
Study on the Safety and Efficacy of Amphiphilic Multi-Emulsion Lipstick

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Abstract

In manufacturing emulsion lipstick in the past, heat and emulsify oil phase made with oil, wax and lipophilic emulsifier with water phase together; and then mold above-mentioned materials, so-called lipophilic emulsified lipstick production method has been used. However it is hard to manufacture products using the above said method and furthermore, weak in moisturizing effect, lip care and stability.

In this paper, I will discuss about multi-emulsion lipstick complementing already existing emulsion lipstick in terms of stability, giving moisturizing effect of lip, and outstanding protection effectiveness of skin by safely gelatinating the state between amphiphilic lipid and water in stable.

1. Introduction

Since lip is totally different from the rest of common skin, if proper moisturizing can't be maintained, the state of lip's roughness and crack becomes accelerated due to environmental factors and lip's internal factors as well. Lip protection can't be well done using merely oil and wax, so is Oil Seal. In addition, lipstick using lipophilic emulsifier doesn't have strong water repellency in terms of its function and give satisfied long lasting effect as well.[1]

In general, when diagnosing emulsion lipstick formula, flocculation phenomenon can be caused if water and inorganic pigment are mixed together. Accordingly, stickiness and roughness are caused after using it and down of chroma is caused along as the time passes.

In addition opaque phenomenon(covered with white) is caused when painting it on lip. Due to evaporating of the surface of lipstick, outer luster is deeply damaged. In addition to it, the size of lipstick is irregularly getting smaller and smaller. What is worse, the body of lipstick can get bent irregularly. [2]

Therefore, in order to complement above-mentioned defects I have newly developed multi-emulsion lipstick with amphiphilic lipid which is further strengthened in color long lasting effect and moisturizing effect on the lip, that is, lipstick's original function. Let water covered by the lamella structure remain as bound water combined with ionic bond and hydrogen bond; it stays longer on the lip in the form of moisture. [3-10]

2. Material and Method

2.1. Experimental Material

Lipid base used in this experiment is sitosterol, cholesterol, POE- sitosterol; water phase components of DEA-cetylphosphate, glycerine are used; moisturizing components of sodium hyaluronate, tocopherol acetate are also used. Purified water passed through the anion-cation exchange resin is used. Materials in this experiment is used for cosmetics.

2.2. Experimental method

2.2.1. Production method of amphiphilic lipid base

Heat and dissolve (A) phase in 95°C; add (B), (C)phase dissolved in 85°C; moisturize above said materials in 95°C for 30 minutes; evenly disperse them using Homo Mixer; and have them go through the High Pressure Machine two times in a row, and then, refrigerate them down to 30°C below zero. (Table 1)

2.2.2. Multi-emulsion lipstick production method

Heat and dissolve lipid base produced by amphiphilic lipid base production method, wax and oil in 90°C; and evenly dispersing finished components of the above said by Scraper Mixer, mold them. (Table 2)

2.2.3. Emulsion lipstick production method

Disperse and dissolve (A) phase in 90°C using Scraper Mixer; dissolve (B) phase in 85°C; and then emulsifying (A) & (B) phase using Homo Mixer for 30 minutes, mold above mentioned materials. (Table 3)

2.2.4. The Measurement of multi emulsion lipstick moisturizing effect.

1) Evenly paint the quantity of 0.002g/mm² on lip; magnify it by 35 times using Image Analyzer(Nexus.corp); analyze it on the monitor by 3-Dimension Skin System Program; and then, measure the number of wrinkle peak.

2) Evenly paint the quantity of 0.002g/mm² on lip; magnify it by 35 times using Image Analyzer (Nexus.corp); analyze it on the monitor by 3-Dimension Skin System Program; and then measure the depth of the wrinkles.

2.2.5. Comparison the holding amount of moisture between a multi emulsion and an emulsion lipstick.

Evaporate water at 105°C, and estimate losing volume of moisture by the hour using Mechanical Convection oven.

2.2.6. Confirm amphiphilic quality of multi emulsion and general lipstick

Cur lipstick laterally; drop a drop of water on it; after 30 minutes compare angle of water between two above-mentioned lipsticks.

2.2.7. Confirm the formation of the multi lamellar vesicular liposome

In order to confirm the formation of multi lamellar vesicular input vitamin made by MLV liposome production method into the vesicular and measure it using Freeze-Fracture Scanning Electron Microscopy.

2.2.8. Comparison the stability between a multi emulsion and a emulsion lipstick

Produce lipsticks containing the same amount of water and observe them for the period of 6 months whether or not opaque phenomenon (covered with white)

3. Results and Discussion

3.1. Measurement of moisturizing efficacy between a multi emulsion and a emulsion lipstick

In general, the differences between common skin and lip are shown at table 4, and the relations between number and depth of skin-wrinkle peak is shown at table 5.

As shown at Figure 1, considering the number of wrinkle-peak is great and the depth of wrinkle is decreasing in terms of measurement-value of moisturizing effect of multi-emulsion lipstick corresponds well against outer circumstances and is to recover the function of skin elastic power.

3.2. Measurement of moisture holding volume between a multi emulsion and a emulsion lipstick

Each and every value of moisturizing effect of lipstick are shown at Figure 2.

Considering the loss of moisture through dehydration the same amount of water is used on above-mentioned lipsticks. However, moisture is more evaporated from emulsified lipstick in the process of production by reasoning backward.

3.3. Confirm amphiphilic quality of multi emulsion lipstick and general lipstick

Cur lipsticks laterally; drop a drop of water on them; and in Figure 3 slide of angle of water is shown after 30 minutes went by.

Considering water angle in multi emulsion lipstick is getting smaller we can see that it has a good reaction with water, the quality of amphiphilic lipid.

3.4. Measurement of the formation of multi lamellar vesicular liposome

In order to confirm whether MLV base to form liposome it is scanned by freeze fracture scanning electron microscopy and is shown at Figure 4.

It forms lamella structure as shown at Figure 4.

Interval of lamella repetition is firstly caused by a mix with water. The size of particle is 0.50 - 3.90 μm.

3.5. Stability measurement of multi emulsion lipstick and emulsion lipstick.

The stability of products holding the same amount of moisture is shown at Figure 5. Although both products holding the same amount of moisture were produced, opaque phenomenon (covered with white) has appeared

in general amphiphilic lipstick after 3 days and it(covered with white) gets worse. At last, stability of formation came out bad.

4. Conclusions

In this study stable amphiphilic multi emulsion lipstick is produced by structuring (lipid components) into water components and lamella, which is the most similar type to the human skin-structure components and I have reached following conclusions.

1. It is proved that water covered by lamellar structure exists as water in the form of ion-bond and hydrogen-bond and moisture on the lip stays longer.

2. It is proved that giving sustaining-power of color which is a original function of lipstick and further strengthened moisturizing efficacy on lip.

3. It is proved that this multi emulsion lipstick production method solve flows of emulsion lipstick flocculation phenomenon caused by mixing water and inorganic pigment, and thus the sense of use gets sticky and rough; chroma deteriorates as the time passes; opaque phenomenon (covered with white) when using it on lip.

References

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Phase	Materials Name		Production Method
A	POE-sitosterol	3.00	(A)→ Heat & Dissolve
	Cholesterol	3.00	↓
	Sitosterol	4.00	Wetting← (B), (C)
	Polyoxyethylene ether	4.00	↓
			Homogeneous Dispersion
			↓
			Passing through H.P.M
			↓
			Cooling
			↓
			Completion
B	DEA-cetylphosphate	1.00	
	Glycerine	3.00	
	Preservatives	0.20	
	Purified Water	30.00	
C	Sodium hyaluronate	35.00	
	Tocopherol acetate	16.80	

Table 1. The Manufacturing Method of Amphiphilic Lipid Base

Phase	Materials Name		Production Method
Lipid Base	POE-sitosterol	0.60	Lipid Base
	Cholesterol	0.60	↓
	Sitosterol	0.80	Homogeneous Dispersion
	Polyoxyethylene ether	0.80	↓
	DEA-cetylphosphate	0.20	Basic Materials
	Preservatives	0.20	
	Purified Water	6.00	↓
	Sodium hyaluronate	7.00	↓
Basic Materials	Tocopherol acetate	3.36	↓
			Molding
	Ozokerite	2.70	
	Rosin	0.80	
	Paraffin	4.85	
	Candelilla Wax	6.00	
	Oleyl alcohol	19.00	
	Diisostearyl malate	30.00	
	Pigments	12.60	
	Cyclomethicone	4.40	
Perfume	0.80		

Table 2. The Manufacturing Method of Multi Emulsion Lipstick

Phase	Materials Names		Production Method
A	Paraffin	15.00	(A) → Disperse &
	Candelilla wax	9.00	Dissolve
	Liquid paraffin	15.00	↓
	Pigments	10.00	Emulsify ← (B)
	Preservatives	0.05	↓
	Perfumes	0.10	↓
	Glyceryl monooleate	3.00	↓
	Sugar ester	1.20	Molding
B	Purified water	6.00	
	Propylene glycol	7.00	
	1,3-Butylene glycol	3.36	

Table 3. The Manufacturing Method of Emulsion Lipstick

	Skin	Lip
Sebum Membrane	Being	Not Being
Horney Layer	Being	Not Being
N.M.F	0.76 ~ 1.27 (10 ⁻⁹ mol/mg)	0.12 (10 ⁻⁹ mol/mg)
Evaporation Speed of Water	11 ~ 19 (g/m ² /hr)	40 ~ 78 (g/m ² /hr)
Water Holding	30 ~ 39 (μΩ)	16 ~ 25 (μΩ)
Characteristics	Slow Drying	Fast Drying

Table 4. The Comparision with Skin and Lip

	In Summer	In Winter
Skin Type	Young Skin	Old Skin
Wrinkle Peak value	Elastic	Not Elastic
Wrinkle Depth	Thin	Deep
Characteristics	Elastic and against outer circumstances	Not elastic and not against outer circumstances

Table 5. The Relation of peak value and Wrinkle Depth
(By Result of Japan Yakurut Lab.)

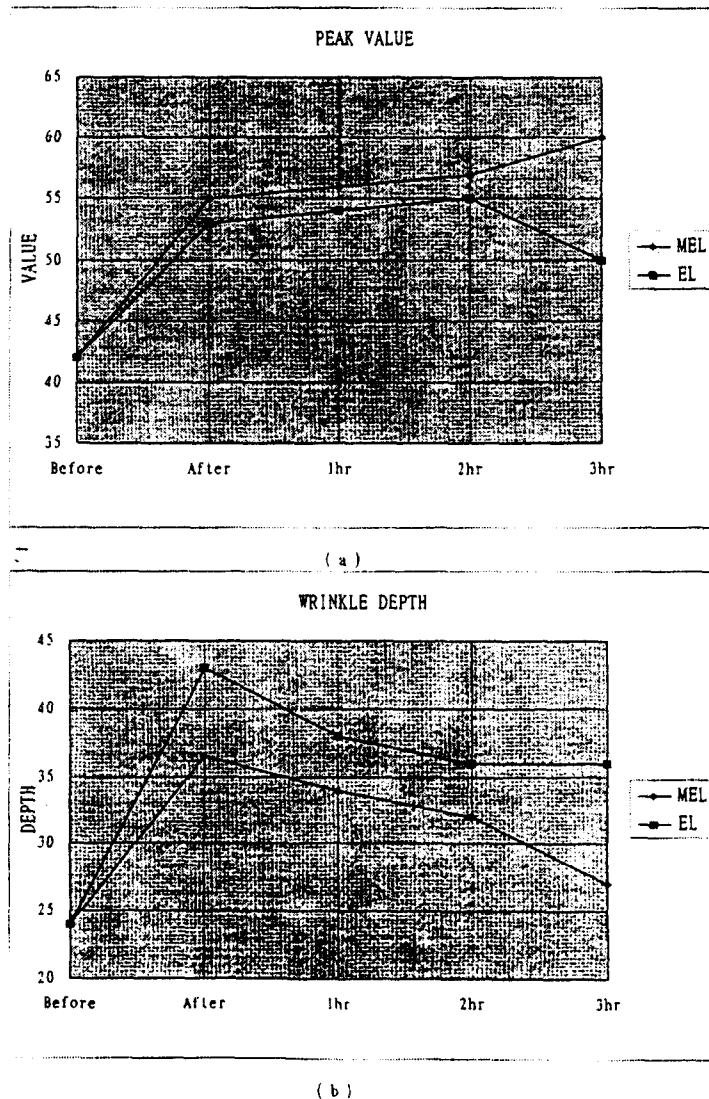


Fig. 1 The Measurement Results of Moisturizing Efficacy after 3hr

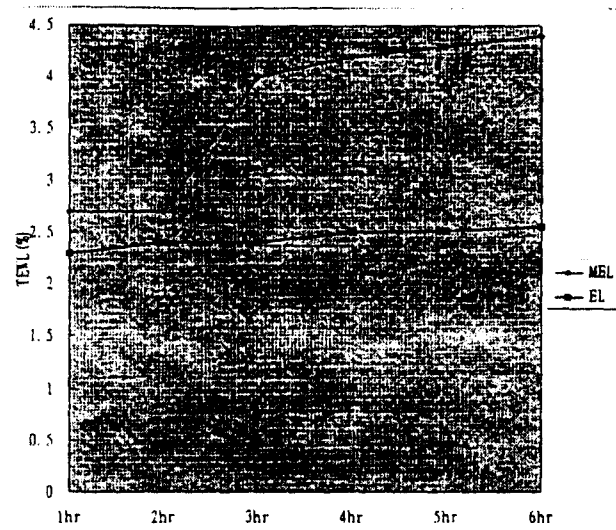
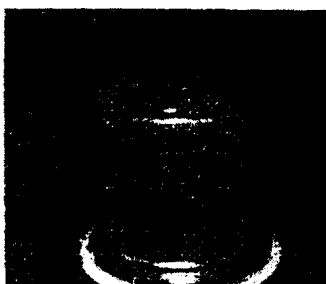


Fig. 2 The Measurement Results of TEWL at 105°C by Mechanical Convection Oven

Fig. 3 The Confirmation of the Amphiphilic Characteristic.



(MEL)



(EL)

Fig. 4 Scanning Electronic Microphotograph
Obtained after Freeze-Fracture of the MLV.
(a)x16,000, (b)56,000

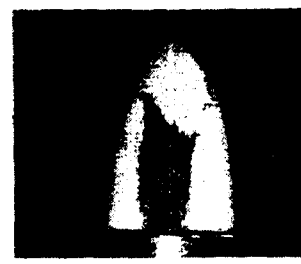
Fig. 5 The Color Stability of MEL, EL after
6 months Storage at 25°C



(a)



(MEL)



(EL)



(b)