



## ORYZA OIL & FAT CHEMICAL CO., LTD.

Ver. 9.2 YF

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# PERILLA SEED EXTRACT Anti-allergy Ingredient

### 1. Introduction

The patients with allergies are increasing every year, and the diet is said to be one of the most important factor of this disease. Daily intake of  $\Omega$ -6 fatty acids, commonly found in fish or plant oil such as safflower, are accumulated as arachidonic acid which is converted to allergic mediators.

PERILLA SEED EXTRACT inhibits the production of allergic mediators, leukotrienes (LTs). The mediators are metabolites of arachidonic acid through 5-lipoxygenase (5-LO) pathway. PERILLA SEED EXTRACT selectively inhibits 5-LO activity (*in vitro*).

PERILLA SEED EXTRACT also inhibits type IV allergy as well as TPA-induced inflammation (*in vivo*).

Moreover, the serum IgE levels were suppressed by administration of PERILLA SEED EXTRACT, and allergic rhinitis, hay fever and urticaria were significantly improved on human.



Perilla



### 2. What is Perilla Seed?

*Perilla frutescens* and a lot of herbs like lavandula belong to *Fam. LABIATAE.* Perilla seed has been cultivated in Japan, China, Korea and Southeast Asia and used as spices and also main supply for  $\alpha$ -linolenate rich oil.

### 3. The Functional Compounds of PERILLA SEED EXTRACT

The functional compounds of PERILLA SEED EXTRACT are flavonoid aglycons, such as luteolin, apigenin, chrysoeriol, and rosemarinic acid. Though flavonoids are normally exist as glycosides in the plant, perilla seeds contain aglycons. It is known that antioxidative activity and lipoxygenase inhibitory activity of flavonoid aglycons are stronger than that of corresponding glycosides.



#### Fig.1 Polyphenols Isolated from Perilla Seed

### 4. Allergy and Metabolites of Arachidonic Acid

Arachidonic acid is released from cell membrane by a stimulation and converted to prostaglandins (PGs), thromboxanes (TXs), leukotrienes (LTs). LTs, the product of 5-lipoxygenase (5-LO) path way, induce allergic reactions so that the specific inhibitors of 5-LO have the potentialities to regulate or prevent allergy and inflammation.



Fig.2 Arachidonic Acid Cascade

PERILLA SEED EXTRACT (Anti-allergy) ver. 9.2 YF

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### 5. Effects of PERILLA SEED EXTRACT 5-1. Lipoxygenase Inhibitory Activity (*in vitro*)

PERILLA SEED EXTRACT control allergy and inflammatory responses due to its lipoxygenase inhibitory activity. The anti-lipoxygenase activity of PERILLA SEED EXTRACT is more than 50 times stronger than Ten-cha (Chinese tea) and more than 100 times stronger than perilla leaves. Ten-cha and perilla leaves contain mainly glycosides which anti-lipoxygenase activity is weaker than that of aglycons.



Fig.3 5-Lipoxygenase Inhibitory Activity of Plant Extract

Table 1 shows the  $IC_{50}$  values of phenolic compounds isolated from perilla seed as well as other chemicals reported having anti-lipoxygenase activity.  $IC_{50}$  of luteolin was 100 times stronger than that of caffeic acide isolated from olive.

# Table 1. IC<sub>50</sub> Values for Inhibition of Lipoxygenase Activities by Phenolic Compounds

Compound	$IC_{50}(\mu M)$
Luteolin*	0.1
Chrysoeriol*	38.9
Rosmarinic acid*	6.4
Quercetin	0.2
Caffeic acid	72.0

\*Main compounds of PERILLA SEED EXTRACT

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### 5-2. Anti-allergic Activity (in vivo)

Anti-allergic action of PERILLA SEED EXTRACT was examined by means of ear edematization test in mice. PERILLA SEED EXTRACT proved to oxazolone-induced type IV allergy. In endermatic test, luteolin have much strong inhibitory activity than other samples which are known for antihistamines or antiphlogistics.



- 3. Luteolin (0.3mg/ear)
- 4. NDGA (1.0mg/ear)
- 5. Ketoprefen (1.0mg/ear)
- 6. Phenidone (1.0mg/ear)
- 7. Mebrophehydramine (1.0mg/ear)

Fig.4 The Effect of PERILLA SEED EXTRACT on Oxazolone-induced Inflammation in Mice

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### 5-3. Anti-inflammatory Activity (in vivo)

Anti-inflammatory action of PERILLA SEED EXTRACT was examined by edematization test in ears of mice. PERILLA SEED EXTRACT proved to inhibit on TPA-induced inflammation.



- 2. 1%PERILLA SEED EXTRACT (1month)
- 3. Luteolin(0.3mg/ear)
- 4. PERILLA SEED EXTRACT (0.5mg/ear)
- 5. NDGA(0.5mg/ear)

# Fig.5 The Effect of PERILLA SEED EXTRACT on TPA-induced Inflammation in Mice

#### 5-4. Inhibitory Effect on Histamine Release (in vitro)

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PERILLA SEED EXTRACT have inhibitory efficacy on histamine release. Studies on histamine release, PERILLA SEED EXTRACT have been found to inhibit the release of histamine from mast cell in a dose-dependent manner, thus PERILLA SEED EXTRACT was considered to be effective for improving symptoms of hay fever.



Fig.6 Inhibitory Activity of PERILLA SEED EXTRACT on Histamine Release

PERILLA SEED EXTRACT is mixture of phenolic compounds and showed synergistic inhibitory effect which was stronger than that of sodium cromoglycate, a mast cell stabilizer and other flavonoids such as catechin, quercetin and caffeic acid.





#### 6. Effect on Serum IgE Level

The effect of PERILLA SEED EXTRACT on human serum IgE level was conducted. PERILLA SEED EXTRACT demonstrated selective inhibitory effect on serum IgE production as illustrated in graphs A and B below. PERILLA SEED EXTRACT has significantly reduced serum IgE level 150 mg/day, but increased again after discontinuation of PERILLA SEED EXTRACT SEED EXTRACT.



Fig.8 Serum IgE Level Before and After Administration of PERILLA SEED EXTRACT

#### 7. Effect on Patient with Allergy



Fig.9 The Effect of PERILLA SEED EXTRACT on Patient with Allergy Before and After Administration of PERILLA SEED EXTRACT for Two Weeks (100mg-150mg/day)

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#### 8. Effect on Deodorization

PERILLA SEED EXTRACT has deodorizing effect on acetaldehyde, ammonia and methylmercaptan, which are commonly found in tobacco, alcohol, sweat and bad breath.

	Ingridient		
acetaldehyde	The smell of Tobacco and Alcohol		
ammonia	The smell of Tobacco, Alcohol and Sweat		
methylmercaptan	Bad breath		

PERILLA SEED EXTRACT has demonstrated similar deodorizing effect to Oreganon powder against acetaldehyde, ammonia and methylmercaptan.

Thus, PERILLA SEED EXTRACT is an effective deodorizing against tobocco, alcohol, sweat and bad breath.

#### (Protocol)

After deodorization sample is dissolved to distilled water, smelly substance is added. The concentration of acetaldehyde, ammonia and methylmercaptanin headspace is measured with Gas Detector Tubes.



Fig.10 Effective against acetaldehyde

Fig11. Effective against ammonia



Fig.12 Effective against methylmercaptan

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In addition, we evaluated the effect of PERILLA SEED EXTRACT on ageing smell (aldehyde smell) in human. We gave PERILLA SEED EXTRACT-WSP (100 mg/day) to healthy male volunteers (n=6) and determined aldehyde in under wear. As a result, PERILLA SEED EXTRACT-WSP suppressed aldehyde smell from 1 to 3 weeks compared to the control group (Fig. 13).

As a result of questionnaire, improvement of subjective symptoms was observed in 3 volunteers. Thus, PERILLA SEED EXTRACT-WSP was found to reduce aging smell.

#### [Method]

PERILLA SEED EXTRACT-WSP (100 mg) was given for 3 weeks. After 1and 3-week ingestion. Amount of aldehyde in undershirt (wearing a day) was determined by a gas analyzer.



Fig.12 Change in aldehyde smell (mean $\pm$ S.E., n=6)

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## 9. Comparison of Perilla Leaf and Seed

### (1) Contents of polyphenol and flavonids

		Contents	Defatted seed	Leaf
	Total polyphenol		0.59%	0.091%
	F	Rosmarinic acid	0.13%	0.022%
Co		Luteorin	0.058%	Not detected
nst	Fla	(aglycon)	0.00070	Not detected
itu	von	Apigeninn	0.011%	Not detected
ent	oid	(aglycon)	0.01170	
s	$\mathbf{s}$	Crysoeriol	0.015%	Not detected
		(aglycon)	0.01070	

- ① Total polyphenol is 6 times higher than leaves.
- 2 Active constituents in seeds are rosmarinic acid and flavonoids. The leaf contains rosmarinic acid only one sixth of leaves.
- ③ The seeds contain large amount of flavonoids as aglycons which are easily absorbed from intestine. On the other hand, flavonoids in the leaves are glycoside forms and the contents are little.

### (2) Anti-allergic mechanism

Seeds : Inhibition of 5- and 12-lipoxygenase Inhibition of mast cell degranulation Leaves : Inhibition of TNF-α production

## (3) Perillaldehyde, perilla ketone and perilla alcohol

- Seeds: As a result of GC analysis, the seeds were found to contain no perillaldehyde, perilla ketone and perilla alcohol (Fig. 13). In addition, the seed has no perilla flavor.
- Leaves: Perilla flavor is based on perillaldehyde and peril ketone. These compounds cause contact dermatitis.

Thus, perilla seeds are more effective and safety than the leaves. Moreover, the seeds contain more than 40% lipids and the more than 60% of the lipid is  $\alpha$ -linolenic acid.  $\alpha$ -linolenic acid is easily oxidized, however the lipid is quite stable in the seeds. Polyphenols in the seeds are thought to protect lipids from oxidization.



Fig. 13. Identification of perillaldehyde, perilla ketone and perilla alcohol by GC anlalysis.

### 10. Stability of PERILLA SEED EXTRACT 10-1. Thermal Resistance

Evaluation of the heat stability of PERILLA SEED EXTRACT showed no changes in the content of polyphenols even after heating at a normal food processing temperature.



Fig.14 Thermal Resistance of PERILLA SEED EXTRACT

#### 10-2. pH Stability

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Polyphenols in the PERILLA SEED EXTRACT was found to be stable from acid to alkali range of pH.



Fig.15 pH stability of the Polyphenols in the PERILLA SEED EXTRACT

#### 10-3. Solubilty

Stability of solubilized PERILLA SEED EXTRACT-WSP in water (pH 3.5) was examined at stipulated in the following conditions. PERILLA SEED EXTRACT-WSP was dissolved in water (pH 3.5) and stored at room temperature,  $40^{\circ}$ C and  $5^{\circ}$ C for 16 weeks and sedimentation and color change was observed.

		Water solubility (0.5 % solution)		
		Room temperature (light shielding)	40°C (dark)	5°C (dark)
Acid	Sedimentation	Negative (observed in 16 weeks)	Negative (observed in 16 weeks)	Negative (observed in 16 weeks)
(pH 3.5)	Change color	Negative (observed in 16 weeks)	Negative (observed in 16 weeks)	Negative (observed in 16 weeks)

PERILLA SEED EXTRACT-WSP was without any sedimentation and color change observed in 16 weeks.

## 11. Daily Dosage of PERILLA SEED EXTRACT

PERILLA SEED EXTRACT-P (powder)	
PERILLA SEED EXTRACT-WSP (powder	$(r) \geq 100 \sim 150 \text{ mg/day}$
PERILLA SEED EXTRACT-L (liquid)	$150\sim225$ mg/day

### 12. Nutrition Facts of PERILLA SEED EXTRACT

Items Analyzed	Result
Water	3.1 g/100g
Protein <sup>*1</sup>	0.9 g/100g
Fat	0.2 g/100g
Ash	0.8 g/100g
Available carbohydrate*2	95.0 g/100g
Energy*3	385 kcal/100g
Dietary Fiber	0 g/100g
Sodium	7.1 mg/100g

\*1 N×6.25

\*2 100-(Moisture + Protein + Fat + Ash + Dietary fiber)

\*3 Factors for calculating the energy value: Protein - 4, Fat - 9, Available carbohydrate -4 Tested by : Japan Food Research Center Foundation Research result issue number : 397060549-001

Assayed Items	Results	<b>Detection Limits</b>	Assay Method
BHC	Not Detected	0.02ppm	Gas Chromatography
DDT	Not Detected	0.02ppm	Gas Chromatography
Aldrin	Not Detected	0.01ppm	Gas Chromatography
Dieldrin	Not Detected	0.01ppm	Gas Chromatography
Endrin	Not Detected	0.01ppm	Gas Chromatography
Diazinon	Not Detected	0.05ppm	Gas Chromatography
Parathion	Not Detected	0.05ppm	Gas Chromatography
Malathon	Not Detected	0.05ppm	Gas Chromatography

### 13. Residual Agricultural Chemicals

Tested by: Japan Food Research Center Foundation Research results issue number 397060549-002

Moreover, we determined 456 agricultural chemicals in 2006. No chemicals were determined in PERILLA EXTRACT.

### 14. Acute Toxicity and Safety

### 14-1. Acute Toxicity

After administering 2,000 mg/kg for 2 weeks, no toxic effects were observed, thus the  $LD_{50}$  (mouse) is more than 2000 mg/kg.

After administering 7.0g/day for two consecutive weeks on human, no toxic effects were observed.

### 14-2. Primary Cutaneous Irritation Test on the Albino Rabbit.

PERILLA SEED EXTRACT was applied on normal skin in 3 rabbits for 4 hours. The methodology indicated in the Official EEC Gazette of September 19, 1984 was used in this study. Examination of the skin at hour 1, 24, 48 and 72 after removed of the dressing reveals the absence of a desquamation reaction or a reduction in the cutaneous extensive range. The local tolerance is good. In these conditions, the product can be rated as : **NON IRRITANT**.

### 14-3. Test to Assess the Sensitizing Power on the Albino Guinea Pig.

PERILLA SEED EXTRACT at the Maximum Non Irritant Concentration did not display any sensitizing potential in the animals tested. The positive reference (1-chloro -2-4 dinitrobenzene 1 %), tested in the same conditions displayed 100 % of positive reactions. The product in accordance with the method described in the protocol displays a **VERY SLIGHT** sensitizing power in the albino guinea pig.

### 14-4. Ocular Irritation Test.

PERILLA SEED EXTRACT was instilled in the fornix of the conjunctiva of 3 rabbits, by a 0.1 ml dosage. The eye was not rinsed. The procedure used in

this study complies with OECD guidelines No 405 of February 24, 1987 and EEC guidelines 67/548. In these conditions, the product is rated as : **SLIGHTLY IRRITANT.** 

### 14-5. Ocular Irritation Test.

0.03 g of PERILLA SEED EXTRACT -LC was spread over film. The film was patched on 12 subject for just stick and 24 hours. No irritation on skin of human ware found.

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Applications	Examples		
Confections	Candies, Gum, Cookies, Pudding, Jelly, Yogurt and		
Confectionery	Chocolate.		
Drinka	Tea, Blended tea, Functional drinks and Nutritional		
Drinks	drinks.		
Others	Functional foods, Health foods and Nutraceutical foods.		
	Base cosmetics (Lotion, Milk, Cream and so on)		
	Body cosmetics (Body lotion, Body cream, and so on)		
Cosmetics	Cleansing cosmetics (Soap, and so on)		
	Make up cosmetics (Lipstick, Foundation, and so on)		
	and so on.		

### 15. Practical Applications of PERILA SEED EXTRACT

## 16. Packing

PERILLA SEI	CD EXTRACT-P (Powder, for food)
PERILLA SEI	CD EXTRACT-WSP (Powder, for food)
5kg Interio	r packaging : a double-layerd plastic plastic bag, can
Exteri	or packaging: cardboard box
PERILLA SEI	CD EXTRACT-L (Liquid, for food)
5kg Interio	r packaging: cubic polyethylene container
Exteri	or packaging: cardboard box
PERILLA SEI	CD EXTRACT-LC (Liquid, for cosmetics)
5kg Interio	r packaging: cubic polyethylene container
Exteri	or packaging: cardboard box

### 17. Storing Method

Store in cool, dry place. Avoid humidity

### 18. Expression of PERILLA SEED EXTRACT

### PERILLA SEED EXTRACT

\*Please refer to your nation's standard.

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### 19. Others

PERILLA SEED EXTRACT-LC is recommended for cosmetics. CTFA FILE NUMBER : 426 INCI name : Water (and) Butylene Glycol (and) Perilla Ocymoides Seed Extract 1242G

#### 20. United States Patent



#### (12) United States Patent Murai et al.

#### (54) INHIBITORS OF LIPOXYGENASE

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- Apr. 1, 1998 (22) Filed:
- (30) **Foreign Application Priority Data**
- Apr. 23, 1997
- (51) Int. Cl.<sup>7</sup> ...... A61K 35/78
- (52) (58) Field of Search ...... 424/195.1

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#### ABSTRACT

Novel inhibitors of the enzyme action of lipoxygenase, especially 5-lipoxygenase and 12-lipoxygenase that are derived from the extraction of the seeds of the perilla (crispa) or perilla (frutescens) plant. These inhibitors are suitably extracted from these seeds using alcohol, preferably ethanol, to form an extract or more preferably to further extract the alcoholic extract with ethyl acetate and water to partition the active inhibitors to the ethyl acetate. The particularly preferred inhibitors are luteolin and chrysoeriol.

#### 24 Claims, 8 Drawing Sheets

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#### PRODUCT NAME

# PERILLA SEED EXTRACT-P

This product is extracted from the seeds of perilla (Perilla frutescens var. frutescens) with aqueous ethanol. It guarantees a minimum of 3.0 % polyphenols.

<u>Appearance</u>	Yellowish powder with slightly unique smell.		
<u>Certification Test</u> Flavonoid	To 1.0g of this product, glycol and 0.5ml of 1N	add 8.5ml of 90% diethlene NaOH. Then it changes yellow. (DAVIS method)	
<u>Polyphenols</u>	Min. 3.0%	(Folin-Denis method)	
Loss on Drying	Max. 5.0% (Analysis fo	r Hygienic Chemists,1g, 105°C, 2h)	
Purity Test (1) Heavy Metals (as Pb) (2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 30 ppm (Sodium Max. 1 ppm (Standard Regulation	a Sulfide Colorimetric Method) Methods of Analysis in FoodSafety n, The Third Method, Apparatus B)	
Standard Plate Counts	Max. $1 \times 10^3$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Coliforms</u>	Negative	(Analysis for Hygienic Chemists)	
Composition			
	Ingredients	Contents	
—	Maltodextrin	70 %	
	Perilla seed extract	30 %	
—	Total	100 %	

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#### PRODUCT NAME

### PERILLA SEED EXTRACT-WSP (FOOD)

This product is extracted from the seeds of perilla (Perilla frutescens var. frutescens) with aqueous ethanol. It guarantees a minimum of 3.0 % polyphenols. This product is water-soluble.

<u>Appearance</u>	Yellowish powder with slightly unique smell.		
<u>Certification Test</u> Flavonoid	To 1.0g of this product glycol and 0.5ml of 11	, add 8.5ml of 90% diethlene N NaOH. Then it changes yellow. (DAVIS method)	
Polyphenols	Min. 3.0%	(Folin-Denis method)	
Loss on Drying	Max. $5.0\%$ (Analysis f	or Hygienic Chemists,1g, 105°C, 2h)	
Purity Test (1) Heavy Metals (as Pb) (2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 30 ppm (Sodiur Max. 1 ppm (Standard Regulatio B))	n Sulfide Colorimetric Method) Methods of Analysis in Food Safety on, The Third Method, Apparatus	
<u>Standard Plate Counts</u>	Max. $1 \times 10^3$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Coliforms</u>	Negative	(Analysis for Hygienic Chemists)	
Composition			
	Ingredients	Contents	
-	Maltodextrin	70 %	
	Perilla seed extract	30 %	
_	Total	100 %	

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#### PRODUCT STANDARD

#### PRODUCT NAME

### PERILLA SEED EXTRACT-L (FOOD)

This product is extracted from the seeds of perilla (Perilla frutescens var. frutescens) with aqueous ethanol. It guarantees a minimum of 2.0 % polyphenols.

<u>Appearance</u>	Dark brown liquid with unique smell.		
<u>Certification Test</u> Flavonoid	To 1.0g of this product, add 8.5ml of 90% diethlene glycol and 0.5ml of 1N NaOH. Then it changes yellow. (DAVIS method)		
Polyphenols	Min. 2.0%	(Folin-Denis method)	
Residue on Evaporation	18.0 to $22.0%$	(Analysis for Hygienic Chemists)	
<u>Purity Test</u> (1) Heavy Metals (as Pb) (2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 20 ppm (Sodium Sulfide Colorimetric Method) Max. 1 ppm (Standard Methods of Analysis in Food Safety Regulation, The Third Method, Apparatus B)		
Standard Plate Counts	Max. $1 \times 10^3$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Coliforms</u>	Negative	(Analysis for Hygienic Chemists)	
Composition			
	Ingredients	Contents	
	Ethanol	50 %	
	water	30 %	
	Perilla seed extrac	t 20 %	
	Total	100 %	

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#### PRODUCT NAME

## PERILLA SEED EXTRACT-PC

#### (COSMETIC)

The product is extracted with aqueous ethanol from the seeds of perilla (*Perilla frutescens* var.*japonica*, *P.frutescens* var.*frutescens* or *Perilla frutescens* var.*crispa*). It includes more than 3.0 % of polyphenols.

<u>Appearance</u>	Yellowish powder with slightly unique smell.		
<u>Certification Test</u> Flavonoid	To 1.0g of this product, add 8.5ml of 90% diethlene glycol and 0.5ml of 1N NaOH. Then it changes yellow. (DAVIS method)		
<u>Polyphenols</u>	Min. 3.0%		(Folin-Denis method)
Loss on Drying	Max. 5.0%	(1g, 105°C, 2 h)	
Purity Test (1) Heavy Metals (as Pb) (2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 30 ppm Max. 1 ppm	(The Second Meth Standards of Qua (The Third Method Standards of Qua	od of The Japanese asi-Drug Ingredients) d of The Japanese asi-Drug Ingredients)
<u>Standard Plate Counts</u>	Max. $1 \times 10^2$ c	fu/g (Analys	is for Hygienic Chemists)
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ c	fu/g (Analys	is for Hygienic Chemists)
<u>Coliforms</u>	Negative	(Analys	is for Hygienic Chemists)
Composition			
	Ingredients		Contents
_	Dextrin		70 %
	Perilla Ocymoides Seed Extract 30 %		
_	Total		100 %

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#### PRODUCT NAME

### PERILLA SEED EXTRACT-WSPC (COSMETIC)

This product is extracted from the seeds of perilla (*perilla frutescens* var. *japonica*, *p.frutescens* var. *frutescens* or *perilla frutescens* var. *crispa*) with aqueous ethanol. It guarantees a minimum of 3.0 % polyphenols. This product is water-soluble.

<u>Appearance</u>	Yellowish powder with slightly unique smell.		
<u>Certification Test</u> Flavonoid	To 1.0g of this product, add 8.5ml of 90% diethlene glycol and 0.5ml of 1N NaOH. Then it changes yellow (DAVIS method)		
<u>Polyphenols</u>	Min. 3.0%	(Folin-Denis method)	
Loss on Drying	Max. 5.0%	(1g, 105°C, 2h)	
Purity Test			
(1) Heavy Metals (as Pb)	Max. 30 ppm	(The Second Method of The Japanese Standards of Quasi-Drug Ingredients)	
(2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 1 ppm	(The Third Method of The Japanese Standards of Quasi-Drug Ingredients)	
Standard Plate Counts	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)	
<u>Coliforms</u>	Negative	(Analysis for Hygienic Chemists)	
<u>Composition</u>			
_	Ingredients	Contents	
	Dextrin	70 %	
	Perilla Ocymoides Seed Extract 30 %		
	Total	100 %	

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#### PRODUCT NAME

### PERILLA SEED EXTRACT-LC (COSMETIC)

This product is extracted from the seeds of perilla perilla frutescens var. frutescens with aqueous ethanol and is dissolved in aqueous 1,3-butylene glycol.

<u>Appearance</u>	Yellow or pale characteristic odor	brown clear liquid with slightly		
<u>Certification Test</u> (1) Tannins	The solution $(1 \rightarrow 5)$	The solution $(1\rightarrow 5)$ of this product shows blue color after ferric chloride is added. The solution $(1\rightarrow 5)$ of this product shows no color after potassium permanganate is added.		
(2) Polyphenols	The solution $(1 \rightarrow 5)$ potassium permanga			
<u>Polyphenols</u>	Min. 0.1%	(Folin-Denis method)		
<u>рН</u>	5.00 to 6.50	(10% solution)		
Specific Gravity	1.020 to 1.060	(25 °C)		
<u>Purity Test</u> (1) Heavy Metals (as Pb)	Max. 20 ppm	(The Second Method of The Japanese Standards of Quasi-Drug		
(2) Arsenic (as As <sub>2</sub> O <sub>3</sub> )	Max. 1 ppm	Ingredients) (The Third Method of The Japanese Standards of Quasi-Drug Ingredients)		
<u>Standard Plate Counts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)		
<u>Moulds and Yeasts</u>	Max. $1 \times 10^2$ cfu/g	(Analysis for Hygienic Chemists)		
<u>Coliforms</u>	Negative	(Analysis for Hygienic Chemists)		
<u>Composition</u>				
	Ingredients	Contents		
	Butylene Glycol	69 %		
	Water	30 %		
	Perilla Ocymoide	Perilla Ocymoides Seed Extract 1 %		
	Total	100 %		

**ORYZA OIL & FAT CHEMICAL CO., LTD.** striving for the development of the new functional food materials to promote health and general well-being.

**From product planning to OEM** - For any additional information or assistance, please contact :

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