



Green caviar extract



1143 Geodu-ri, Dongnae-myeon,

Chuncheon, Gangwon,

Republic of Korea 200-957

Email: radiantcmo@chol.com

www.eradiant.co.kr

CONCEPT BOARD



Green caviar (derived from plant, not the animal) contains high contents of amino acids like Threonine, Valine, Aspartic acid, Glutamic acid, etc. Some amino acid (Glutamic acid, proline, Glycine) acts like collagen which effective for skin elasticity. These kinds of amino acid prevent the water loss and help to absorb the moisture; they also enhance the skin immune system, and maintain the skin elasticity.

Green caviar makes blood clean & pure and inhibits the ROS and lipid peroxides (Anti-oxidative activity). And it also has a heavy metal chelating activity.

We evaluated Moisturizing effect of and free radical scavenging (DPPH) activity of Green caviar. It has various properties as a cosmetic ingredient.

CONTENTS

■ Part I . General Information

1. About “ <i>Green caviar extract</i> ”	-----	5
2. Research data	-----	6

■ Part II . Technical Data

1. Explain of Green caviar extract	-----	8
2. Stability study	-----	10
3. Safety study	-----	13

■ Part III. Efficacy Data

1. Anti-oxidant effect	-----	20
2. Skin-moisturizing effect	-----	21

■ Part IV. Conclusion

1. Application of cosmetics	-----	23
-----------------------------	-------	----

Part I. General Information



1. About “Green caviar extract”
2. Research data

1. About “Green caviar extract”



Common name	Green caviar
Latin name	<i>Caulerpa Lentillifera</i>
INCI name	Caulerpa Lentillifera Extract
Biological Effect	Anti-oxidative effect, Moisturizing effect Anti-inflammation effect

Green Caviar is different from Caviar what is the salted egg of a fish called a sturgeon, it is one of the favored species of edible Caulerpa due to its soft and succulent texture. They are also known as sea grapes, "ar-arosep", or "lato" in the Philippines

Its latin name is *Caulerpa Lentillifera*, and it is also called sea grape or green caviar because of its shape is similar to grape. Green caviar is farmed in the Philippines where the plant is eaten fresh.

The pond cultivation of *C. lentillifera* has been very successful on Mactan Island, Cebu, in the central Philippines, with markets in Cebu and Manila. About 400 ha of ponds are under cultivation, producing 12-15 tones of fresh seaweed per hectare per year.



2. Research data of

Biosorption of heavy metals

A Batch and column studies of biosorption of heavy metals by *Caulerpa lentillifera* (*Bioresource Technology* 99 (2008) 2766–2777)

Abstract; The biosorption of Cu(II), Cd(II), and Pb(II) by a dried green macroalga *Caulerpa lentillifera* was investigated. The sorption kinetic data could be fitted to the pseudo second order kinetic model. The governing transport mechanisms in the sorption process were both external mass transfer and intra-particle diffusion. Isotherm data followed the Sips isotherm model with the exponent of approximately unity suggesting that these biosorption could be described reasonably well with the Langmuir isotherm. The maximum sorption capacities of the various metal components on *C. lentillifera* biomass could be prioritized in order from high to low as: Pb(II) > Cu(II) > Cd(II). The sorption energies obtained from the Dubinin–Radushkevich model for all sorption systems were in the range of 4–6 kJ mol⁻¹ indicating that a physical electrostatic force was potentially involved in the sorption process. Thomas model could well describe the breakthrough data from column experiments. Ca(II), Mg(II), and Mn(II) were the major ions released from the algal biomass during the sorption which revealed that ion exchange was one of the main sorption mechanisms.

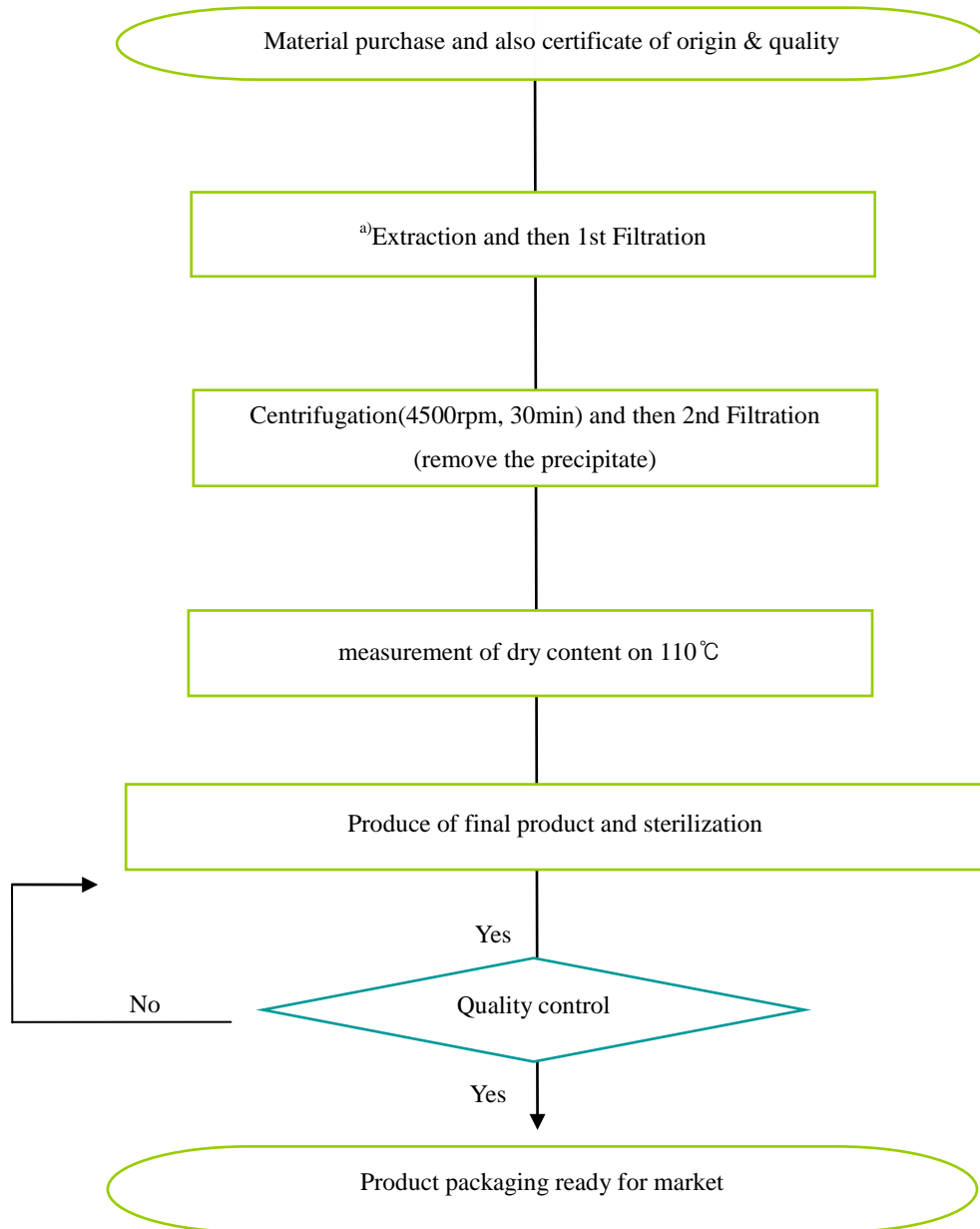
Part II. Technical Data



1. Explain of Green caviar extract
2. Stability study
3. Safety study

1. Explain of Green caviar extract

Overall Procedure for the preparation of *Green caviar extract*



Green Caviar Extract

Specification

INCI Name	Water / Butylene Glycol / Caulerpa Lentillifera Extract
Colour	Light yellow-Light green
Odour	Typical
pH	5.00 - 7.00
Specific Gravity	0.980 - 1.100
Heavy Metal	≤ 20ppm
Arsenic (As)	≤ 2ppm
Preservative	0.5% Phenoxyethanol

Microbiology

Total Aerobic Count	Less than 100 cfu/g
E. coli	Not detected
Salmonella	Not detected

Storage condition

Sealed containers should be Stored at a temperature of 10~30°C (50~86°F), Quality might be affected after opening packing, please refer to MSDS for more informations. After opening the drums, sterilization is no more guaranteed

Packaging unit

10kg / 20kg

Recommendation dosage

0.5 - 2.5%

Expiration Date

2 years in sealed original packing, stored in due conditions



KS Q/ISO 9001:2008 CERTIFIED



KS Q/ISO 14001:2004 CERTIFIED



RADIANT, 1143 G-tech Village Geodu-ri Dongnae-myeon
Chuncheon Gangwon Republic of Korea.

TEL. +82-33-244-1243 FAX. +82-33-244-1367

radiantcmo@chol.com

Stability to pH

We have evaluated the stability of *Green caviar extract* at different pH, temperature, ethanol, at its recommended dosage 1% to 5% in final products.

pH of *Green caviar extract* solution was measured using the potentiometric method. Measurements were made at room temperature within a pH range of 2 to 10.

V/V \ pH	2	4	6	8	10
1%	+	+	+	+	+
3%	+	+	+	+	+
5%	+	+	+	+	+

+ ; stable, ±; slightly unstable

Green caviar extract shows generally stability between 2 to 10 tested pH. Accordingly, it allows the use of various formulations in final products.

Stability to temperature

This study was made at the pH of the solution (pH close to 5.0) at temperatures ranging from 40 to 80 °C, for 2 hours.

Temp	40 °C			60 °C			80 °C			
	V/V	30min	60min	120min	30min	60min	120min	30min	60min	120min
1%		+	+	+	+	+	+	+	+	+
3%		+	+	+	+	+	+	+	+	+
5%		+	+	+	+	+	+	+	+	+

+ ; stable, ±; slightly unstable

Green caviar extract shows stability within tested range of temperature (40 °C ~80 °C). Accordingly, it allows the use of any formulations in final products.

Stability in the presence of ethanol

The study of solubility in various water/ethanol mixtures was made at room temperature at the pH of the solution (pH close to 5.0)

(V/V)	Ethanol / H ₂ O (V/V)					
	10/90	30/70	50/50	40/60	70/30	90/10
1%	+	+	+	+	+	+
5%	+	+	+	+	+	+
10%	+	+	+	+	+	+

+ ; stable, ±; slightly unstable

Green caviar extract shows good stability within the tested range of ethanol content. It means you don't care about limitation of ethanol. Therefore, it allows the use in any formulations in final products.

3. Safety study

Repeated insult patch test (RIPT)

OBJECTIVE

To determine the irritation and/or sensitization potential of a test material after repeated application under occlusive, semi-occlusive or open patches to the skin of human subjects.

TEST MATERIAL

Green caviar extract 10% solution in distilled water

PANEL SELECTION

Panels of human subjects, male and female, randomly selected. No individuals were empanelled if they exhibited or had a history of acute or chronic dermatologic, medical, or physical conditions that could interfere with dermal scoring.

TEST METHOD

Patches were applied to the same site on Monday, Wednesday, and Friday for a total of 9 applications during the Induction period. The subjects remove the patches 24hours after each application. 24hour rest periods follow each removal. Prior to each reapplication, site(s) were graded for dermal irritation and sensitization

Dermal scores

0	No visible skin reaction
±	Barely perceptible erythema (minimal)
1+	Mild erythema (diffuse)
2+	Well defined erythema
3+	Erythema and oedema
4+	Erythema and oedema with vesiculation

Ten to 21 days after application of the final induction patch, challenge patches are applied to previously unpatched sites, adjacent to the original induction patch sites. The challenge sites 24~72hours after application.

REFERENCE

Standard Operating Procedures, Clinical Trials 930.00, Repeat Insult Patch Test (RIPT)

RESULT

		Induction Scores									Challenge Scores		
Subject Number	Subject Initials	1	2	3	4	5	6	7	8	9	24hr	48hr	72hr
1	LSY	0	0	0	0	0	0	0	0	0	0	0	0
2	JMH	0	0	0	0	0	0	0	0	0	0	0	0
3	KNK	0	0	0	0	0	0	0	0	0	0	0	0
4	SJH	0	0	0	0	0	0	0	0	0	0	0	0
5	KAN	0	0	0	0	0	0	0	0	0	0	0	0
6	MYC	0	0	0	0	0	0	0	0	0	0	0	0
7	JJH	0	0	0	0	0	0	0	0	0	0	0	0
8	BJS	0	0	0	0	0	0	0	0	0	0	0	0
9	CBK	0	0	0	0	0	0	0	0	0	0	0	0
10	JJJ	0	0	0	0	0	0	0	0	0	0	0	0

CONCLUSION

Based on the test population of 10 subjects and under the conditions of this study, *Green caviar extract 10%* solution identified did not demonstrate a potential for eliciting dermal irritation on sensitization.

Ames test for mutagenicity

OBJECTIVE

To screen for mutagens through the simple and inexpensive procedure that uses a bacterial test organism. It is a biological assay used in genetics, generally genetic toxicology, to test for mutagenic properties of a chemical compound.

TEST ORGANISMS

The test organism is a histidine-negative (his^-) auxotrophic strain of *salmonella typhimurium* that will not grow on a medium deficient in histidine unless a back mutation to his^+ (histidine-positive) has occurred.

PRINCIPLE OF TEST METHOD

It is recognized that the mutagenic effect of a product is frequently influenced by the enzymatic pathway of an organism, whereby non-mutagens are transformed into mutagens and vice versa when introduced into human system.

REFERENCE

K. Mortelmans, E. Zeiger., *Mutation Research* 455 (2000) 29-60, The Ames Salmonella. Microsome mutagenicity assay.

RESULT

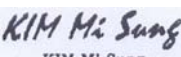
Test samples	His+ revertants/plate	
	TA98	TA100
Spontaneous test	31	137
4-NQO	3010	4000
Green caviar extract 10%	22	98

CONCLUSION

Based on the test procedure and under the conditions of this study, *Green caviar extract 10%* solution identified did not demonstrate a potential for mutagenicity.



MATERIAL SAFETY DATA SHEET

WRITTEN BY : Mi Sung, Kim	
DATE : Sep, 22, 2011	SIGNATURE :  KIM Mi Sung
1. PRODUCT AND COMPANY IDENTIFICATION	
Product name :	Green Caviar Extract
Product code :	RA588
Use :	Raw material for cosmetic
Manufacturer :	RADIANT 1143 G-tech Village Geodu-ri Dongnae-myeon Chuncheon Gangwon Republic of Korea
Tel :	+82-33-244-1243
Fax :	+82-33-244-1367
E – mail	radiantcmo@chol.com
Emergency call	+82-33-244-1243
G2. COMPOSITION AND INFORMATION OF INGREDIENTS	
Chemical Name :	None
Molecular weight	N.A
CAS Number (Butylene Glycol)	107-88-0
EINECS (Butylene Glycol)	203-529-7
INCI Name :	Water / Butylene Glycol / Caulerpa Lentillifera Extract
Hazardous ingredients:	None
3. HAZARDS	
Information provided on the health effects of this product is based on individual components. All ingredients are bound and potential for hazardous exposure as shipped is minimal. However, some vapours may be released upon heating and the end-user (fabricator) must take the necessary precautions (mechanical ventilation, respiratory protection, etc) to protect employees from exposure.	
Main hazards	No Known Health hazards
Health risks	Experience shows no acute irritancy or toxic effects.
Environment risks	Handle the product with good working practice avoiding dispersion into the environment.
Routes of exposure	Inhalation, Ingestion, Skin/Eye contact.

4. FIRST AID	
Skin : Eyes: Ingestion : Inhalation :	Wash off with soap and plenty of water. Immediately irrigate with water. Do not induce vomiting without medical advice. Move to fresh air in case of accidental inhalation of fumes from overheating or combustion. When symptoms persist or in all cases of doubt seek medical advice.
5. FIRE FIGHTING	
NFPA: Health: 1 Flammability: 1 Reactivity: Unsuitable extinguishing media	
Flammable properties Flash point (test method): Flammable limits in air, % by volume: Autoignition temperature: Products of combustion: Extinguishing Media: Fire Fighting Environmental Concerns: Fire Fighting Instructions:	109 °C (228 F) (Closed Cup) Upper: No Information Lower: No Information 394 °C (741 F) Carbon monoxide and butadiene. Use alcohol type aqueous film forming foam for large fires. Use CO2 or dry chemical for small fires. Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use. Water spray should be used to cool fire-exposed structures and vessels. Water or foam may cause frothing. Water spray can be used to reduce the intensity of flames and to dilute spills to a non-flammable mixture. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation.
6. ACCIDENTAL RELEASE	
Remove heat and sources of ignition. Drums and packing in danger should be cooled by pulverized water, as heating could provoke a rise in pressure with explosion or deflagration risks. Prevent entry into watercourses and pipeworks. Immediately mop up with suitable absorbant equipment for subsequent correct disposal according to current legislation.	
7. HANDLING AND STORAGE	
Store in a dry place and away from light to insure the quality. Keep the drums well closed in a well aired place. Keep away from heat and sources of ignition. Do not smoke. In case of important heating of the liquid, there is a risk of formation of explosive mixtures with air. Risk of fire in case of contact with hot area, sparks or flames.	
8. EXPOSURE CONTROL AND PERSONAL PROTECTION	

Respiratory protection	Facial mask
Hand Protection :	Protective gloves
Eye Protection :	Glasses with air-tight protection
Skin and body protection :	Long sleeved clothing and safety shoes
Engineering measures	Heat only in areas with appropriate exhaust ventilation. Provide appropriate exhaust ventilation at machinery.
9. PHYSICAL AND CHEMICAL PROPERTIES	
Appearance:	Liquid
Colours:	Light yellow-Light green
Odour:	Typical
Specific Gravity at 20°C:	0.980 - 1.100
Solubility in water:	Soluble
pH:	5.00 – 7.00
Vapour pressure	N.A.
Vapour density	N.A.
Preservative	0.5% Phenoxyethanol
10. STABILITY AND REACTIVITY	
Thermal decomposition: Distillation without decomposition at normal pressure, No thermal decomposition in case of correct storage and handling.	
Dangerous decomposition products: No dangerous decomposition products if storage and handling conditions are respected. In case of fire or thermal decomposition, release of carbon monoxide and carbonic anhydride.	
Dangerous reactions : Reacts violently with powerful oxidising agents.	
Hazardous decomposition products :May emit irritant/toxic vapour/fumes under fire conditions.	
11. TOXICOLOGY	
Acute toxicity :	No toxic effect known
Sensitisation :	Not sensitizing
Inhalation :	Inhalation is possible only under aerosol conditions, and vapour/fumes might be irritant/toxic.
12. ECOLOGICAL INFORMATION	
No ecologic effect known	
13. DISPOSAL	
Recommended method to dispose the product without danger: Dispose in accordance with the current legislation preferably using high temperature incineration or In a biological purification station in accordance with the current legislation.	
14. TRANSPORT INFORMATION	
Not dangerous for transport. (ROAD-RAIL, SEA, AIR)	
15. REGULATORY INFORMATION	
Labelling according E.E.C. directives : Not submitted to labelling	
16. OTHER INFORMATION	
This information is furnished without warranty, except that it is accurate to the best knowledge of RADIANT INC. The data on this sheet relates only to the specific material designated herein.	

Part III. Efficacy Data



1. Antioxidant effect

Free radical scavenging activity

OBJECTIVE

Free radical species are unstable and highly reactive. They become stable by acquiring electrons from nucleic acids, lipids, proteins, carbohydrates or any nearby molecule causing a cascade of chain reactions resulting in cellular damage and disease. So we have tested the free radical scavenging activity of *Green caviar extract* as an anti-oxidative effect.

REFERENCE

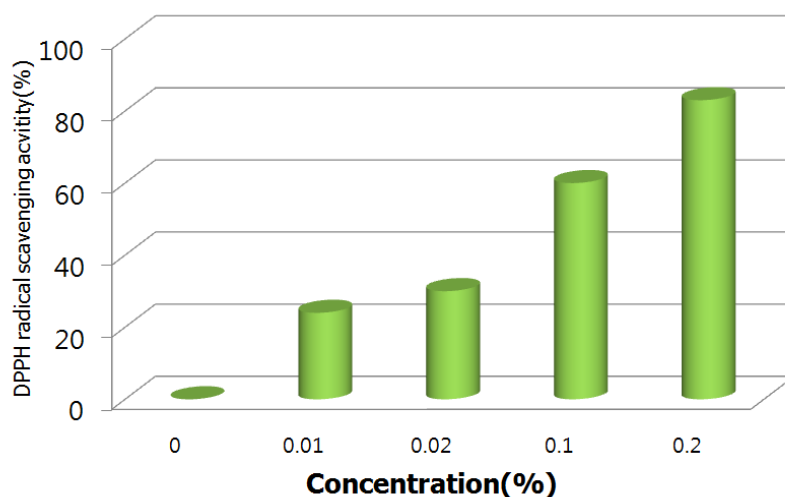
1. The cellular-induced decay of DMPO spin adducts of .OH and .O₂. FRBM, 1989;6:179-83
2. Antioxidant determinations by the use of a stable free radical *Nature*, 181:1199,1958.

TESTING METHOD

DPPH radical scavenging effect

1,1-Diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activities were found in Green caviar extract

RESULT



CONCLUSION

By DPPH radical scavenging assay, anti-oxidative activity of Green caviar was measured. At the concentration of 0.2%, Green caviar has nearly 80.00% of DPPH radical scavenging activity. These results indicate that Green caviar could be used as natural antioxidant.

2. Skin moisturizing effect

OBJECTIVE

In order to measure the skin moisturizing activity, we have investigated the skin moisture of the volunteer's forearm area before and after the treatment with Green caviar extract

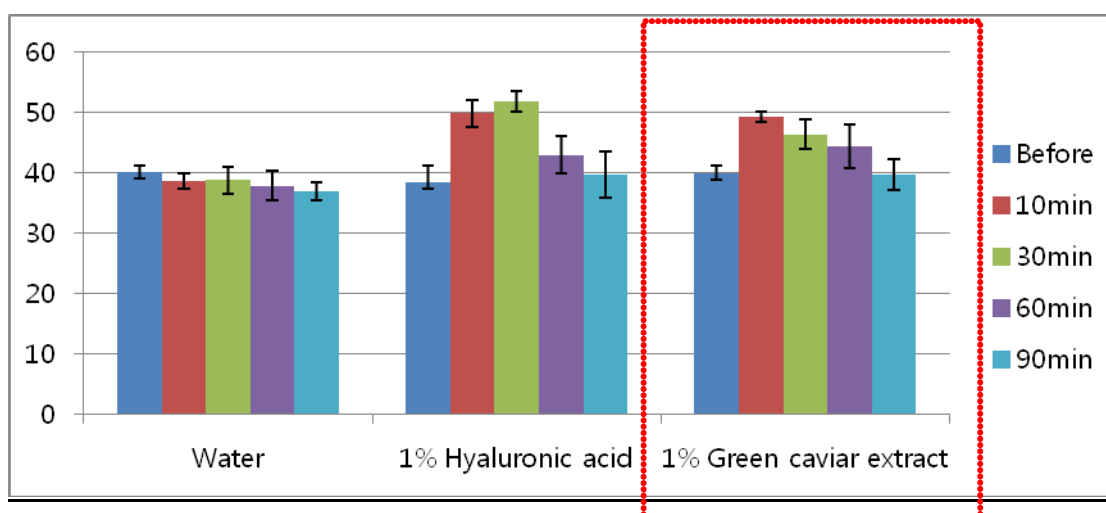
REFERENCE

Gwan et.al, Sedum sarmentosum Enhances Hyaluronan Synthesis in Transformed Human Keratinocytes and Increases Water Content in Human Skin. J. Soc. Cosmet. Scientists Korea. Vol. 33. No.1. March 2007

TESTING METHOD

Measurements were carried out using the Corneometer CM 825 by Courage & Khazaka (Cologne, Germany). Five different digital probes were compared. For comparison of the probes and for calibrating the instrument, the capacitance of four solvents with different dielectrical properties was investigated, emulating the complete range of skin moisture content: Green caviar extract and Hyaluronic acid as a positive control and water as a negative control. Measurements were performed on filter discs soaked with the solvents (10 repetitions per probe). In order to determine the force of the instrument's spring, the weight was determined 20 times by pressing the probe onto an analytical balance, until the acoustic signal of the probe occurred. This signal indicates the end of one capacitance measurement. The weight was then used for calculation of the spring's force.

RESULT



CONCLUSION

We have tested skin moisturizing effect of Green caviar extract compared with hyaluronic acid as a positive control. After treatment of each test material on the volunteer inner forearm, we have calculated the Δ value from this index. In this data we got the Green caviar extract moisturizing effect it is similar with

hyaluronic acid effect.

Part IV. Conclusion



APPLICATION of COSMETICS

Green caviar extract can be applied to all kinds of Cosmetic product.



Certifications

- May. 2005 Received an ISO 9001/ 14001
- August. 2005 Certified clean manufacturing company
- Member of International Trade Association
- Member of Cosmetic, Toiletry and Fragrance Association
- Selected as the promising small or medium sized business enterprise designated by Gang won Province
- Selected as the Promising Export Firm by small & medium business administration



1143 Geodu-ri, Dongnae-myeon,
Chuncheon, Gangwon, Korea 200-883
Email: cmo@eradiant.co.kr
www.eradiant.co.kr

