful as an antioxidant.

METHODOLOGY

Materials

The materials used in this study were the ethanol extracts of Buas-buas (*Premna serratifolia* L.), 96% ethanol, methanol p. a Carbomer 940 (carbopol), Propylene glycol, PVA, Methyl Paraben, Propyl Paraben, Oleum citri, Aquadest, DPPH.

Methods

Formulation of peel-off mask of Buas-buas ethanol extract

Gel peel-off mask was made by dissolving the extract in propylene glycol little by little until the extract dissolves completely. Then in a separate place, PVA was dissolved with warm aquadest (80 ° C) until it has fully homogenous (container A). Furthermore, carbopol was dissolved in hot water until it is homogeneous and clear (container B). In another separate container (container C), methylparaben and propylparaben were dissolved into propylene glycol. Then mix container B and container C in a row into container A, then stir until homogeneous. Add the extract that has been dissolved and oleum citri little by little, then stir until homogeneous, then add aquadest to 100 grams. Table 1 showed the formula of peel off mask of Buas-Buas ethanol extract.

Table 1: The formula of peel-off mask of Buas-Buas ethanol extract.

Composition	Concentration (%)		
	F1	F2	F3
Buas Buas Ethanolic Extract	1	2	3
PVA	8,75	8,75	8,75
Propilenglikol	10	10	10
Carbomer 940 (carbopol)	0,5	0,5	0,5
TEA	0,5	0,5	0,5
Metil paraben	0,2	0,2	0,2
Propil paraben	0,1	0,1	0,1
Oleum citri	0,5	0,5	0,5
Aquadest ad	100	100	100

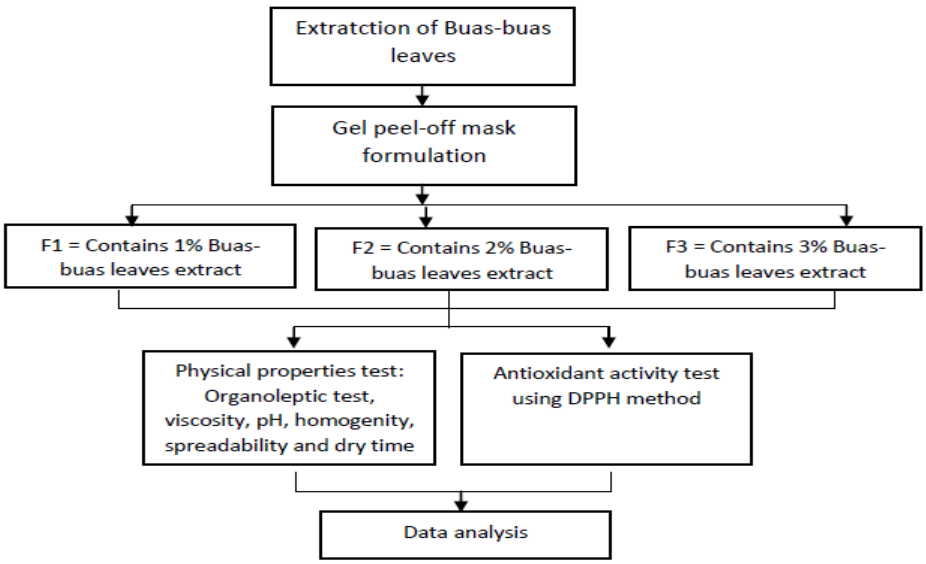
Evaluation of Physical Properties of Gel Peel Off Mask

Physical and chemical evaluation on the preparation of peel-off gel mask of Buas-buas (*Premna serratifolia* L.) ethanol extract which was carried out included observing organoleptic, homogeneity, viscosity, drying time test, dispersion test and pH measurement.

Antioxidant activity test of the gel peel-off mask from Buas-buas

As much as 2.5 grams of the preparation was dissolved with methanol p.a in a 25 mL volumetric flask, then stirred until homogeneous to make 1000 ppm mother solution. Furthermore, several series of concentration levels of the preparation of the mother solution of 1000 ppm were made. Mix 2 mL of each preparation solution with 2 mL DPPH 0.1 mM in methanol p.a, homogenized, then stored in a dark room for 30 minutes. Furthermore, the absorbance of the solution is measured at the maximum wavelength using a UV-Vis spectrophotometer (Sutriningsih et al, 2017).

Reasearch Diagram



RESULT AND DISCUSSION

Buas-Buas leaf extracts in this study were obtained by maceration with 70% ethanol solvent. The selection of this solvent is based on the results of Palpon's research (2017) which shows that the extraction of Buas-buas using 70% solvent produces high total flavonoid levels of 4.67 mg / g and 0.47% w / w. Extraction is a process of chemical separation by using an appropriate solvent to obtain the appropriate chemical content as well. The purpose of extraction is to separate as much of the chemical content as possible so that it is easier to use and can be stored longer. The extraction method used in this study is the maceration method. Maceration was chosen because it can extract compounds well and can prevent the decomposition of compounds which are unstable to heat. Results of Organoleptic Evaluation of Peel-Off Gel Mask of Ethanol Extract of Buas-buas Leaves were shown in Table 2.

Table 2: Results of Organoleptic Evaluation of Peel-Off Gel Mask of Ethanol Extract of Buas-buas Leaves.

Formula	Color	Odor	Texture
1	Brownish Green	Typical oleum citri	Thick, no blobs and homogenous
2	Brownish Green	Typical oleum citri	
3	Brownish Green	Typical oleum citri	

The brownish-green color of the gel is produced from the active substance of Buas-buas ethanol extract. The aroma on the peel-off gel mask is produced from the aroma of oleum citri, and the texture produced from the preparation of the gel peel-off mask is thick. The organoleptic test is intended to obtain gel mask preparations that have attractive colors, odors that can be accepted by the user, and a comfortable form to use considering these preparations are peel-off gel mask preparations so that the aesthetic value of gel peel-off mask preparations must be noted right.

Formula 1, 2, and 3 are brownish green and homogeneous. Armandany et al. (2016), reported that homogeneity is characterized by the absence of secondary particle aggregation, where homogeneity inspection aims to see the distribution of particles from preparations. On the results of homogeneity examination of the gel peel-off mask preparations using glass preparations from the three formulas showed each preparation remained homogeneous and had evenly distributed particles. This is because in all formulations there are no coarse grains and show a homogeneous arrangement or there is no lump in the gel peel-off mask preparation of Buas-buas.

Table 3: Evaluation Results of the Gel Peel Off Mask of of Ethanol Extract of Buas-buas Leaves.

Evaluation	Result			
	F1	F2	F3	Requirements
pH	$5.77\pm0,11^{c}$	5.71 ± 0.03^{b}	5.53 ± 0.16^{a}	4,5-6,5
Viskosity	46.67 ± 5.77^{a}	56.67 ± 5.77^{b}	66.67 ± 5.77^{c}	< 300 dPas
Spreadability	6.2 ± 0.15^{c}	6.0 ± 0.02^{b}	5.9 ± 0.05^{a}	5-7 cm
Dry Time	30.00 ± 0.11^{c}	28.25 ± 0.03^{b}	25.41 ± 0.16^{a}	15-30 menit

Notes: a-c in the same row with lower case letters differ significantly with the level of concentration of the ethanol extract of Buas-Buas leaves ($p < 0.05$)

The results of the pH measurement of the peel-off gel mask preparation can be seen in Table 3, where the average pH value in the three formulas ranges from 5.53 ± 0.16-5.77 ± 0.1. The results of the three pH values according to the pH range of human skin. Tranggono and Latifah (2007), reported that the pH range of preparations must follow the skin pH which ranges from 4.5 to 6.5. If the pH of the preparation is outside the skin's pH interval it is feared that it will cause scaly skin or even irritation while if it is above the skin's pH it can cause the skin to feel smooth, dry quickly, and can affect skin elasticity. Based on tests conducted preparations are still in the range of pH values within the safe limit for topical preparations, which are between 4.5-6.5.

Viscosity testing is an important factor because it affects the spreadability parameters and active substances of the gel mask preparation. Besides, gels that have optimum viscosity will be able to hold the active substance remains dispersed in the gel base and increase the consistency of the gel (Madan and Singh, 2010). Viscosity measurements of the three formulas of peel-off gel mask preparations were carried out using a Rion VT-06 viscometer with a viscometer stirring number 2, where based on the results in table 4, the average viscosity values in the three formulas ranged from 46.67 ± 5.77 dPas-66.67 ± 5.77 dPas. All three formulas have good viscosity values because the viscosity test results obtained are still within the range of good peel-off gel mask viscosity values <300 dPas (Rahmawanty, et al., 2015).

Based on the spread test results in table 3, the average spreadability of the three formulas ranges from 5.9 ±

0.05 cm-6.2 ± 0.15 cm, where all three formulas have good spreadability because they are following the spreadability requirements for topical preparations, within 5-7 cm (Tranggono et al, 2007). A gel with good dispersion will be able to spread evenly on the skin so that the resulting effect is evenly distributed. Also, the viscosity of preparation affects the extent of its spread. The smaller the viscosity of preparation, the greater the spread. Scattering is related to the dispersal properties of peel-off gel when used in topical preparations. The greater the spread power, the surface area of the skin in contact with the gel will be more extensive and active substances will be well distributed. A gel that has a large dispersion so that it can be applied to a wide surface of the skin without excessive pressure.

Testing the time for gel to dry in gel peel-off mask preparations aims to determine the speed of the mask forming film on the skin. Beringhs et al. (2013) reported that the principle of a peel-off mask is based on the ability to form films that are easily peeled when applied to the skin. Based on the test results of drying time in table 4, the average drying time in the three formulas is around 25.41 ± 0.16 minutes -30.00 ± 0.11 minutes, where the three peel-off gel mask formulas still meet the dry time of a good peel-off gel mask, which is between 15- 30 minutes (Beringhs et al., 2013). Polyvinyl alcohol in masks plays a role in giving a peel-off effect because it has adhesive properties so it can form a film layer that is easily peeled off after drying. The concentration of proper PVA administration is the most important factor influencing the performance of film formation in peel-off face masks (Brick et al. 2014).

The principle of the DPPH test is a color removal for antioxidants that directly reaches DPPH radicals by monitoring absorbance using a UV-Vis spectrophotometer. DPPH radicals with centralized organic nitrogen are stable free radicals with a dark purple color which, when reduced to a non-radical form by antioxidants, turn yellow (Bendra, 2012).

Table 4: Test Results of Antioxidant Activity (% Inhibition) Peel OFF Gel Mask Extract of Ethanol Leaf of Buas-buas.

Formula	% Inhibition
1	43.236 ± 0,885 [a]
2	56.089 ± 1.328 [b]
3	70.206 ± 0.636 [c]

Notes: a-c in the same row with lower case letters differ significantly with the level of concentration of the ethanol extract of Buas-Buas leaves ($p < 0.05$)

The results of testing the antioxidant activity (% inhibition) of the gel peel-off mask formula of Buas-buas ethanol extract in table 4 showed the average% inhibition ranges from 43,236 ± 0.885% - 70,206 ± 0.636%, whereas formula III (ethanol extract of Buas-buas of wild bears 3%) has the highest antioxidant activity (% inhibition) that is equal to 70,206 ± 0.636%. This is due to the DPPH radical capture activity of phenolic and flavonoid compounds contained in Buas-buas, which according to Palpon's research (2017) states that Buas-buas have high levels of flavonoids with total flavonoids of 4.67 mg / g and 0.47% w / w. Flavonoid compounds act as antioxidants because they have hydroxyl groups that can release protons in the form of hydrogen ions. The hydrogen ion has only one proton and has no electrons, so the radical electron contained in the nitrogen atom in the DPPH compound binds to the hydrogen ion and produces a reduced DPPH (Gurav et al., 2007). Radicals in DPPH can be reduced when reacting with hydrogen donors contained in phenolic compounds (Maisarah et al., 2013).

CONCLUSION

The ethanol extract of Buas-buas (*Premna serratifolia* L.) can be formulated into a gel peel-off mask preparation. The peel-off gel mask formula with a concentration of ethanol extract of Buas-buas (*Premna serratifolia* L.) 3% meets the test requirements with the results of the organoleptic test that is characteristic of oleum citri, has a brownish-green color and has a thick texture. Homogeneity test which has homogeneous results with a pH value of 5.53 ± 0.16, a viscosity of 66.67 ± 5.77 dPas, a dispersion power of 5.9 ± 0.05 cm, a drying time of 25.41 ± 0.16 minutes and antioxidant activity (% inhibition) of 70,206 ± 0.636%.

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