EFFECT OF INCREASING CETOSTEARYL ALCOHOL CONCENTRATION AS THICKENING AGENT ON PHYSICAL STABILITY SCALPS NONI FRUIT **(*Morinda citrifolia* L.)** *EXTRACT LOTION*

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ABSTRACT

Noni fruits contain scopoletin. It known as inhibiting agent for Pityrosporum ovale growing, the dandruff floral factor. To get the optimum effect, the 96% ethanol extract of noni fruit (Morinda citrifolia.L) formulated into scalp lotion with cetostearyl alcohol as a thickening agent. This research aimed at knowing the effect of increasing cetostearyl alcohol concentration as thickening agent on physical stability of the scalp lotion 96% ethanol extract of noni fruit. Firs step of research was made noni fruit juice, followed by freeze drying process untill powder of noni juice formed. Second step the powder was extracted by maceration method followed by vacuum evavorated it to obtain viscous noni fruit extract. Scalp lotion made into 4 formulas were: F1 (0.5%), F2 (1%), F3 (1.5%), F4 (2%). Each formula was evaluated every week for 6 weeks in room temperature (± 25°C) for organoleptic, homogeneity, emulsion type, pH, viscosity, density and separation phase test. The viscosity data were analyzed by a theoretical approach and one-way ANOVA. Significant value obtained of ANOVA $p<0.05$ means that there are significant differences in each formula, so it followed by Tukey HSD test. Based on analyzed of all data, it can be concluded that increasing concentrations of cetostearyl alcohol can increase the physical stability of scalp noni fruit extract lotion.

***Key words** : Scalp lotion, Cetostearyl alcohol ,Thickening agent, Noni fruit.*

INTRODUCTION

Dandruff is one of hair healthy problem, especially for greasy hair. Some of factor for dandruff problem are microorganism floral infection, hormonal, and mental stress. The floral microorganism was surely as the main factor known Pityrosporum ovale synonim as Malassezia furfur. Based on this fact, to overcome dandruff problem might be killed or decreased the floral factor (Wasitaatmadja, 1997).

Nowadays, developing of antidandruff dosage form use natural resources active ingredients. One of it that had been researched is morinda extract. The extract showed activity on killing Pityrosporum ovale with minimum inhibition concentration (MIC) 9% as 25.78 mm of area inhibition zone (Maryanti, 2000). The compound that was predicted as active ingredient of Morinda extract is scopoletin (Yuliarti, 2010). Another research try to use morinda extract as antidandruf shampoo's active ingredient. The result showed that the shampoo fullfilled of standard good quality of shampoo on 2.5-22.5% of extract (Febrihastuti, 2000).

Every dosage form has some lacks and advantages. The lacks of shampoo are short-contact time with head skin and alkalicity of shampoo can destroy hair cuticula (Tranggono and Latifah, 2007). To overcome this problem, developing dosage form which might be long-contact time on head skin is preferable. Scalp lotion is one of kinds of longterm-contact to be develop. It is liquid suspension or emulsion with o/w (oil in water) emulsion type. Scalp has lower viscosity than cream or gel. The advantage of scalp is more free-flowing than cream, easy to use on hairy head skin, and economically is low cost (Ansel, 1989).

To obtain good stability of scalp lotion, ought to use thickening agent on formulation, in apropriate concentration. The ordinary thickening agent in scalp lotion formula are fatty alcohol compound i.e. cetyl alcohol, stearyl alcohol and cetostearyl alcohol (Barel, et al., 2000). All of compounds are different on structure, couses different on their melting point temperature and polarity. More long of C chains on it structure more high on their melting point, and so do on their polarity. On the other hand, existing of unsaturated C (double chains), couses lower of melting point. All of this characteristic could be give different viscosity and stability, if they are used as thickening agent on scalp lotion formula (Presents, 2007).

This research try to develop formulation of scalp lotion using Morinda extract as active ingredients with cetostearyl alcohol as thickening agent. Cetostearyl alcohol is

combined compound of cetil alcohol and stearyl alcohol. This combining compound has some advantages as well as each property i.e. smooth texture, uniritated, safe to use, high water trapped so has good moisturizing property (Rowe et al., 2009). Using as thickening agent in scalp lotion only in low concentration less than 2.5%. In this research the concentration subsequently 0.5, 1.0, 1.5, and 2.0%.

METHOD

Instruments and Materials

Analytical balance, pH meter, Viscometer, Centrifuge, Oven, Mixer, Hot plate, Freeze dryer, Microscope, picnometer, and others of glasses ware.

Morinda Fruit, Ethanol 96%, HCl, Bouchardat &Mayer reagent, Cetostearyl alcohol, TEA, Stearic acid, Glycerine, Isopropyl Myristate, Dinatrium EDTA, Propyl Paraben,Metyl Paraben, and Methylen Blue

Scalp Lotion Formula

See Table I

Table I. Scalp Lotion Formula

Material	***F1 (%)***	***F2 (%)***	***F3 (%)***	***F4 (%)***
Morinda Extract	*8.3*	*8.3*	*8.3*	*8.3*
TEA	*1*	*1*	*1*	*1*
Stearic acid	*1.5*	*1.5*	*1.5*	*1.5*
Cetostearyl alcohol	*0.5*	*1.0*	*1.5*	*2.0*
Glycerol	*8*	*8*	*8*	*8*
Isopropyl Myristate	*5*	*5*	*5*	*5*
di-Na EDTA	*0.1*	*0.1*	*0.1*	*0.1*
Nipagin	*0.18*	*0.18*	*0.18*	*0.18*
Nipasol	*0.02*	*0.02*	*0.02*	*0.02*
Aqudest ad	*100*	*100*	*100*	*100*

Producing Morinda Viscus Ethanolic Extract

Morinda fruits were the specific quality fruit, about 25 kg, it was made juice. The juice was mixed with 20% of maltodextrin, followed by powdering the juice using freeze dryer on -50^{o}C, 5 mmHg air pressure for 48 hours. The produced powder followed macerating to obtain extract using 96% ethanol as solvent. The extract was eavporated by rotary evaporator on 5 rpm and 50^{o}C, become viscus extract.

Scalp Lotion Producing

Made of Water Phase:

Dissolve TEA in hot water (1 : 1), mean while dissolve EDTA in water and mix glycerol with methyl paraben. Mix all the solution and warmed it, add morinda extract into the mixing solution thoroughly.

Made of Oil Phase:

Put on medium porselein cup stearic acid, cetostearyl alcohol, isopropyl myristate, and propyl paraben together, heat them untill melt on about 70^o – 75^{o}C. Add water phase into this mixing and mix use mixer till the homogenous emulsion was form.

Scalp Lotion Evaluation

1. *Organoleptic observation*
2. *Homogeneity test*
3. *Viscosity test*
4. *Observation of pH*
5. *Observation of emulsion type*

Destability Test

Centrifugation Test) and Cycling Test (Lachman, 1976)

Data Analyses

Data analyses use Anova Test followed by Tukey HSD test for viscosity data.

RESULTS AND DISCUSSION

Morinda Extraction

The extract of 25 Kg noni fruit was obtained 641.67 g. It means the rendemen of extraxt was 2.57%. To make the formula, it could be count for concentration equal to 9% of 2.79% (previous research) was 8.3% (Maryanti, 2000).

Organoleptic of Extract (see Table II)

Table II. Morinda Extract Properties

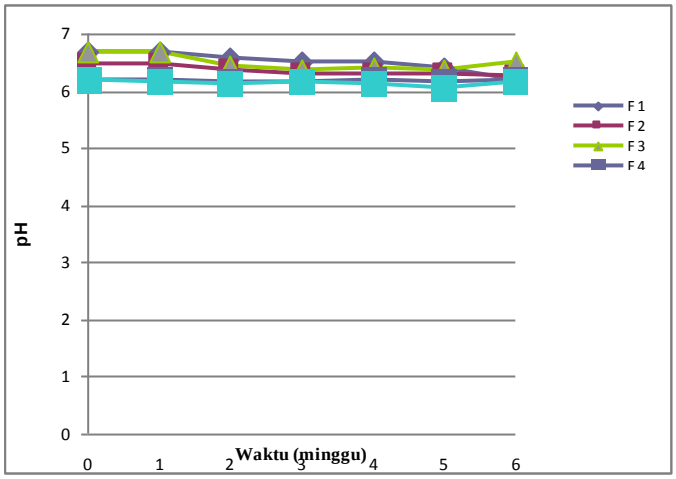
Observation	***Results***
Organoleptic	*Physical Form : Viscus Liquid*
	Color: Browny Black
	Smell: Specifics of Noni Fruits
Phytochemical test	*(+) alkaloids*
pH	*3.58*
Density	*1,866 g/ml*
LOD	*8,6%*

For physic data, see Table III

Table III. Physical Properties of Scalp Lotion

Formula	Consistency	Smell	Color	Homogeneity
F1	Low Viscous	Specific	Brown	Homogen
F2	Viscous	Specific	Brown	Homogen
F3	Viscous	Specific	Brown	Homogen
F4	High Viscous	Specific	Brown	Homogen

For 6 weeks observation, obtained the homogeneity data and all organoleptic data were stable along observation period. Its mean that the formulas were stable. Observation of pH plotted on graphic (see Pigure 1.)



Pigure 1. Plot of pH Data for 6 Weeks Period

Table IV. Result of Cycling Test

Formula	Cycle 1		Cycle 2		Cycle 3		Cycle 4		Cycle 5		Cycle6	
	4° C	45° C	4° C	45° C	4° C	45° C	4° C	45° C	4° C	45° C	4° C	45° C
F1	-	+	+	+	+	+	+	+	+	+	+	+
F2	-	-	-	-	-	-	-	-	-	-	-	-
F3	-	-	-	-	-	-	-	-	-	-	-	-
F4	-	-	-	-	-	-	-	-	-	-	-	+

On pigure 1, we can see that the pH of all formulas were relatively stable. The pH values on first week were 6.19-6.70 and on 6th week were 6.17-6.50. The differences of pH value was still in the allowance range, it means that the formula was

unirritance, cause destroyed of skin mantle which always covered skin from microorganism harm (Djuanda, 2010).

Emulsion type observation was used 2 methods i.e. dilution and color test. The results of dilution test see on pigure 2 and color test see on pigure 3.

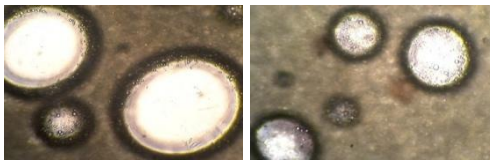
The obtained of these tests was o/w emulsion type and it formula was stable till 6th week.

Cycling test and centrifugation test were used for separation phase evaluation (dehomogeneity test). The results of these test can you see on Table IV and Table V.

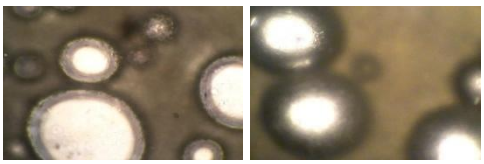
Separation phase test was used to predict expired of dosage form, especially for emulsion kinds. Cycling test was done for 6 cycles, put on 4°C for 48 hours followed put on 45°C fo 48 hours too. The results of this test were: F2 and F3 were stable, mean while the F1 and F4 were unstable formulas. These fact showed because of concentration too low on F1 and too high on F4. Too low concentration cause unstable emulsion phase on extreme condition (Lachman, 1994). Too high concentration on F4 because of uneffective concentration. It made proportion of thickening agent and co-emulgator was inapropriate, so the formula was unstable (Rowe, et al., 2009)

(a) By Water *(b) By Oil*

Figure 2. Dillution Method for Emulsion Type Test



F1 F2

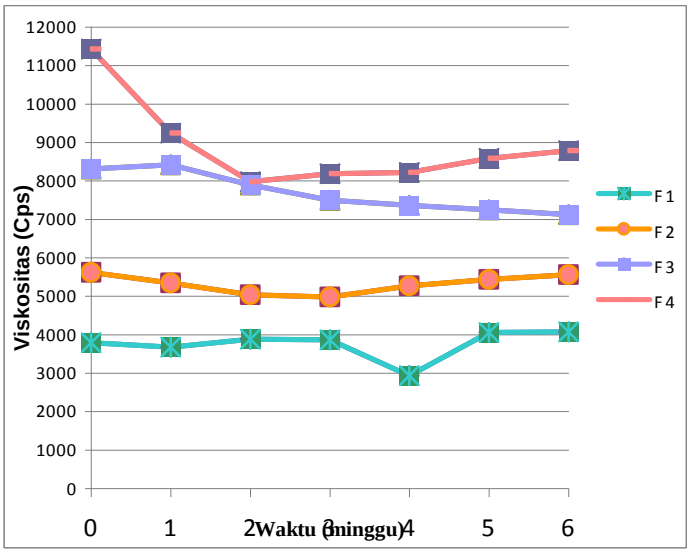


F3 F4

Figure 3. Microscopic Color for Emulsion Type Test

As Stoke's law, gravitation can give effect on stability. Base on this law, centrifugation can show stability of formula (Lacman, 1994). The results of observation showed that F1 was unstable in 30 minutes of centrifugation, mean while the others were stable. On 60 minutes later showed that F1 and F4 were unstable but F2 and F3 were stable. Instability of formulas due to high density of extract.

Viscosity observation were done for 6 weeks, the results could be seen on pigure 4. Differences of cetostearyl acohol in every formula gave differences of viscosity. It occured due to cetostearyl alcohol properties that can make up complex micro structure i.e liquid crystal, lamellar structure, and gelphase, if it combined with another surfactant (rowe, et al., 2009). Additing of cetostearyl alcohol concentration on F4 was not increasing of viscosity but decrease for 505 Cps, it is the largest decreasing of viscosity compared the others formula. Decreasing of viscosity showed unstability of a dosage form (Lachman, 1994). It showed that in scalp lotion have to add cetostearyl alcohol with apropriate concentration, lower than 2% (Barel et al., 2000).



Pigure 4. Viscosity Observation of All Formula for 6 Weeks

One way ANOVA followed Tukey HSD test was used in data analyses of this research. The results of analyses showed that there were significant differences onANOVA test. Followed by Tukey HSD test showed every formula has significant difference. It means that increasing concentration of cetostearyl alcohol as thickening agent gave

increasing of physical stability in scalp lotion formula, although in the highest formula it was not give the best stability.

CONCLUSION

Increasing of cetostearyl alcohol as hickening agent on scalp lotion of morinda extract, could increased physical stability of lotuon formula.

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