



Cosmetics Material Research of FRO Extract

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Abstract

Purpose: In this study, skin and lotion containing 10% FRO were prepared to compare the skin improvement effects. **Research design, data and methodology:** After using cosmetics containing FRO ingredients, analysis was performed for 6 weeks. **Results:** As a result of measuring the moisture and elasticity of the pores, significant results were obtained only in the pores when used for 2 weeks between the experimental group and the control group ($p < .001$). Also after 4 weeks of use, moisture ($p < .05$) showed significant results, and after 6 weeks of use, moisture ($p < .01$) and elasticity ($p < .001$) showed significant.

Keywords : Fermented *Rhus verniciflua* stokes, *Orostachys japonicus*, A. Berger(FRO), Cosmetics, Skin

JEL Classification Codes : I12, I15, I31

1. Introduction

While the standard of living in the modern society is increasing and prospering, interest and demand for cosmetics using natural materials are increasing due to the acceleration of aging. Natural extracts are emerging as cosmetic materials as the effects of skin physiological activity related to antioxidant, antibacterial, anti-inflammatory, and anti-aging of natural plant extracts are known (Ann et al., 2004).

Rhus verniciflua Stoke, a natural substance, is a deciduous broad-leaved tree belonging to the Sumacaceae family, and has a large amount of antioxidants as an effective material for the human body. The composition of lacquer tree contains 55-70% of urushiol, a phenolic compound, 4-

8% of rubber, 2-3% of nitrogen content, 10-40% of hydrogen and water, 1-2% of flavonoids, other adenosine, and a number of oxidizing enzymes. It is composed of polysaccharides, proteins, and other substances (Park et al., 2010). Although lacquer contains urushiol, which causes contact dermatitis such as blisters, itching, and rash, polyphenols and flavonoids contained in lacquer have antioxidant (Jung, 1998; Kim, 2003; Choi et al., 2008) anti-inflammatory and antibacterial and α -glucosidase inhibitory effects. etc. have been reported to exist (Lee et al., 2009; Kim et al., 2010; Kim et al., 2010). Also Fermented *Rhus verniciflua* Stokes has been reported to have excellent anti-inflammatory effects, MMP-1 expression aging inhibition, and melanogenesis inhibition (Kim & Kim, 2015).

Wasong(*Orostachys japonicus* A. Berger) is a perennial

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herbaceous plant in the family Crassulaceae, and the physiologically active components of antioxidant and anticancer action, as well as basic nutrients such as minerals, are high in the wasong collected from August to October. Active ingredients of Wasong include the triterpenoids friedelin, epi-friedianol, glutinone, and sterol-based substances β -sitosterol and campesterol, and flavonoids and aromatic acids 4-hydroxybenzoic acid, 3,4-dihydroxybenzoic acid, gallic acid, a tannin-based substance, kaempferol, a flavonoid, quercetin, and fatty acid esters (Choi et al, 2012; Choi et al, 2008; Park et al, 1994). Wasong has antioxidant, anti-melanin, anti-inflammatory, and anti-aging effects, and β -sitosterol, an anti-inflammatory active substance, is used for the treatment of inflammatory diseases that can inhibit the generation or activity of major inflammatory mediators for various inflammatory diseases such as arthritis. It has been reported that it can be used (Choi et al, 2008).

Also studies on the physiological activity and clinical efficacy of *Orostachys japonicus* A. Berger Extract reported that it has anti-oxidation, anti-melanin, anti-inflammatory, and anti-aging effects (Jung, 2016).

Therefore, this study aims to find out whether there is a relationship with changes in pores, moisture and elasticity when acne cosmetics containing fermented *Rhus verniciflua* Stokes and *Orostachys japonicus* A. Berger complex extract are prepared and used, and to verify the effect of improving skin.

2. Methods and Materials

2.1. Data Collection and Analysis

This study was conducted with 26 experimenters who agreed to participate in the experiment, and the study period lasted 6 weeks from September 7th, 2020 to October 21st, 2020.

In order to minimize the variation in the results of the clinical group, the experimental group and the control group were divided by random assignment. Experimental group and control group were divided into two groups of 13 people each, and FRO toner and lotion were provided to the study subjects to use twice a day, morning and evening. For skin condition analysis moisture, elasticity, pores were measured at 2, 4, and 6 weeks using a skin testing machine. In order to examine the improvement of the skin, a clinical study was conducted with approval (IRB EU19-83-01) from the Ethics Committee of Eulji University.

Statistical analysis of the data from this study was performed using the SPSS 22.0 program. Independent sample t-tests and mean \pm standard deviation (M \pm SD) of the experimental group and the control group and were used

and significance levels were judged based on 0.05.

Table 1: Distribution and explanation according to skin condition

Item	Reference range	Skin condition
Moisture	1-19	very little
	20-29	little
	30-39	normal
	< 40	a lot
Elasticity	1-24	very low
	25-44	normal
	45-54	high
	< 55	very high
Pores	< 8	very wide
	6-8	wide
	4-6	slightly wide
	1-4	normal

2.2. Manufacturing of FRO

As for the fermented *Rhus verniciflua* Stoke extract a commercially available product of detoxified lacquer tree fermented extract from which urushiol has been removed based on Patent No. 10-1089176 was used (Kim, 2016). For *Orostachys japonicus* A. Berger extraction, the sample is contained in 70% fermented ethanol aqueous solution, and the solvent is extracted for 72 hours at room temperature in the range of 20 to 25 °C, Japan) to obtain a 70% ethanol aqueous solution extract by second filtration (fig 1). FRO was prepared by mixing fermented lacquer extract and 70% fermented ethanol extract of wasong in a 1:1 ratio and concentrating the flask under reduced pressure while bathing the flask in a heated water tank maintained at 45°C.

2.3. Preparation to Cosmetic Sample

Toner and lotion containing 10% of FRO for clinical trials were prepared and used in the experimental group, and a lotion of the same component that did not contain FRO was prepared and used in the control group. The manufactured cosmetics were used in the experiment after securing safety by observing physical, chemical and microbiological stability, container compatibility, physical property change, foreign material formation and uniformity, odor, color, pH, viscosity, etc. for 4 weeks. The cosmetic formulation used in this experiment is as follows (Table 2, 3)

2.4. Measuring Instrument

A skin measuring device (A-One Tab with Wi-Fi, Skin & Hair, BOMTECH ELECTRONICS CO., LTD, KOREA) was used.

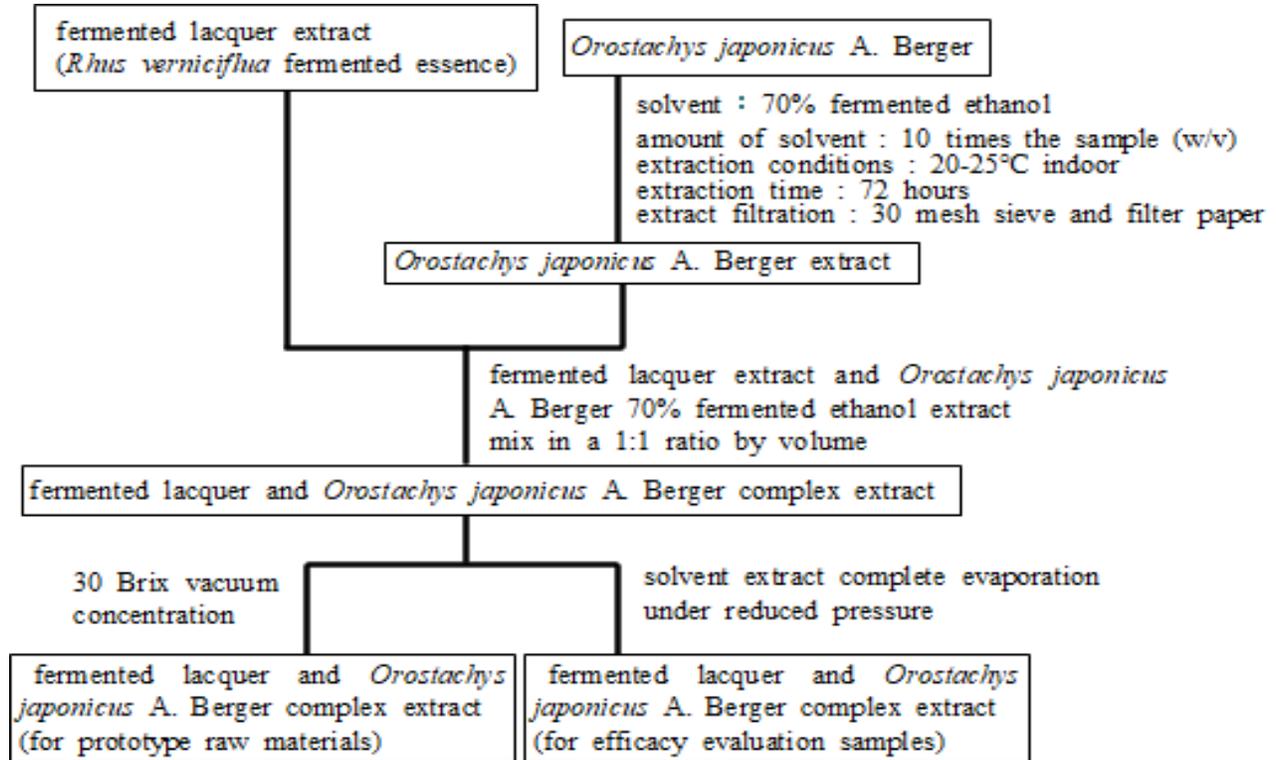


Figure 1: Manufacturing process diagram of FRO extract

Table 2: Prescription manufacturing Toner to improve skin

	INGREDIENT	CONTENT(%)
A Part	Water	85.330
	FRO	10
	Chlorphenesin	0.2
	Allantoin	0.1
	Trehalose	0.1
	Carbomer	0.1
B Part	Glycerin	3.5
	PEG-60 hydrogenated castor oil	0.3
	Phenoxyethanol	0.25
	Lavandula angustifolia oil	0.02
C Part	Arginine	0.1
Total		100 (%)

Table 3: Prescription manufacturing Lotion to improve skin

	INGREDIENT	CONTENT(%)
A Part	Water	74.660
	FRO	10
	Glycerin	6.0
	Trehalose	0.5
	Allantoin	0.3
	Chlorphenesin	0.2
	Carbomer	0.2
B Part	Cetyl alcohol	1.25
	Olivoyl hydrolyzed wheat protein	0.3684
	Cetearyl alcohol	0.2760
	Glyceryl oleate	0.2760
	Glyceryl stearate	0.24
	Potassium sorbate	0.0012
	Sodium benzoate	0.0024
	Potassium hydroxide	0.0360
	Butyrospermum parkii (shea) butter	1.0
	<i>Prunus amygdalus dulcis (sweet almond) oil</i>	1.0
	Caprylic/capric triglyceride	1.0
	Dimethicone	1.0
	Octyldodecanol	0.4
	Dicaprylyl carbonate	0.4
	Tocopheryl acetate	0.3
beeswax	0.1	
C Part	Arginine	0.2
D Part	Phenoxyethanol	0.25
	<i>Lavandula angustifolia (lavender) oil</i>	0.040
Total		100 (%)

3. Results

The skin condition of the experimental group was superior to that of the control group in terms of moisture, elasticity and pores. As a result of measuring the moisture and elasticity of the pores, significant results were obtained only in the pores when used for 2 weeks between the experimental group and the control group (p <.001). After 4

weeks of use, moisture (p <.05) showed significant results, and 6 weeks after use, moisture (p <.01) and elasticity (p <.001) showed significant results (Table 4). Kang & Ann's (2012) study in which 35 kinds of herbal medicines and natural ingredients such as natural herbal oil were fermented and dried was applied, and it was found that there was a positive role in facial skin care change and the effect of skin improvement.

Table 4: Comparative analysis of skin improvement effect(n=26)

Categories		Moisture			Elasticity			Pores		
		M±SD	t	p	M±SD	t	p	M±SD	t	p
pre	EG	38.23±2.77	1	0.33	46.30±4.38	-0.56	0.58	6.30±1.93	0.10	0.91
	CG	36.69±4.38			47.07±4.80			6.23±1.64		
2 weeks	EG	40.61±5.82	0.96	0.35	47.07±4.80	0.69	0.50	7.30±1.49	3.95	0.001***
	CG	37±12.44			45.43±8			5.38±1.26		
4 weeks	EG	41.46±8.67	2.12	0.05*	49.07±5.92	1.23	0.23	6.38±1.50	0.88	0.39
	CG	36.69±4.38			45.53±8			5.84±1.72		
6 weeks	EG	42.23±7.88	2.84	0.01**	52.30±6.26	3.07	0.001***	6.53±1.89	1.45	0.17
	CG	35.92±4.80			43.23±9.54			5.53±.19		

Note: *p<0.05**p<0.01***p<0.001
EG; Experimental Group CG; Control Group

4. Conclusion

In this study, in order to confirm the skin improvement effect of cosmetics containing fermented *Rhus verniciflua* Stokes and *Orostachys japonicus* A. Berger complex extract (FRO), 26 men and women in their 10s and 20s with skin were prepared with toner and lotion and applied to their facial skin in the morning and in the evening for 1 day. It was used twice, for a total of 6 weeks, and the degree of skin improvement was investigated. The clinical trial results are as follows.

For modern people, cosmetics play a role in protecting the skin and keeping it healthy. Through this study, it was confirmed that the Fermented *Rhus verniciflua* stokes, *Orostachys japonicus* A. Berger (FRO) cosmetic product has a skin improvement effect. Recently, based on the results of research on the physiological activity and clinical efficacy of Fermented *Rhus verniciflua* stokes and *Orostachys japonicus* A. Berger extracts, food and beverages, detergents, and dyes containing these substances have been released.

We confirmed that fermented *Rhus verniciflua* Stokes and *Orostachys japonicus* A. Berger complex extract (FRO) has useful value as a cosmetic material when this study is summarized.

Therefore, I hope that more research will be done on cosmetics made from natural ingredients in the future.

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