



SHAANXI HUATAI BIO-FINE CHEMICAL CO., LTD.

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COMPANY PROFILE

Shaanxi Huatai Biotechnology Co., Ltd. was established in 2008, headquartered in the Yangling Demonstration Zone in Xi'an, covering an area of over 4000 square meters. As a high-tech enterprise specializing in the research, production, and sale of natural plant active ingredients, we mainly produce pure natural plant-based chemical products. Our products are mainly sold to European and American countries such as Germany, France, Italy, Spain, Brazil, as well as Southeast Asian countries including South Korea, Malaysia, Vietnam, Thailand, and Indonesia. As a long-time practitioner and pioneer in the cosmetics efficacy raw materials industry, we provide excellent products and services to customers with years of experience and professional knowledge, aiming to add unique value to your brand. We will continue to innovate, improve product quality and service levels, and work hand in hand with customers to create a better future. We look forward to cooperating with you for mutual development!



Glabridin



[INCI Name] Glabridin

[Cas No.] 59870-68-7

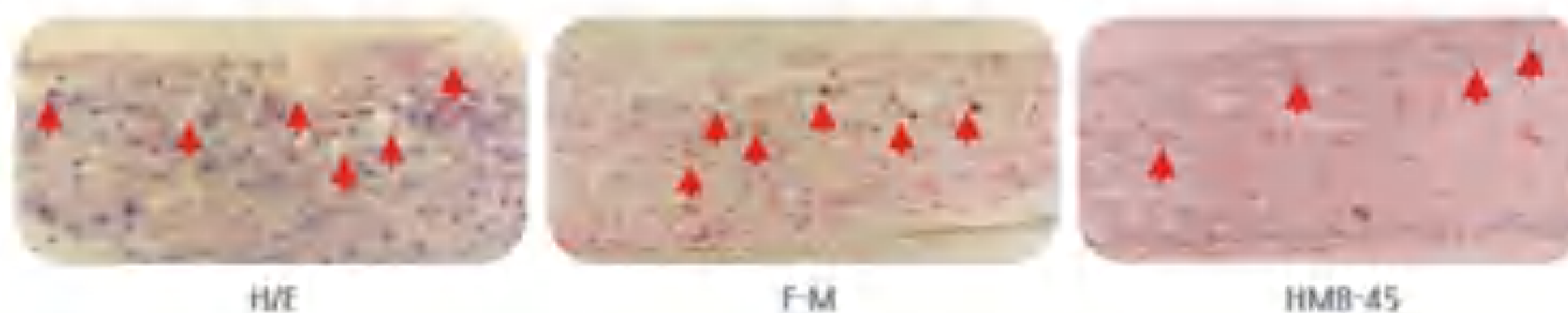
[Introduction] Glabridin is extracted from the root of licorice, it is an efficient whitening and spot-fading cosmetic raw material, which can effectively inhibit the activity of tyrosinase, dopachrome tautomerase, and DHICA oxidase. It helps reduce melanin synthesis, reduce spots and melanin deposition. Our Glabridin has completed a full set of toxicology experiments (sub-acute level) and has issued a complete safety assessment report with the help of toxicology experts based on experimental data. We have successfully developed Glabridin with a content of 98% and have put it into mass production, and can also customize according to customer needs. Our Glabridin can be widely used in various types of cosmetics (water, alcohol, plant oil systems), and has mature formula suggestions to support.

[Function]

- ◆ Skin Whitening, Lightening and anti-freckle. Glabridin helps in the inhibition of tyrosinase, dopachrome tautomerase and activity of DHICA oxidation enzyme, endothelin.
- ◆ Anti-Inflammation. By inhibiting cyclooxygenase-2 (COX-2), glabridin helps to reduce the inflammation.
- ◆ Anti-oxidant & Anti-free radical . Glabridin helps in the reduction of reactive oxygen.

[Depigmentation Effect]

UVB irradiation on Melanocyte containing Bioartificial Skin (0.05J/cm²/day for 5 days)



* Fig 1HT-Glabridin(1ug/ml) and UVB irradiation on Melanocyte containing Bioartificial Skin (0.05J/cm²/day for 5 days)

Under the stimulation of ultraviolet light, the inhibition of melanin in the **3D** artificial skin model is shown in the figure from left to right, which includes the control group, **UVB** group, glycyrrhizin group, and kojic acid group.

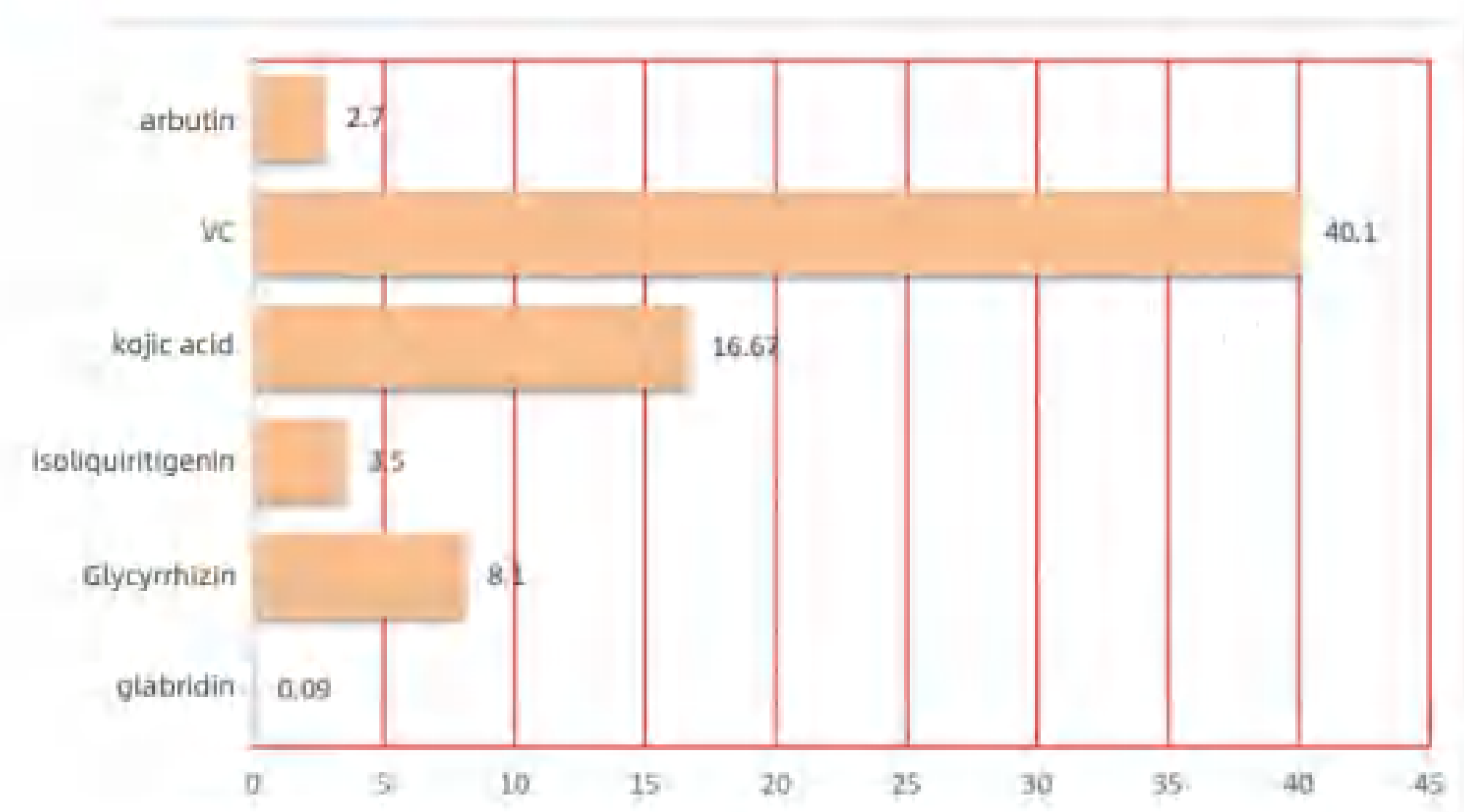


Under the stimulation of ultraviolet light, the precipitation of melanin in the 3D artificial skin model is shown in the figure, from left to right as the control group, UVB group, glycyrrhizin group, and kojic acid group, respectively



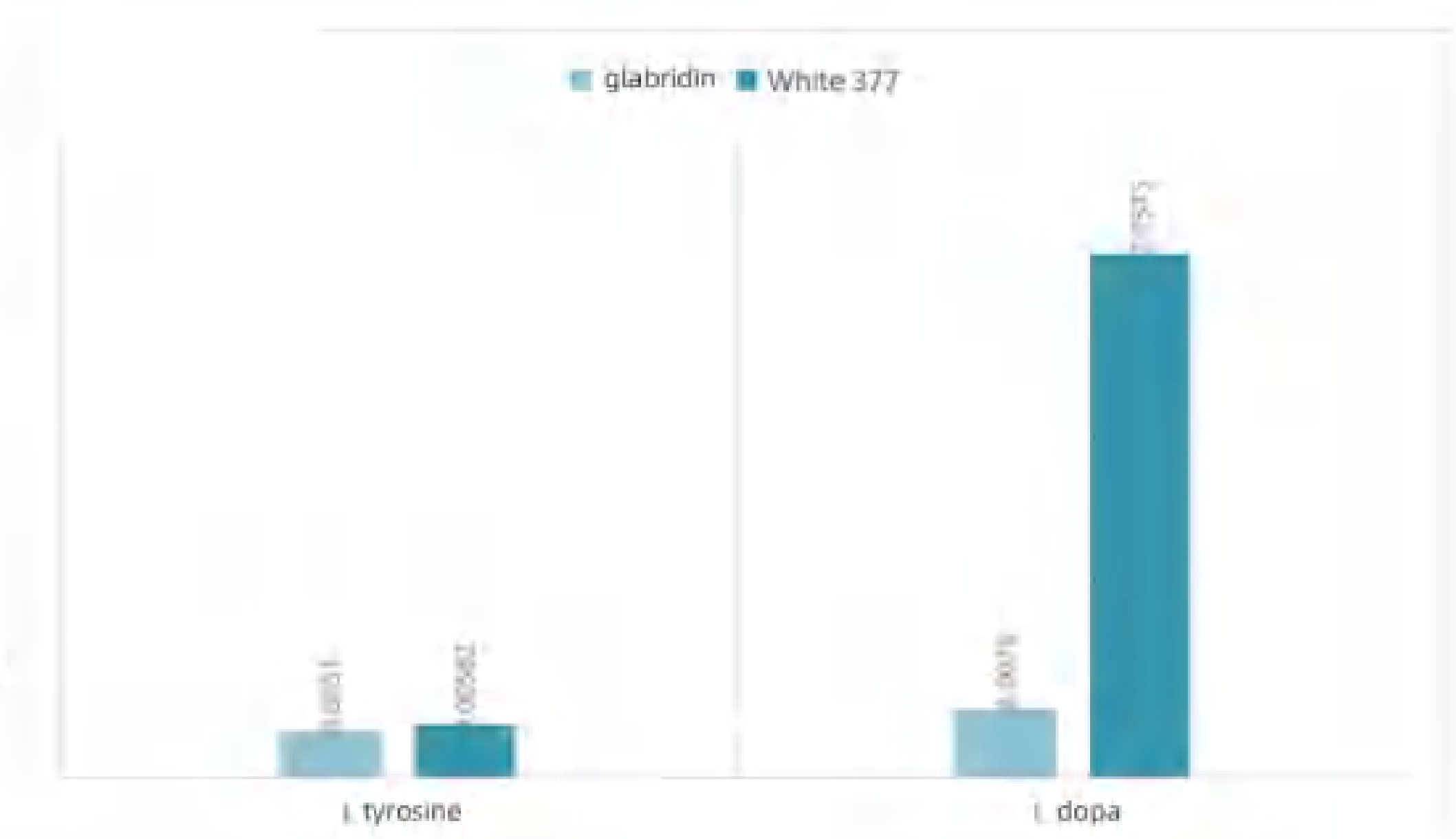
【 Comparison of tyrosinase inhibition rates 】

Comparison of the inhibitory effect of glycyrrhizin and other active substances on tyrosinase activity, IC50 (half of the required raw material concentration for tyrosinase inhibition, unit: μ Mol/L)



【 Comparison with competitors 】

When L-tyrosine is used as the substrate (on the left) and L-dopa is used as the substrate (on the right), the 50% inhibition rate of glycyrrhizin on tyrosine monophenolase and diphenolase shows that the order of inhibition activity is glycyrrhizin>Sym white377, with the former being **1.1** and **7.6** times higher than the latter.



【 Usage Guide 】

Content	Product characteristics	Solubility	Recommended	Dosage	Storage conditions
1%-5%	Colorless Transparent Liquid	Dissolved in water	1.0%-5.0%	The shelf life of liquid products is 12 months	Suggest storing licorice in a closed space that is dark, ventilated, and dry
1%-5%	Reddish brown liquid	Dissolved in alcohol	1.0%-5.0%		
1%-5%	Colorless Transparent Liquid	Dissolved in alcohol	1.0%-5.0%		
10%	White Powder	Dissolved in water		The shelf life of powder products is 24 months	
40%	Reddish brown powder	Dissolved in alcohol			
40%	White Powder	Dissolved in alcohol			
90%	White Powder	Dissolved in alcohol			
98%	White Powder	Dissolved in alcohol			
99%	White Powder	Dissolved in alcohol			

Welcome to customize various specifications and contents of Glabridin, 1-99% can be customized

Dipotassium glycyrrhizinate



[INCI Name] Dipotassium glycyrrhizinate

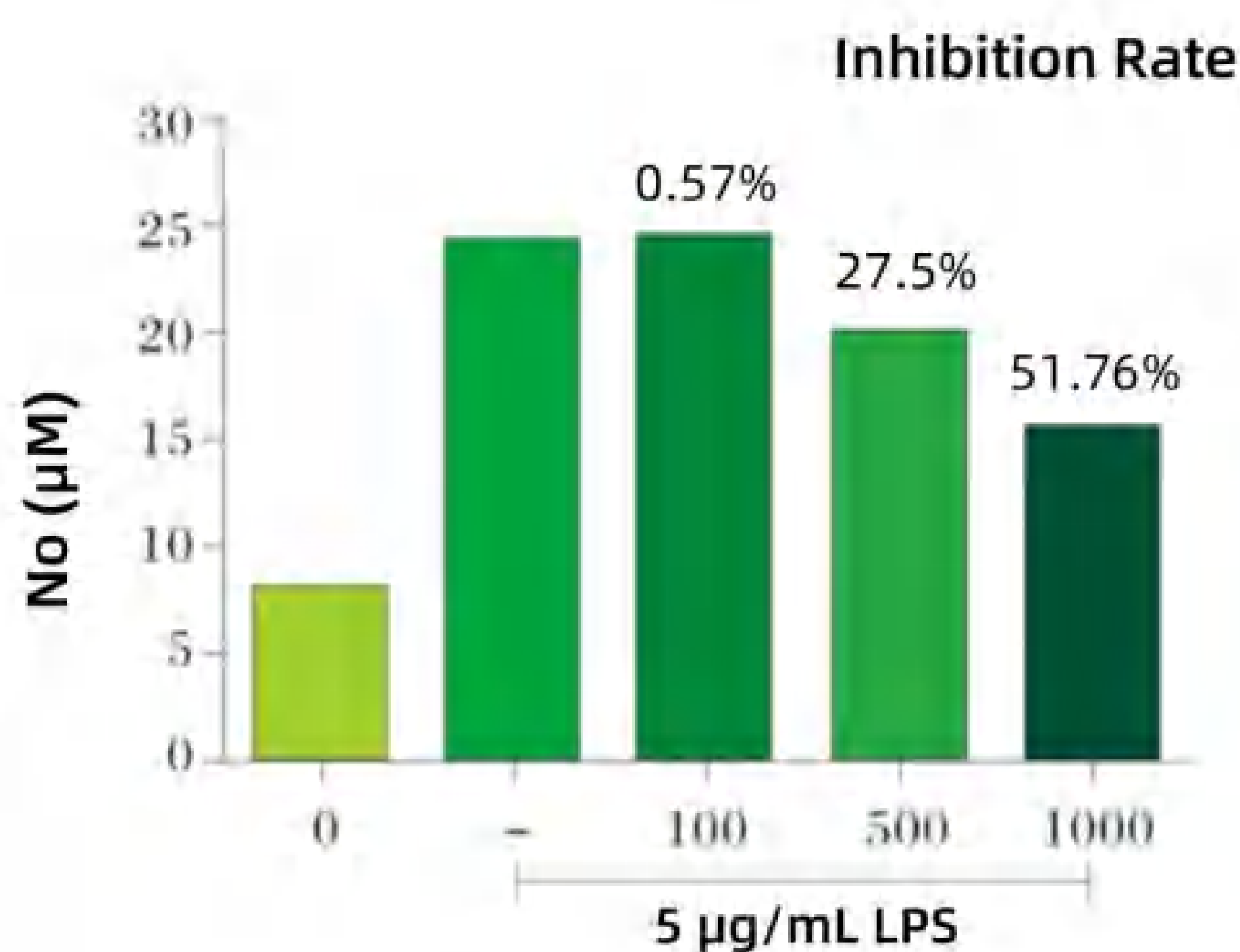
[Cas No.] 68797-35-3

[Introduction] Dipotassium glycyrrhizinate is widely used anti-inflammatory agent isolated from the licorice root. It is metabolized to glycyrrhizic acid. Studies have shown that it has many properties, including anti-inflammatory, anti-allergic, anti-bacterial, and anti-viral activities. Its anti-inflammatory effect is particularly well known and has been applied to clinical therapy, cosmetics, etc. It can be found in personal care products such as facial moisturizer/lotion, anti-aging treatment, sunscreen, acne treatment, cleanser, foundation, skin fader/lightener, facial mask and eye cream.

[Efficacy]

Principle: the inhibition effect of dipotassium glycyrrhizinate on NO produced by LPS-induced RAW264.7 cells was evaluated by detecting the content of NO in the cell supernatant.

The result showed NO was significantly inhibited by D.P.G of 500 μ g/mL and 1000 μ g/mL, exhibiting rate of 27.5% and 51.76%, the inhibition of different concentrations was in a dose-dependent manner.



Effect of D.G.P On the content of NO released by LPS-reduced RAW 294.7

Overnight cultures of *S.aureus* MW2 were adjusted to an OD of 1.0. Then, 100 μ l of bacterial culture was inoculated into 5 ml of TSB. The bacterial culture was incubated at 37 $^{\circ}$ C with shaking. When the OD at 660 nm reached 0.3, various concentrations (■: control, ◆: 1/64MIC, ▲: 1/16MIC, ●: 1/4MIC, x: 1xMIC, +: 2xMIC) of GRA (Glycyrrhizic acid) were added to the medium. The growth and colony counts were monitored.

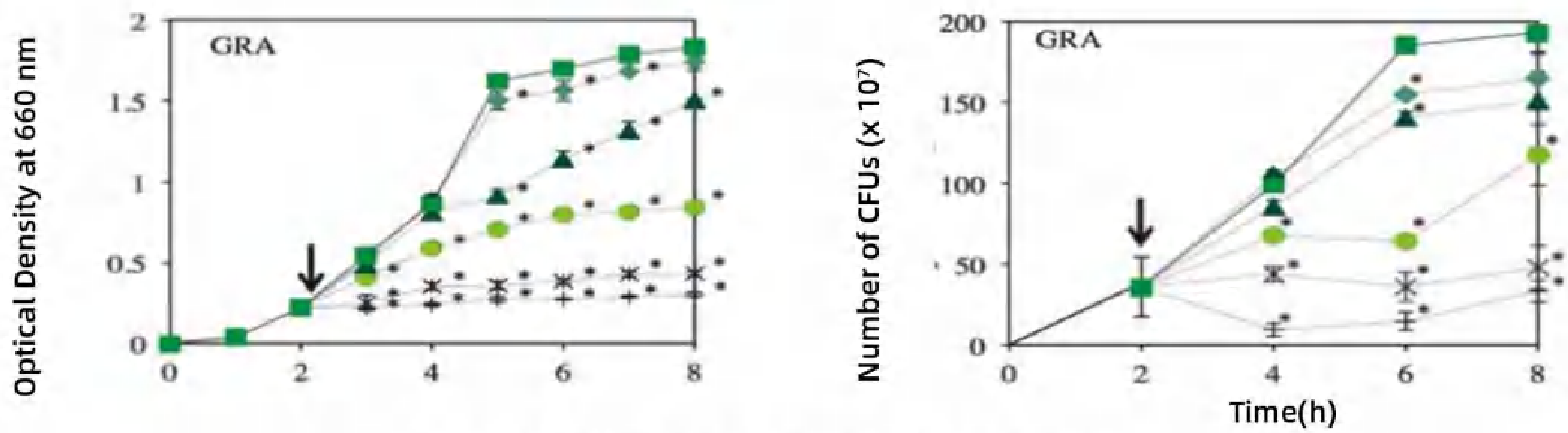


Fig2.Effect of GRA on *S. aureus* MW2 growth

As shown in Fig2, *S. aureus* MW2 growth was inhibited by the addition of GRA in a dose-dependent manner. The addition of more than 1xMIC of GRA fully inhibited the growth of *S. aureus* MW2 as expected, but growth was already inhibited by both agents at sub-MIC concentrations (1/16 and 1/4MIC).

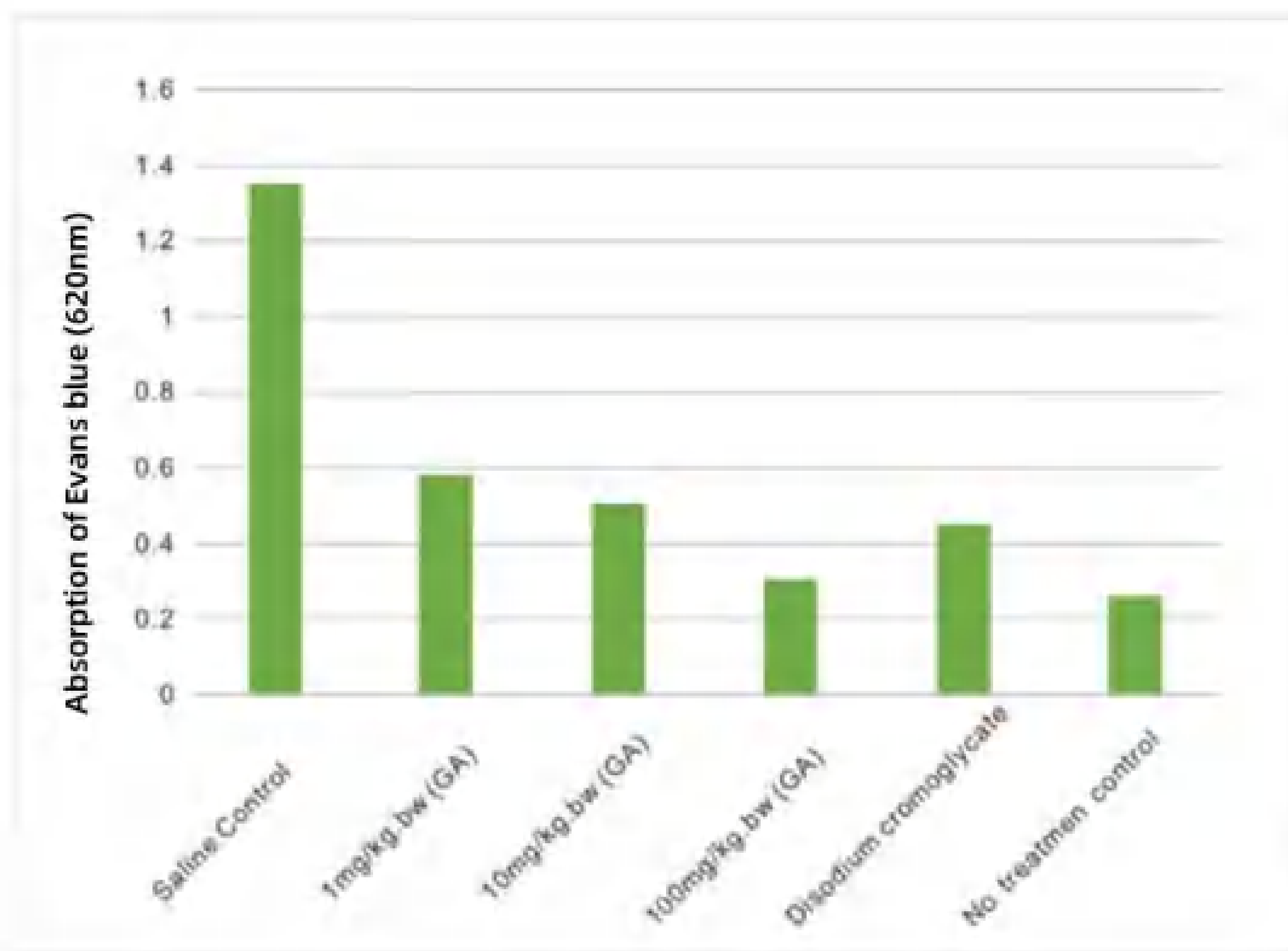


Fig 3. GRA can also act as a "mast cell stabilizer" to lieve allergic symptoms by suppressing mast cell-mediator release

Mast cells are responsible for IgE-induced anaphylaxis through the secretion of various inflammatory cytokines and mediators that can strengthen allergic symptoms.

According to the test, GRA significantly attenuated the mast cell-dependent PCA reaction in a dose-dependent manner, exhibiting 49.1%, 47.1% and 26.9% suppression at 1, 10 and 100 mg/kg · bw of GRA based upon Evans blue extravasation, respectively ($P < 0.05$, Fig3.)

[Practical Hint]

Dipotassium glycyrrhizinate	
Specification	UV 98% HPLC 73%/HPLC 75%
Appearance	White Powder
Recommended Dosage	0.5%-1%
Solubility	Do not dissolved in ethanol 1,3-butanediol etc. Dissolved in water
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area
Shelf life	24 months when properly stored

Portulaca Oleracea L.



[INCI Name] Portulaca Oleracea L.

[Cas No.] 90083-07-1

[Introduction] Carefully select wild purslane from multiple regions and compare it with cultivated purslane under multiple conditions to obtain the most suitable purslane grass for extraction, which is rich in anti-inflammatory and anti-allergic ingredients. One of the natural extracts from food and medicine, which is safer to use. The requirements for factory inspection indicators are much higher than those of peers. Standardize the quality of raw materials while strengthening the requirements for safety technical indicators such as pesticide residues. Portulaca oleracea extract has strong anti-inflammatory and soothing effects, and its anti-acne and anti-bacterial functions have gradually been recognized by consumers. Animal experiments have shown that purslane extract and dexamethasone have similar anti-inflammatory effects at the same concentration.

[Anti-inflammation]

After applying xylene to induce ear swelling in mice, compared with the blank control group, the purslane extract and dexamethasone positive control group showed a significant decrease in the degree and rate of ear swelling in mice, indicating that both dexamethasone and purslane extract can have anti-aging effects.

The high-dose group of purslane extract and the positive control group of dexamethasone showed more significant effects. When the mass concentration of purslane extract was 150g/L, its swelling inhibition rate was higher than that of dexamethasone solution with a mass concentration of 100g/L.

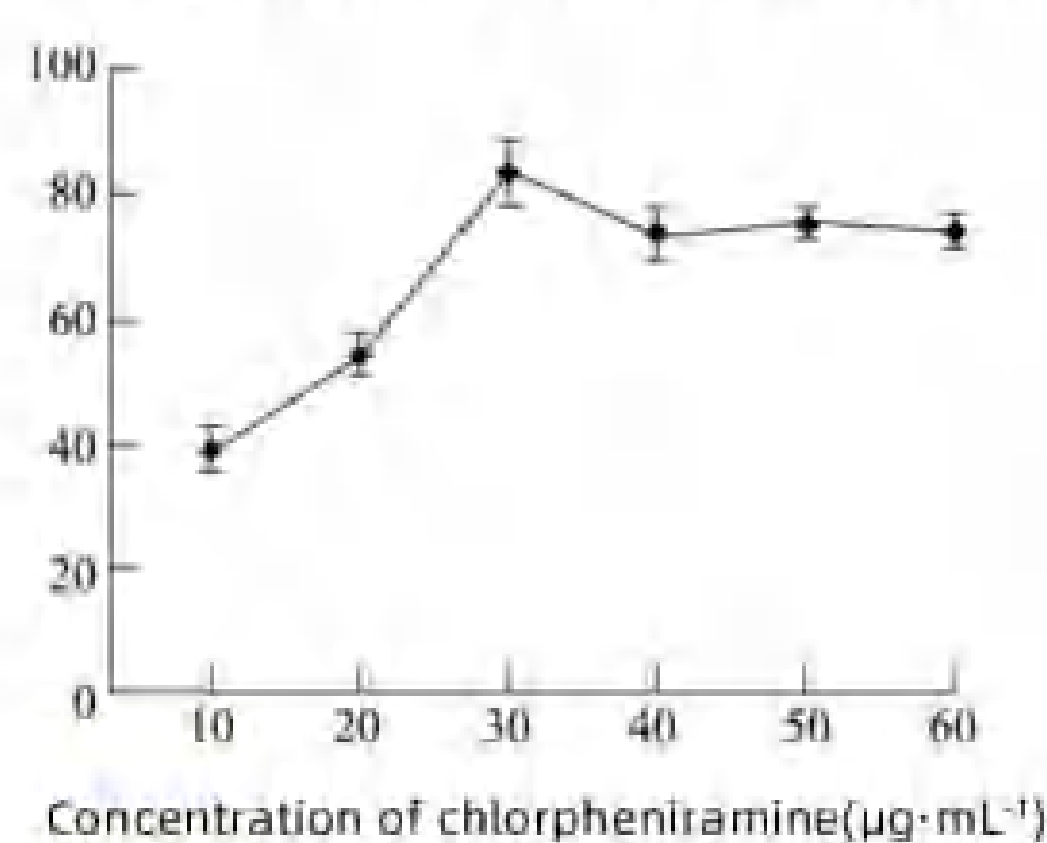
Experimental results of xylene induced ear swelling in mice

Group		Swelling degree/mg	Swelling rate/%	Swelling inhibition rate/%
Blank control group	—	36.63 ± 1.04	89.56 ± 3.72	—
Dexamethasone positive control group	100	22.44 ± 1.58 ^{***}	59.37 ± 5.03 ^{***}	38.73
Low dose group of purslane extract	50	32.25 ± 1.63 ⁺	85.03 ± 4.17 ⁺	11.95
Middle dose group of purslane extract	100	23.75 ± 1.06 ⁺	64.33 ± 4.08 ⁺	35.16
High dose group of purslane extract	150	16.21 ± 1.79 ^{***}	44.17 ± 8.16 ^{***}	55.74

Note: ^{***} indicates P<0.05, with significant differences compared to the blank control group. ^{***} indicates P<0.01, with extremely significant differences compared to the blank control group.

Detect the soothing and anti-inflammatory effects of purslane extract by measuring the inhibition rate of hyaluronidase.

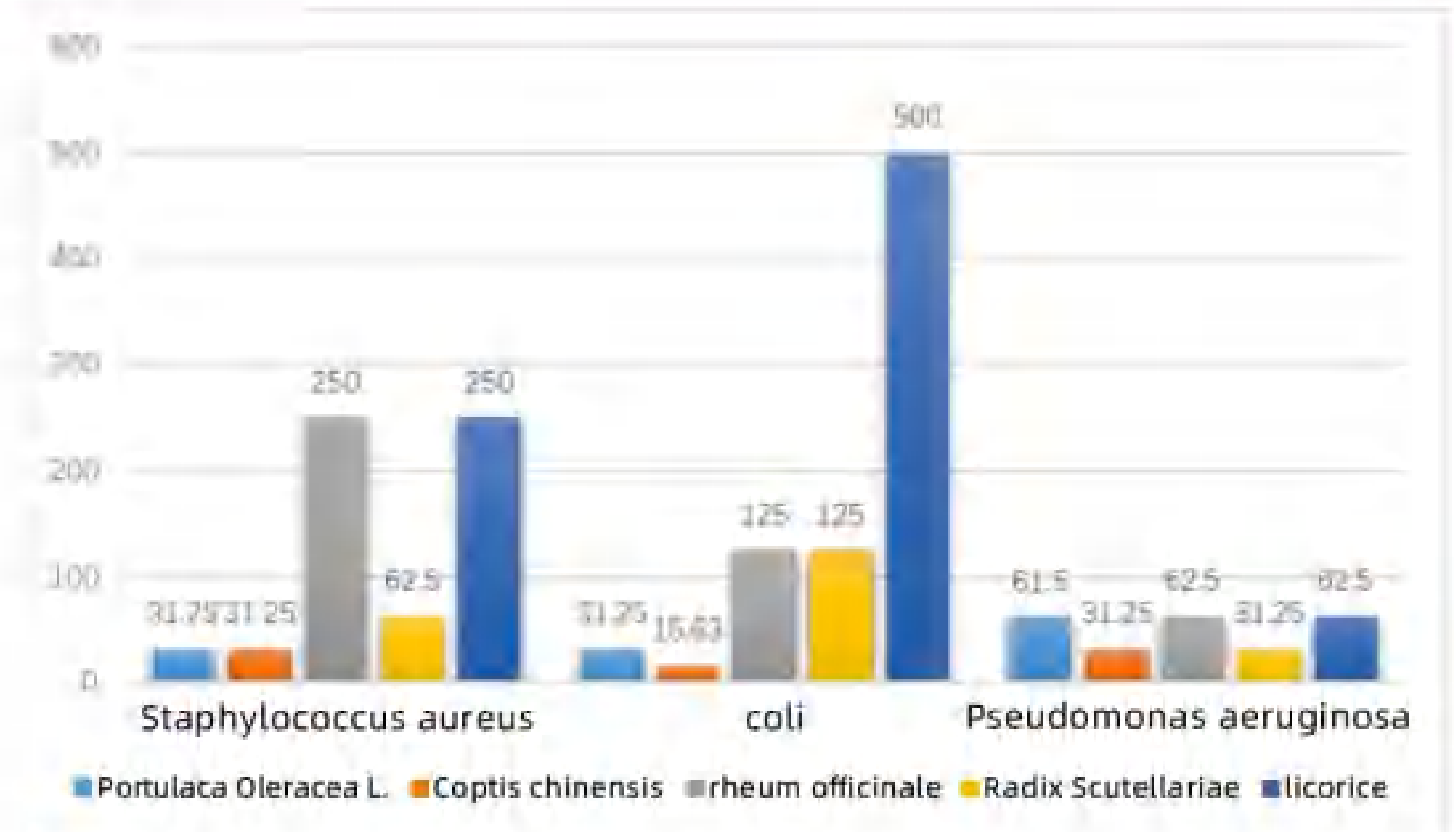
At present, common anti-allergic testing methods in the detection of toiletries include hyaluronidase in vitro inhibition test, mast cell histamine release test, etc. The hyaluronidase in vitro inhibition test is a measurement method that is strongly correlated with allergies. The following experimental data can verify that the purslane extract has significant anti-allergic activity.



Hyaluronidase inhibition results

[Anti-inflammation]

The comparison of minimum inhibitory concentration (MIC) between purslane extract and commonly used anti-bacterial extracts revealed that purslane extract exhibited better anti-bacterial efficacy, significantly outperforming licorice, scutellaria, and other traditional Chinese medicine extracts.



[Application related]

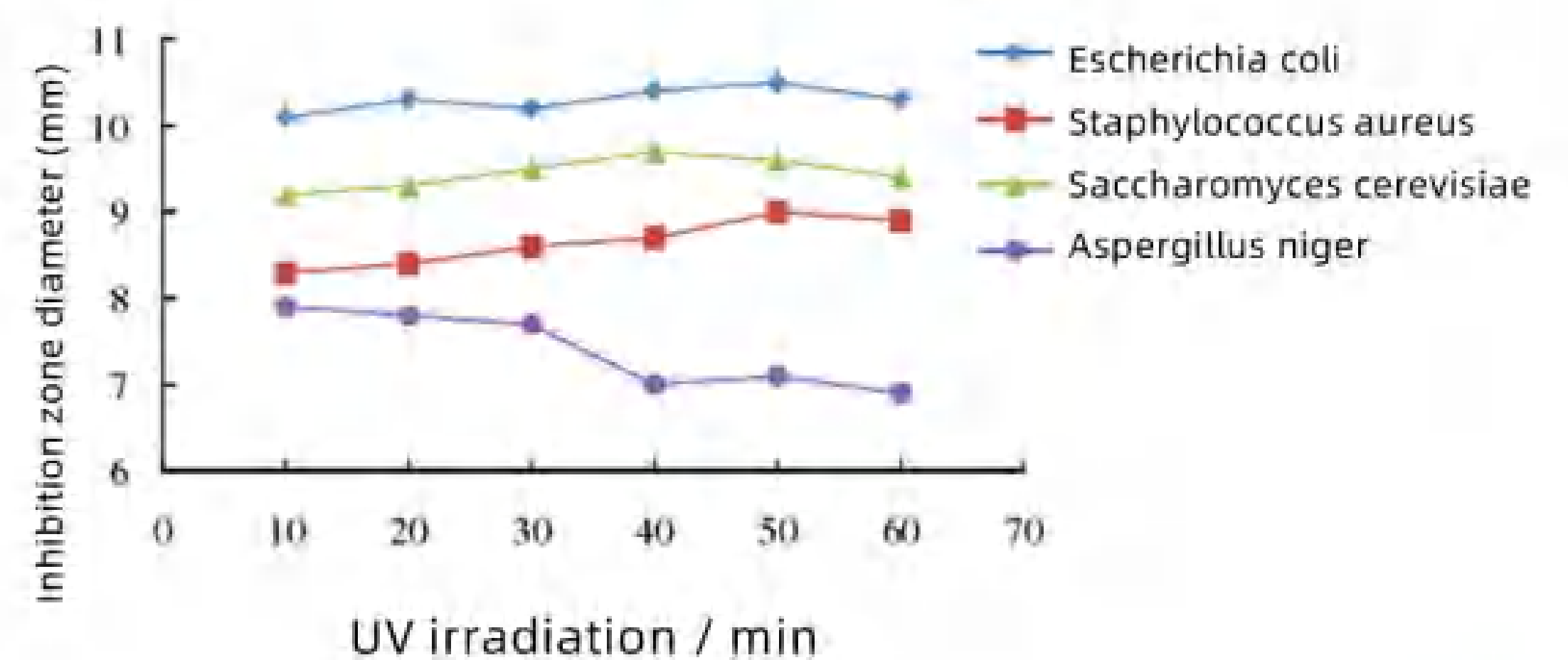
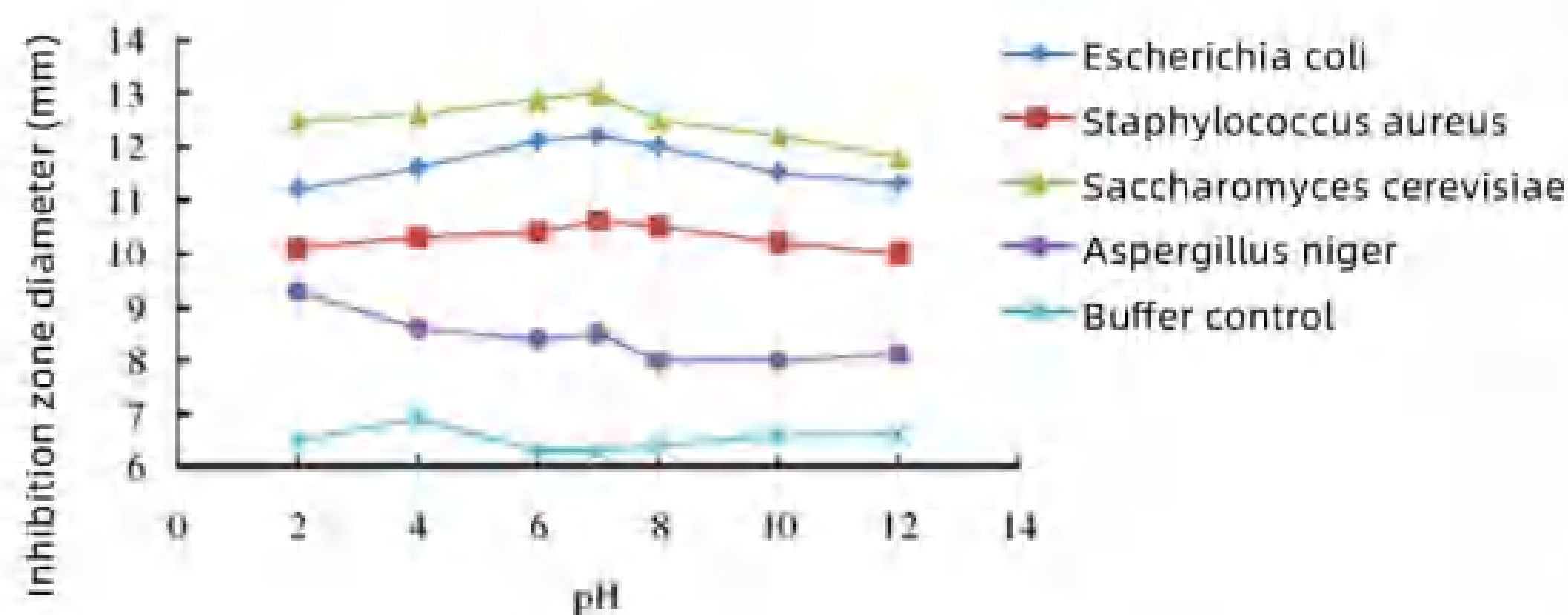
1. Basic Formula: Proportion of addition in the formula: Skincare Anti-allergic Agent:

1.0%-5.0%; Body Wash: 1.0%-2.0%; Anti-itch and Anti-dandruff Shampoo: 1.0%-5.0%;

Functional Body Lotion: 3.0%-5.0% (It is recommended to use a 1.0% colored extract of Portulaca Oleracea). Usage Method: Water Phase System: Direct Addition; Temperature:

Below 60°C; pH Environment: 4.0-7.0.

2. Stability: The anti-bacterial ability of Portulaca Oleracea weakens when the pH is greater than 7, while in acidic environments, its anti-bacterial ability gradually increases. The strongest inhibitory ability of flavonoids on bacterial cells is observed at a pH of 6-7. With the increase in UV exposure time, the anti-bacterial ability of Portulaca Oleracea diminishes due to the oxidation of flavonoids. Therefore, minimize exposure to sunlight and UV radiation.



[Practical Tips]

Content	1.0%	2.0%	3.0%	4.0%	5.0%
Specification	Red brown liquid, slightly yellow liquid		Red brown liquid	Red brown liquid	Dark brown liquid
Recommended Dosage	1.0%-5.0%	1.0%-5.0%	0.5%-1.0%	0.5%-1.0%	0.5%
Solubility	Dissolved in aqueous phase				
Quality	The shelf life of liquid products is 12 months				
Storage	It is recommended to store the extract of purslane in a closed space that is dark, ventilated, and dry				



Totarol

[Introduction] Totarol is a new type of anti-bacterial acne product, with raw materials sourced from the New Zealand totara tree. This product is a natural active substance extracted from the core material of the totara tree, with various effects such as acne removal, bactericidal, anti-inflammatory, whitening, and anti-oxidant properties. In addition to providing the skin with anti-inflammatory and acne-fighting properties, this product can also brighten and moisturize the skin. In response to market demands, Shaanxi Huatai has further purified and refined the product, producing white powder and liquid forms based on the imported 80% light yellow powder content.

[Anti-bacterial property]

Totarol belongs to small molecule (molecular weight 286.5 Daltons) yellow or white powder oil-soluble .



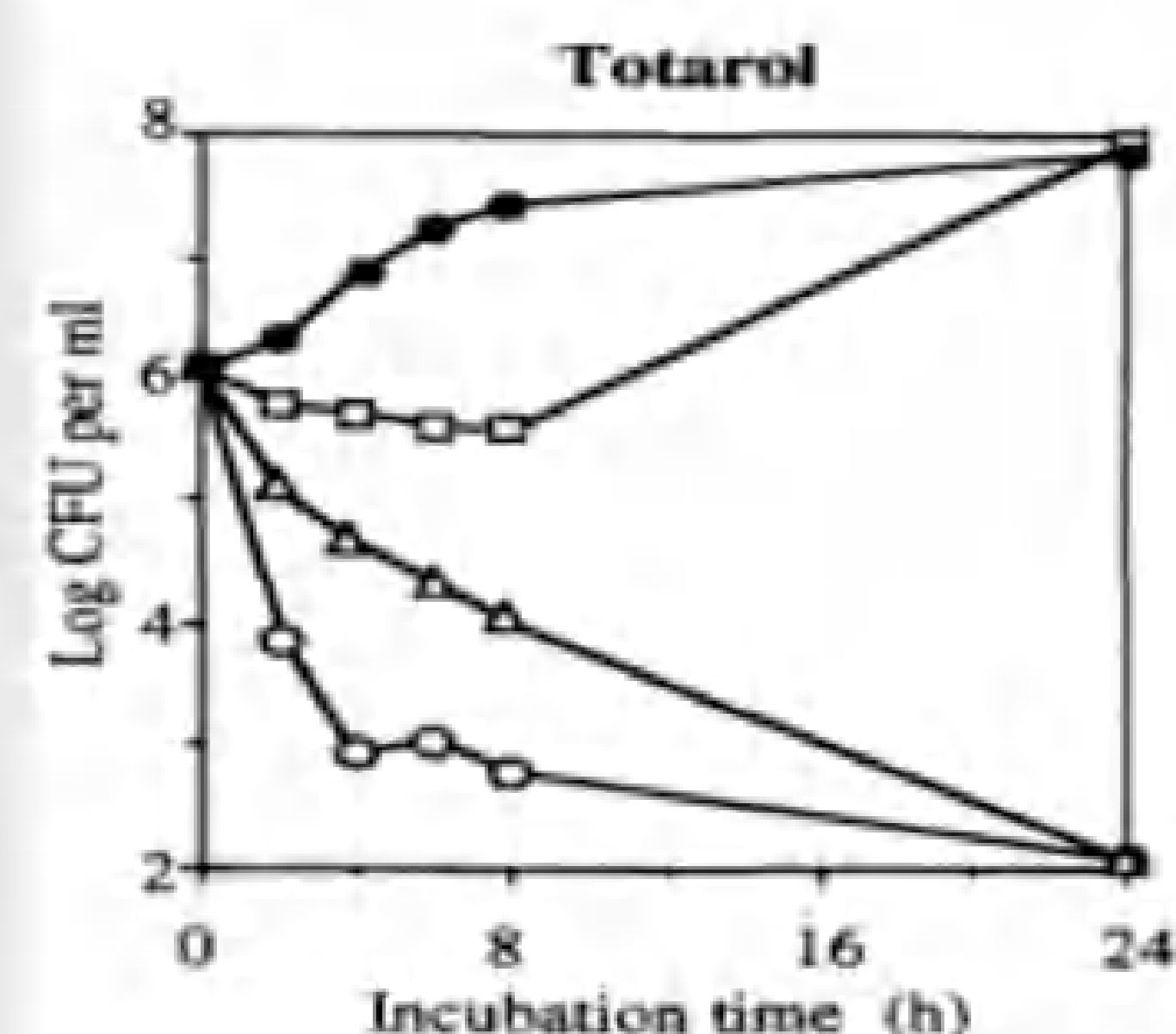
Research data shows that Totarol has excellent anti-bacterial activity, and compared with tea tree essential oil, it has better ability to resist Gram positive bacteria (including P.acnes and other acnes) and Gram negative bacteria.

In addition to its excellent ability to resist Propionibacterium acnes, Totarol also has excellent anti-oxidant properties. There is no initial skin irritation or initial skin allergy to the skin. As a maintenance ingredient for acne prone skin, its non irritating natural anti-bacterial properties make it safer. Shaanxi Huatai Biotechnology provides different types of Totarol, including powders, water-soluble liquids, and alcohol soluble liquids, based on the properties of Totarol and terminal needs, to meet the requirements of cosmetics with various oil soluble and water-soluble systems.

[Anti-inflammatory and anti-bacterial]

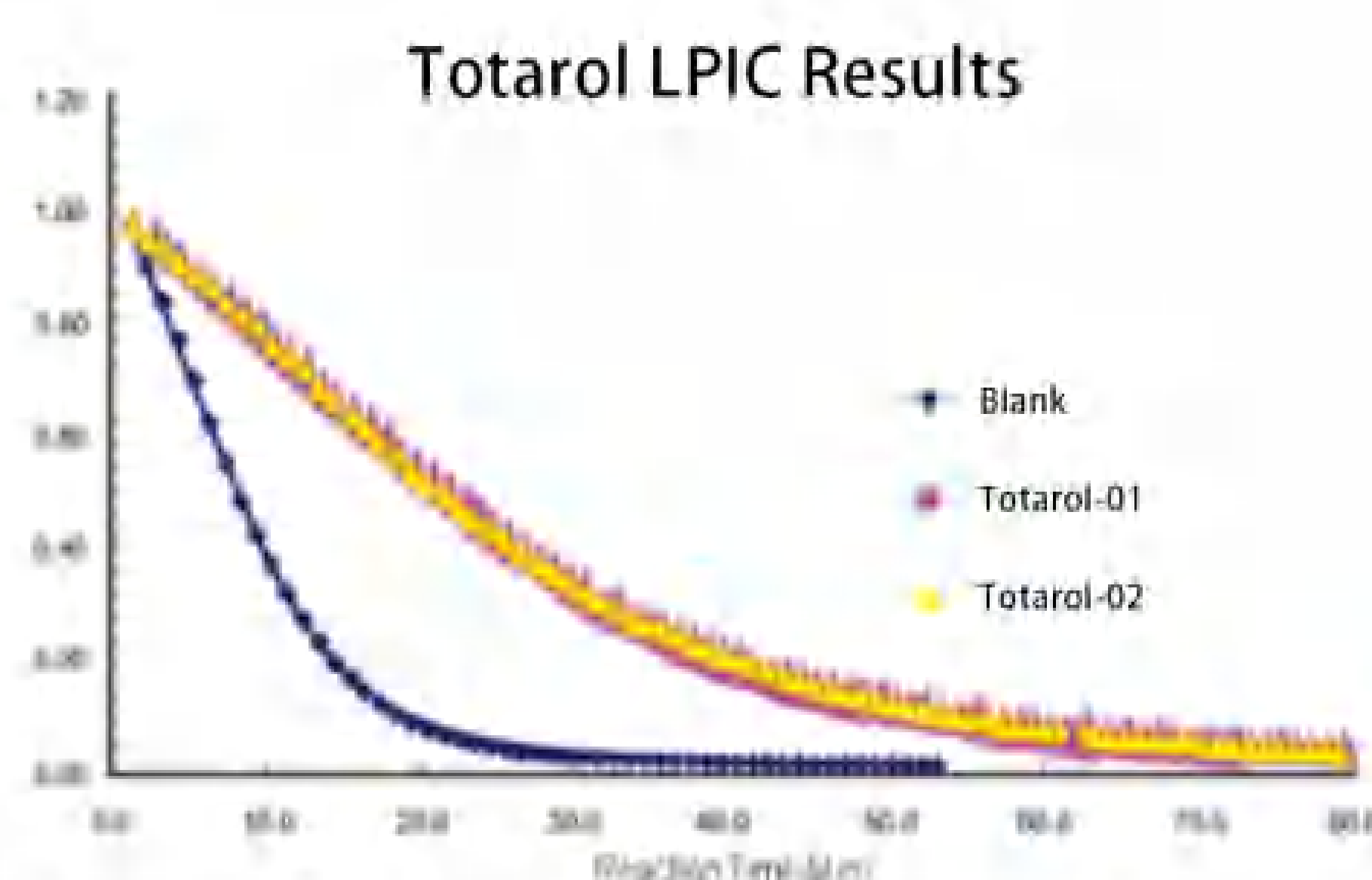
Inoculate a 30 µl sample of the two-day culture in a 1/2 ratio into 3 ml of NYG broth containing quinone (□), 1 (△), and 2 (○) times MIC (●) without adding any compounds. The initial vaccination dose is approximately 1x10⁶ CFU/ml. At 2, 4, 6, 8, and 24 hours of cultivation, the number of live cells was measured by counting the colonies formed by continuous 10 fold dilution on NYG agar. Incubate at 37 °C for 18 to 24 hours before counting. The detection limit is 10²CFU/ml.

Staphylococcus aureus (MRSA) infection is an important issue among hospitalized patients, as MRSA strains often exhibit multiple anti-biotic resistance, they have become a global epidemic threat. Therefore, it is necessary to search for new anti-bacterial agents with anti MRSA activity. In this study, we found that pomelol has a good inhibitory effect on this bacterium.



[Anti-oxidant efficacy]

The phenol samples extracted by CO₂ extraction method were tested at room temperature. Due to its poor water solubility, it is difficult to detect its anti-oxidant activity in water-based experiments. This experiment was conducted based on the lipid membrane test. The anti-oxidant activity of pomelol was measured using the LPIC method, and this graph shows the variation of the LPIC value of pomelol over time. The chart shows the variation of LPIC values of phenols over time. Toharol-01 and Toharol-02 are repeated tests.



Result: In the lipid membrane based anti-oxidant assay, the activity was very high. Therefore, phenol has good anti-oxidant and anti-corrosion activity in lipid or lotion systems.

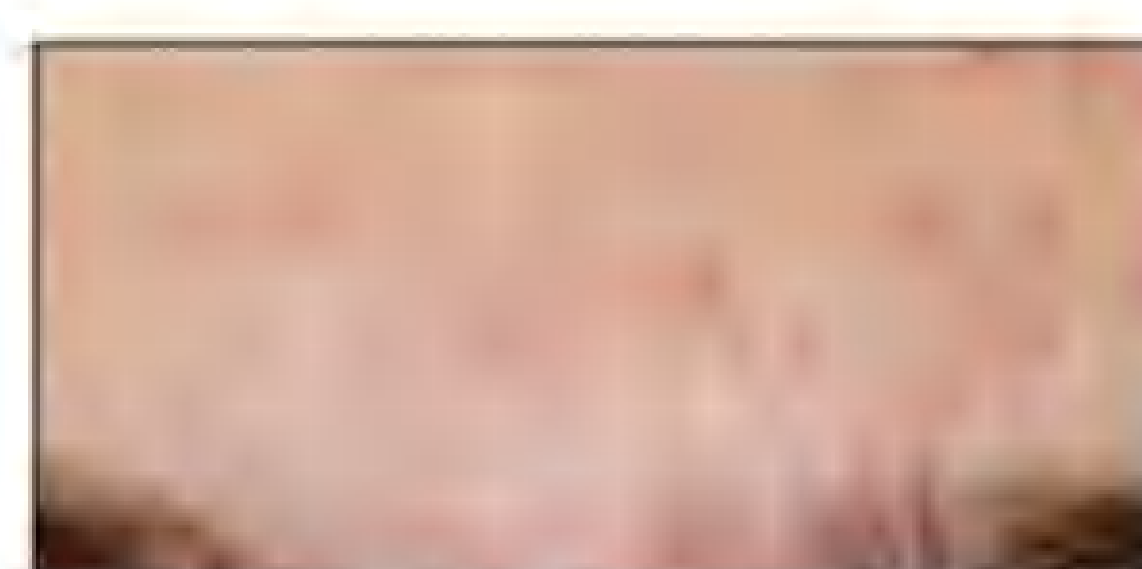
[Acne removing efficacy]

Totarol, a rare phytochemical, can effectively combat acne and dental plaque bacteria, and is also one of the substances that can effectively combat resistant strains of penicillin and methicillin in Staphylococcus aureus.

During a 42 day testing period, a teenage acne patient (twice a day, 0.5% treated) was tested with a product containing Totarol. The result is shown in the figure:



BEFORE



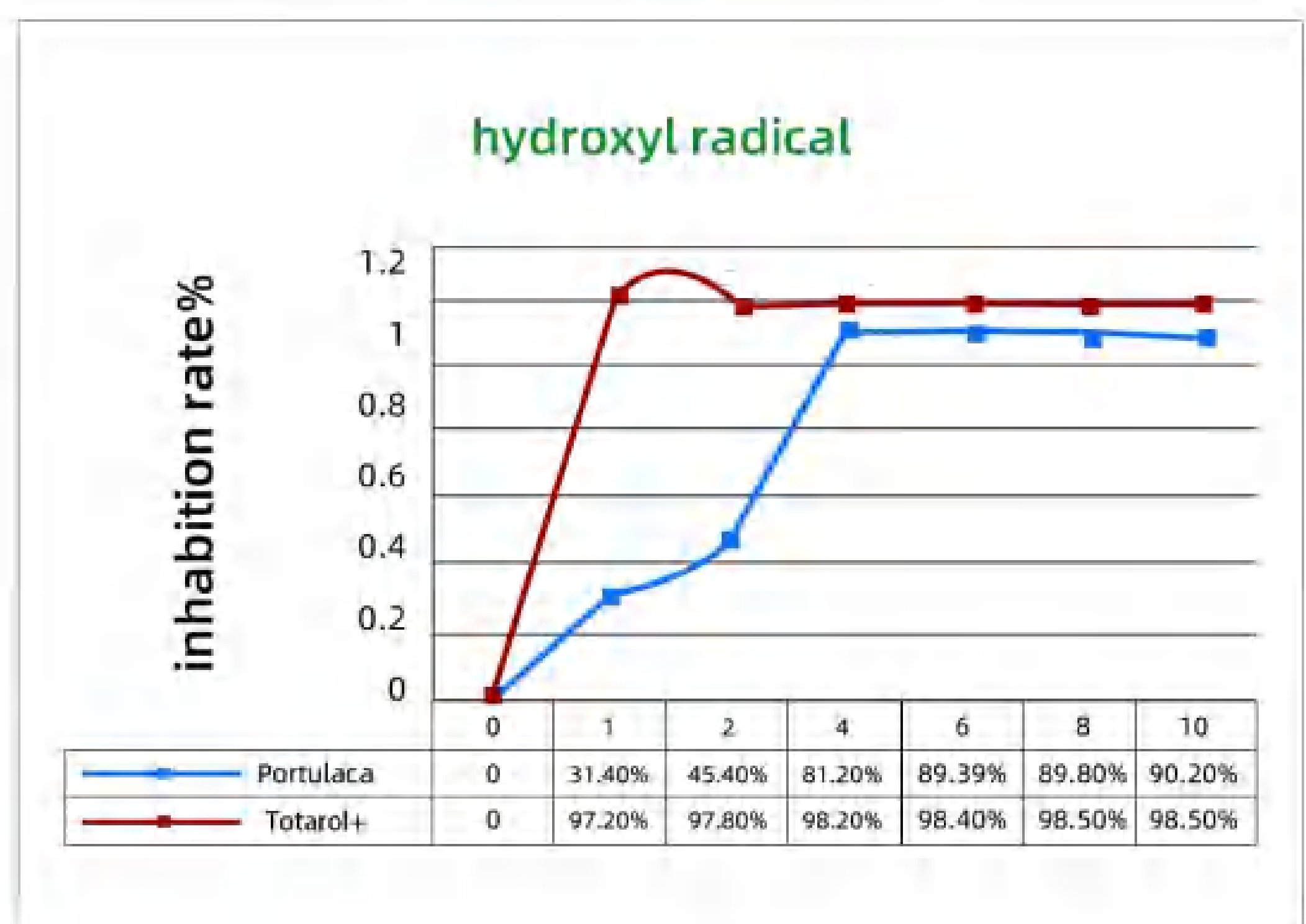
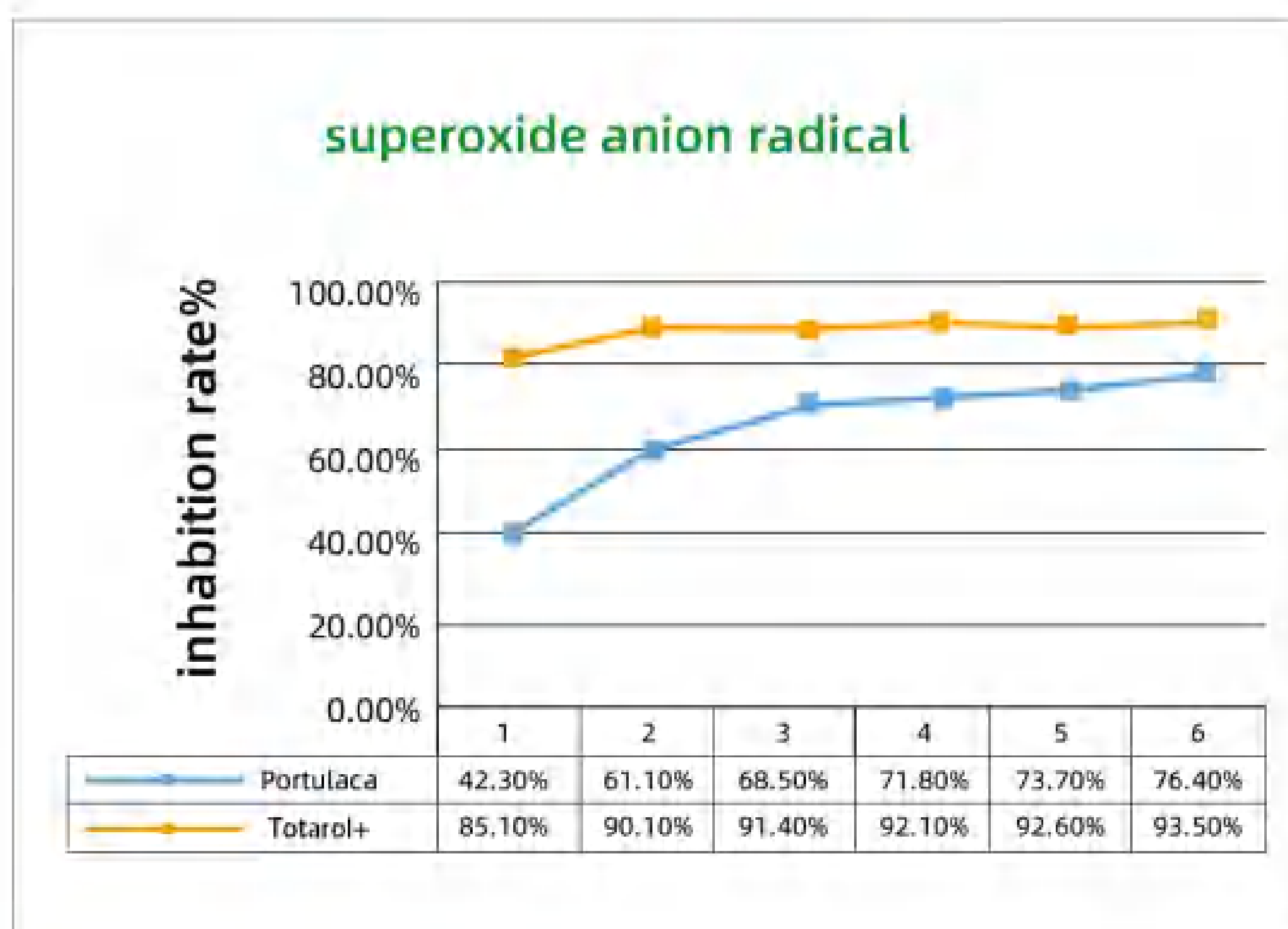
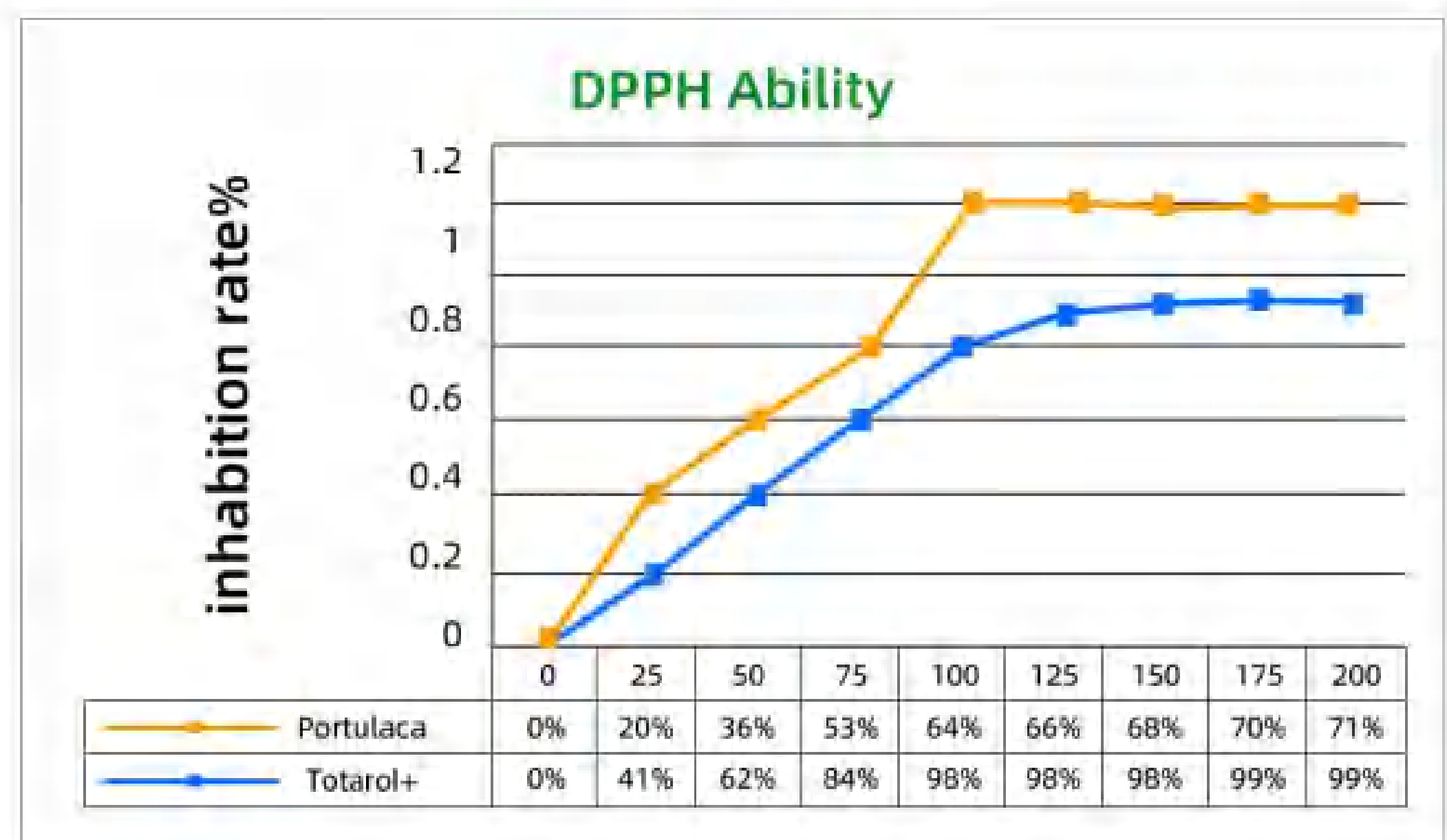
After 42 days of use

[Oral care]

As an anti-bacterial ingredient added to toothpaste and mouthwash, Totarol has a significant anti-bacterial effect in the low concentration range of 0.001-0.05%, even better than the anti-bacterial effect of toothpaste and mouthwash containing high concentrations of Totarol. It can effectively inhibit the growth of pathogenic bacteria and harmful oral bacteria, and has a good effect on preventing oral diseases and maintaining comprehensive oral health.

[Anti-oxidant Activity Test]

The anti-oxidant capacity was evaluated by the determination of cleaning DPPH ability, hydroxyl radical and superoxide anion radical in vitro. Comparing 1% Totarol liquid and 1% portulaca liquid, the oxidation resistance of purslane is much lower than Totarol with the increase of concentration.



[Practical Hint]

Content	Product characteristic	Solubility	Suggested addition amount	Quality guarantee period	Storage condition
1%-10%	Colorless Transparent Liquid	Dissolved in water	1.0%-2.5%	The shelf life of liquid products is 12 months	Suggest using pomelol Store in dark Well ventilated and dry In enclosed spaces
1%-10%	Yellow orange liquid	Dissolved in water	1.0%-2.5%		
1%-10%	Colorless Transparent Liquid	Dissolved in alcohol	1.0%-2.5%		
80%	Yellow orange powder	Dissolved in water	0.1%-1.0%	The shelf life of powder products is 24 months	
99%	White Powder	Dissolved in alcohol	0.1%-0.5%		

Welcome to customize various specifications and contents of Roharol, 1-99% can be customized



Anti-Acne

[Introduction]

Anti-Acne is a special compound of pure natural acne product newly developed by Shaanxi Huataibio. It is made from the main raw material of Totarol extracted from New Zealand Totara trees, and extracted and compounded with the ingredients of Magnolia officinalis, liquorice, Centella asiatica and other Chinese herbal medicine.

[Bacteria Inhibition]

Anti-bacterial Effect

Compared with Anti-Acne and Rhubarb extract, the bacterial inhibition rate was increased by 35 times and 112 times, respectively.

Anti-Acne has significant anti-bacterial effect. (Data source: outsourcing third-party laboratory)

Bacterial species	Bacteriostasis Situation (Unit: $\mu\text{m}/\text{ml}$)			
	Anti-Acne (MIC)	Anti-Acne (MBC)	Rhubarb Extract (MIC)	Erythrocin (MIC)
Staphylococcus aureus	0.44	0.88	15.6	0.049
Propionibacterium acnes	0.28	0.56	31.3	0.012

[Anti-inflammatory]

The anti-inflammatory effect of Anti-Acne was proofed by inhibition test about the major pro-inflammatory factors NO, interleukin (IL-1) and THF-a. (Blue bar diagram is without LPS-induced bacterial content). In the NO inhibition test, after LPS induction, the NO content in the blank control group reached a peak of $12.5\mu\text{M}$. When different levels of Anti-Acne were added, they decreased gradually. Compared with the blank control group, the inhibition rate was increased by 17.8 times. For the interleukin (IL-1) and THF-a inhibition tests, the inhibitory effect became more and more obvious with the increase of Anti-Acne concentration (10, 20, $40\mu\text{M}$). The effect was significant when the concentration was $40\mu\text{M}$, and the inhibition rate of inflammatory cytokines was increased by 4.5 times and 7 times respectively compared to the blank control group. Fig 2 showed after 4h and 8h of skin edema, after reach 12 hours, the Anti-Acne area completely reduced swelling and returned to its normal skin state, and more quickly than portulaca oleracea.

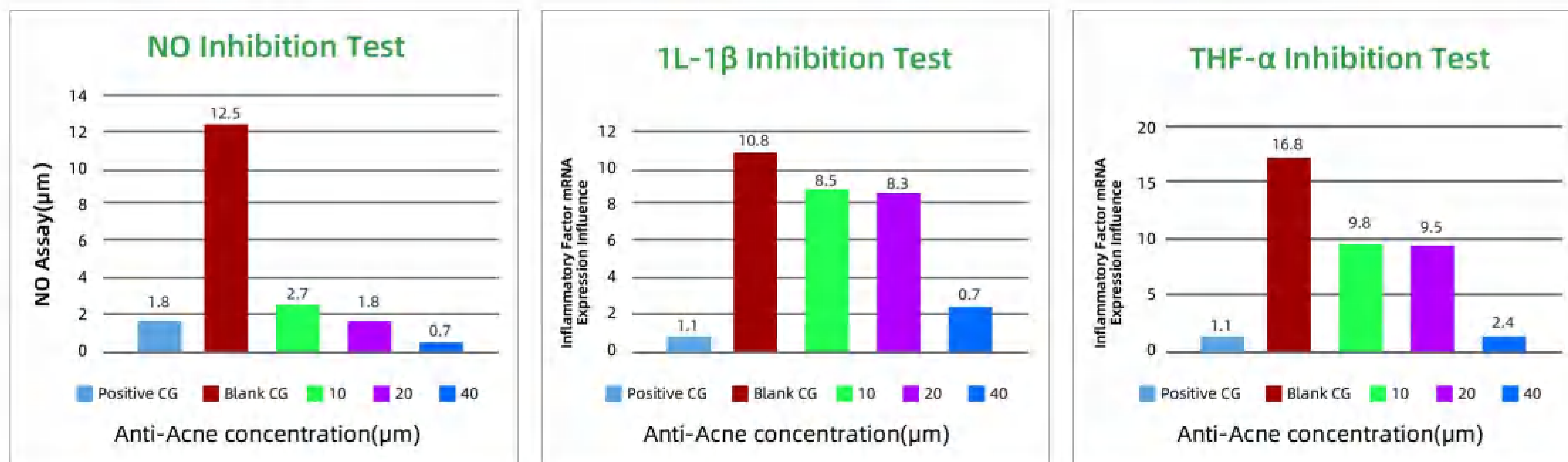
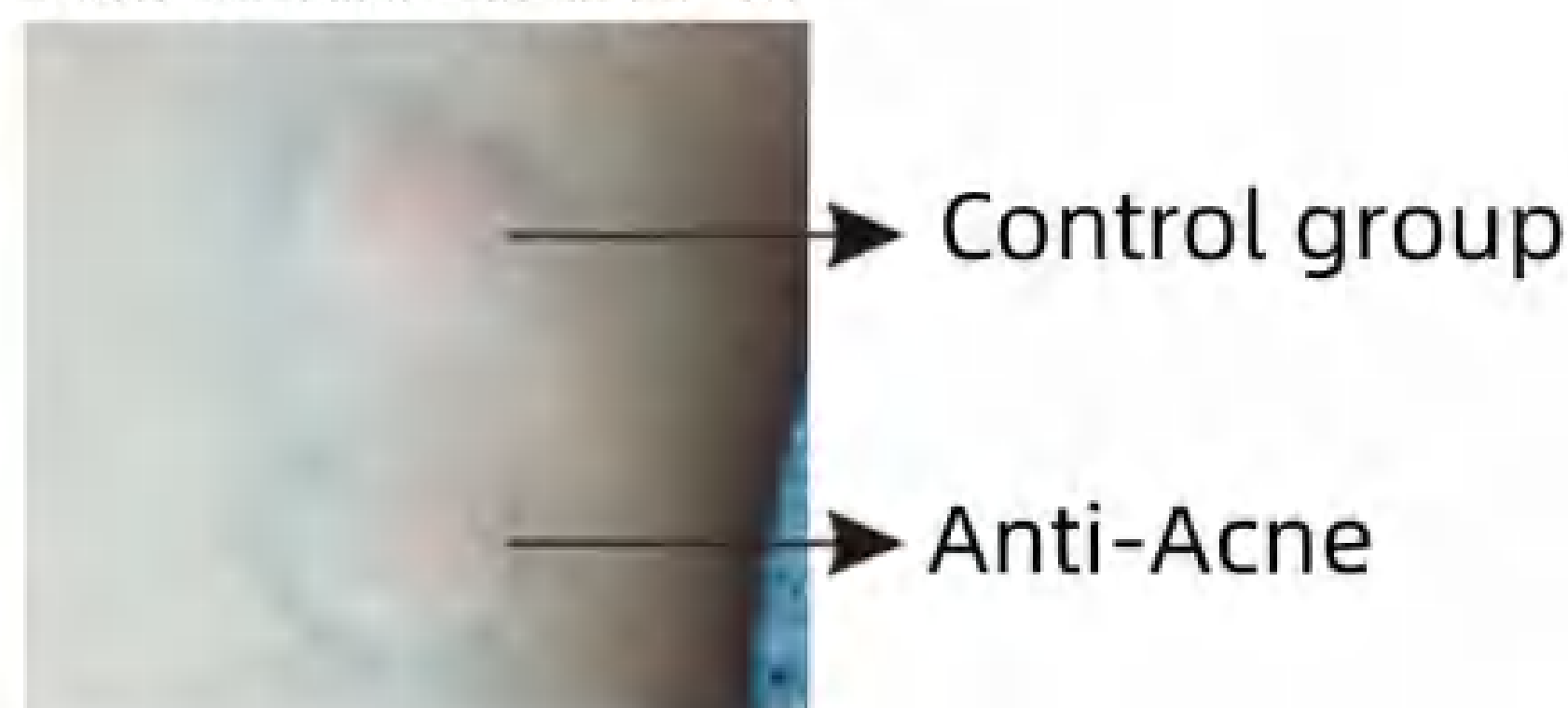


Fig 1

[Anti swelling effect]

Skin Conditions after 4h



Skin Conditions after 8h

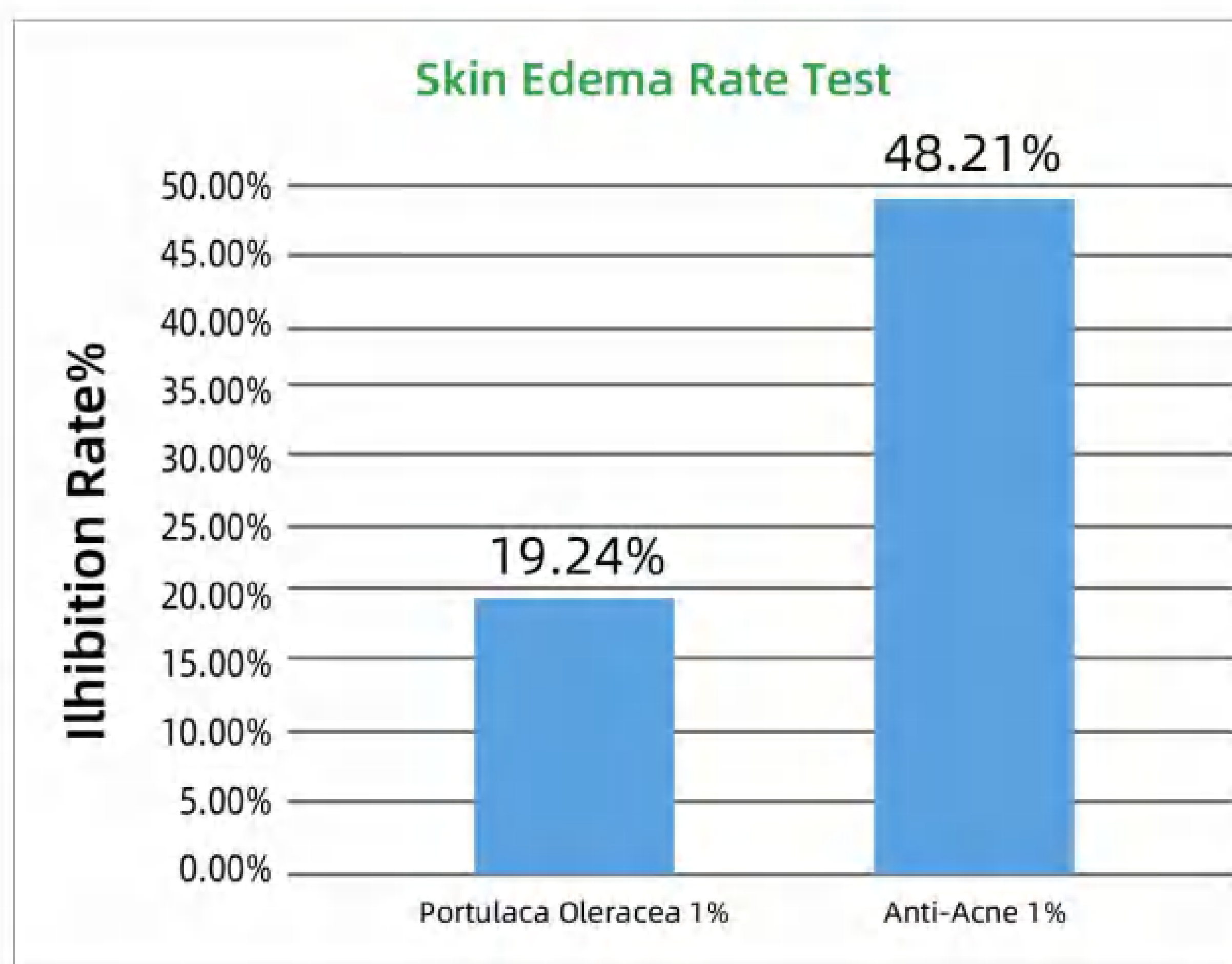
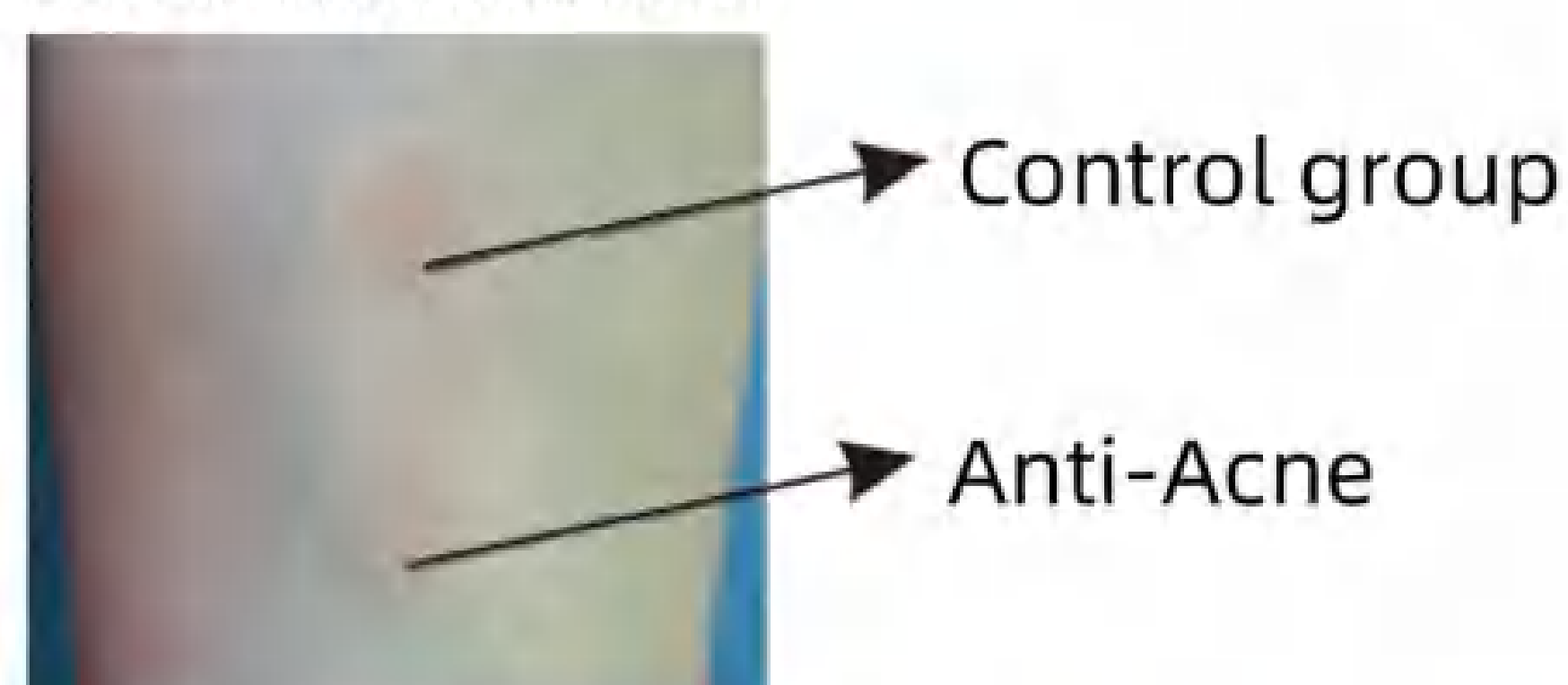


Fig 2

[Anti-allergy Comparison]

The hyaluronidase inhibition rate of 17 plant samples was shown in the figure below. Anti-Acne (inhibition rate 74.50%)> Totarol(inhibition rate 57.13%)>Centella (inhibition rate 51.43%)> Cactus (inhibition rate 48.5%)> Tea polyphenols (inhibition rate 47.7%)> Dipotassium Glycyrrhizate(inhibition rate 47.6%)> Grape Seed (inhibition rate 46.6%)> Oat Alkaloid (inhibition rate 42.6%)> Portulaca Oleracea (inhibition rate 42.4%) (active substance content:0.1%)

[Description]

Specification	1%,2%
Appearance	Red brown liquid
Recommended Dosage	1%-5%
Solubility	Soluble in water
Storage	Store in dark,low temperature(20°C),and ventilation conditions
Shelf life	12 months
Application	Cream,lotion,mask,etc



Oat β -glucan

[Introduction] Oat β Glucan is extracted from oat bran and is a unique {1,3}, {1,4}- β -D-glucan linear chain molecular structure, the oat glucan liquid produced by Huatai Biotechnology is a refined colorless and odorless liquid with a molecular weight of less than 200kDa, easy to absorb, and easy to add to the formula. It has been proven to form a natural protective film on the surface of the skin, thus having soothing, anti allergic, restorative, and protective effects on the skin. Has a deep moisturizing effect on the skin, fast and long-lasting.

[Function]

- ◆ 1. Anti-wrinkle and anti-aging
- ◆ 2. Long-lasting moisturizing
- ◆ 3. Wound healing, Scar removing
- ◆ 4. Improve skin smoothness
- ◆ 5. Increase skin elasticity
- ◆ 6. Anti-allergy, anti-irritating
- ◆ 7. Improve hair strength and extensibility

1. Oat beta-glucan moisturizes and regenerates the skin, supporting its renewal and reducing redness with dosage 2% after 28 days:



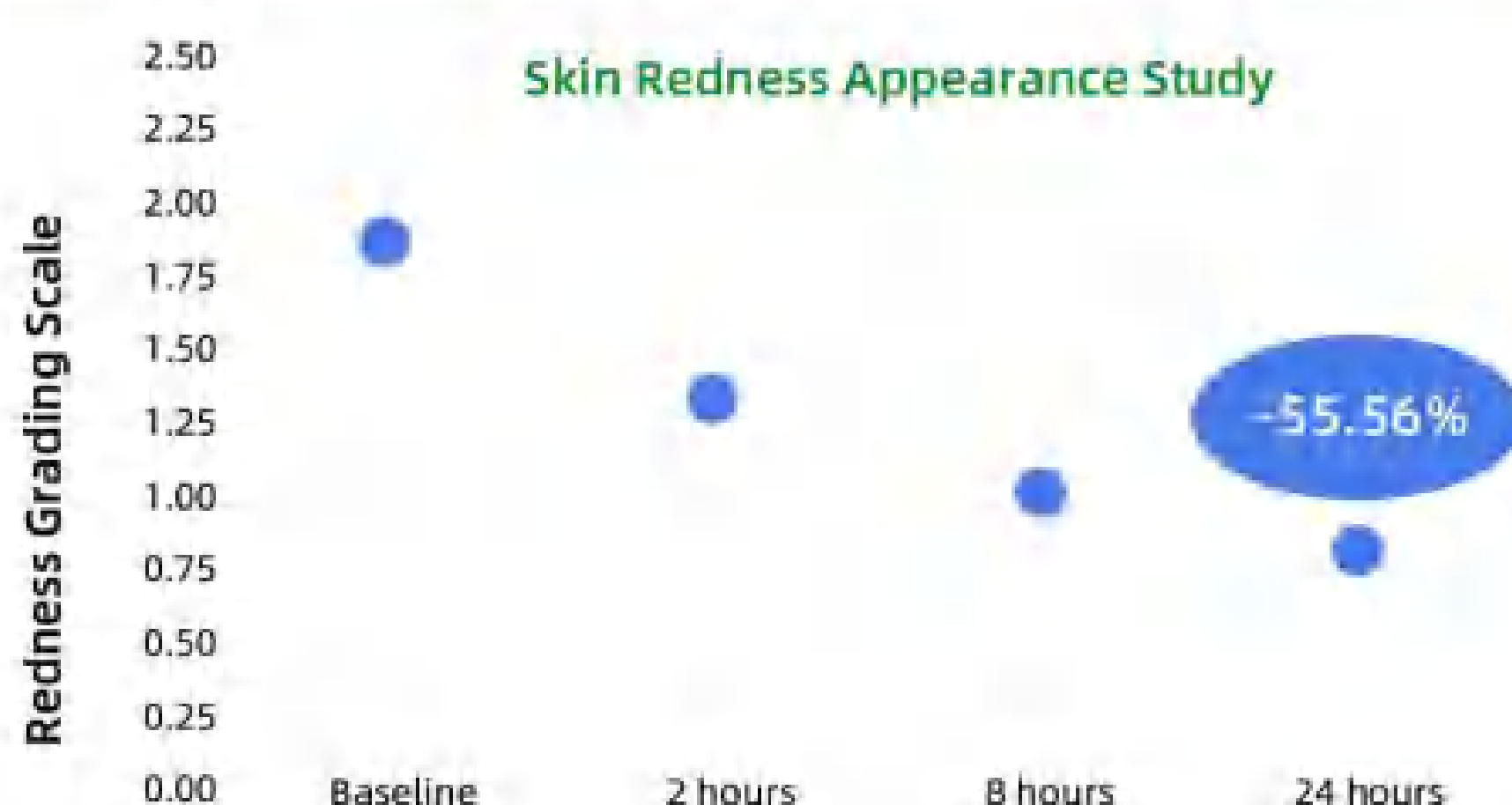
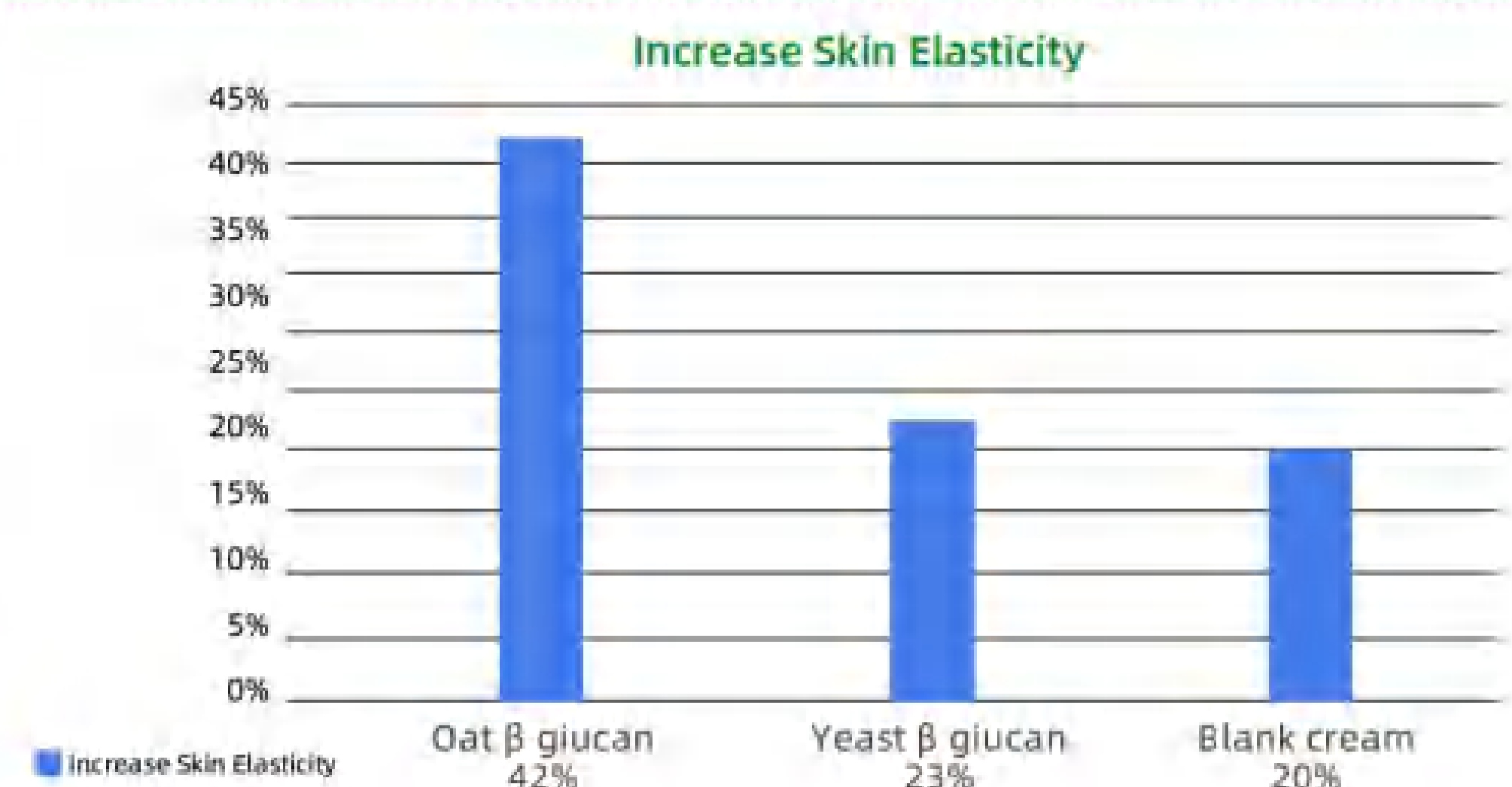
Dilated blood vessels—the effect before and after use of oat beta glucan



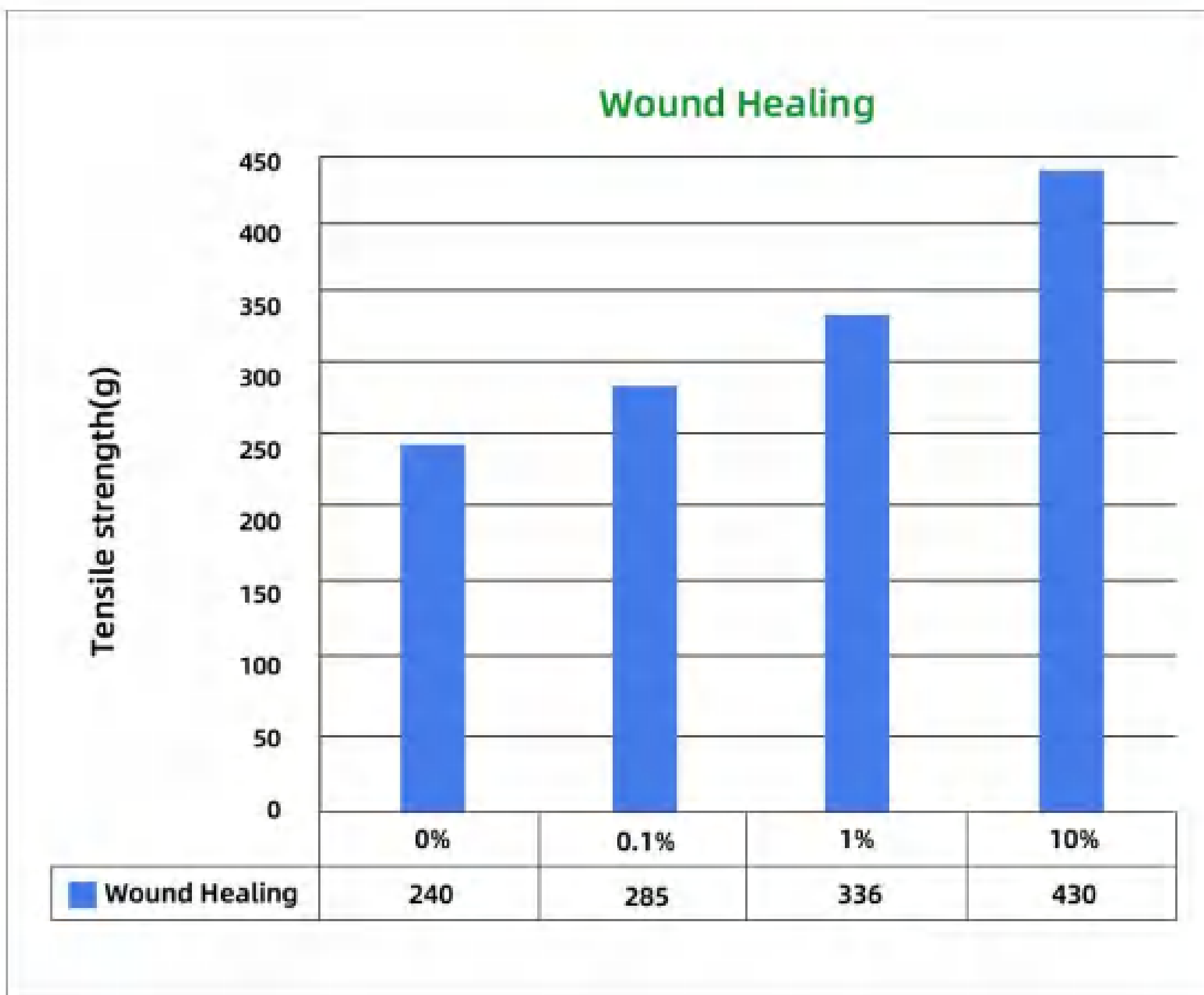
Redness—the effect before and after application of the serum.

2. Increase Skin Elasticity

Compared with yeast beta glucan, oat beta glucan shows better performance in skin elasticity increasing.



3. Effect of Oat Beta Glucan on the Appearance of Skin Redness
The redness appearance decreased 55.56% within 24 hours

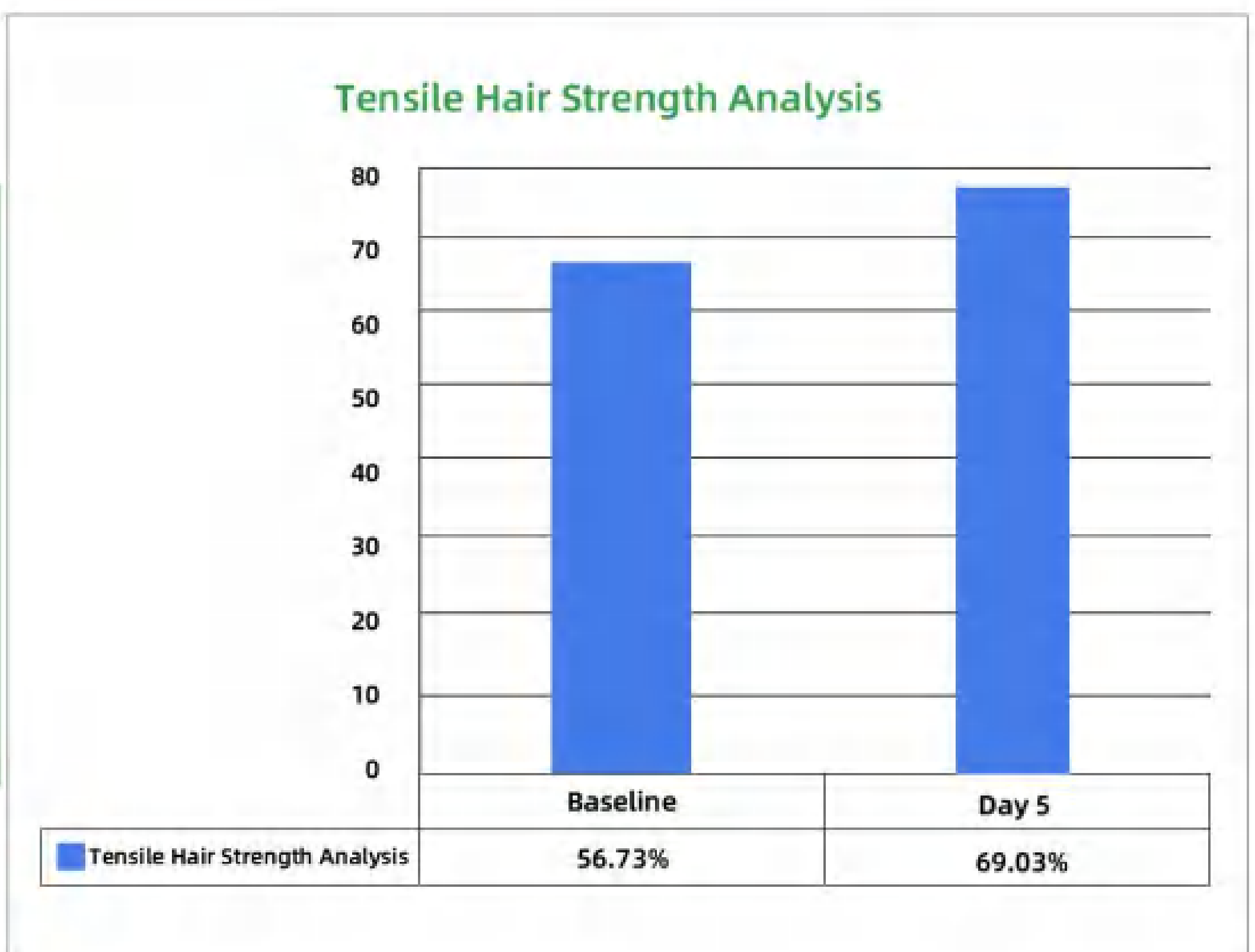


4. Wound Healing of Oat Beta Glucan

Macrophages play a critical role in healing wounds and burns. Using various subcutaneous and dermal incisional models, the benefit of Huatai Oat Beta Glucan as a wound-healing agent was demonstrated by increased: cellularity, leukocyte antimicrobial activity, resistance to wound infection, wound tensile strength, re-epithelialization

5. Huatai Oat Beta Glucan Increases Tensile Hair Strength by 21.68%

5% usage level in leave-on conditioning serum



[Practical Hint]

INCI Name	Oat Bate-(1,3)(1,4)-Glucan
Specification	1%,2%,3%,4%,5%,70%,90%
Appearance	Colorless liquid,powder
Recommended Dosage	1%-5%
Solubility	Insoluble in ethanol,1,3-butanediol ect. Soluble in water.
Storage & Shelf life	Store in tightly sealed and preferably full containers in cool,dry and ventilated area. 12 months when properly stored.
Brand application of the same material	MUVAZI Anti-Aging Skin Care Set with Oat Beta Glucan Kiapp Cosmetics

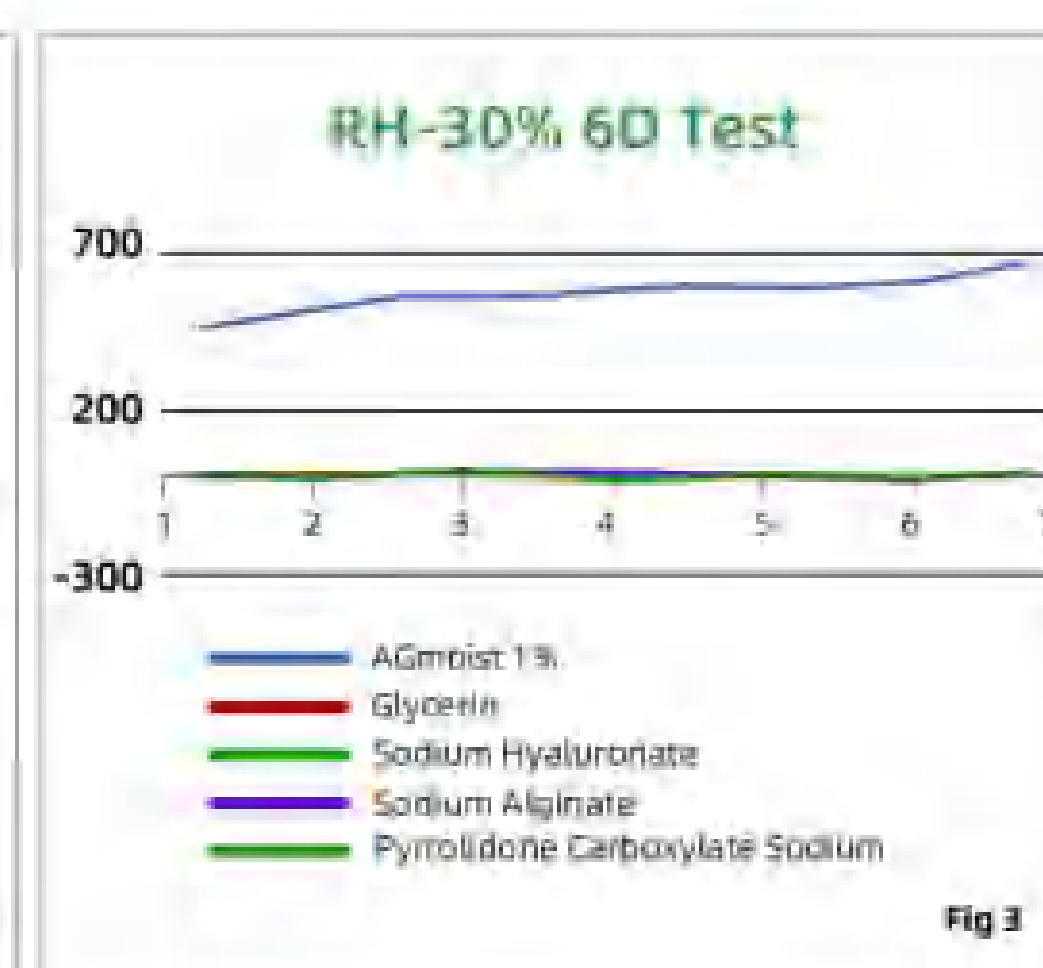
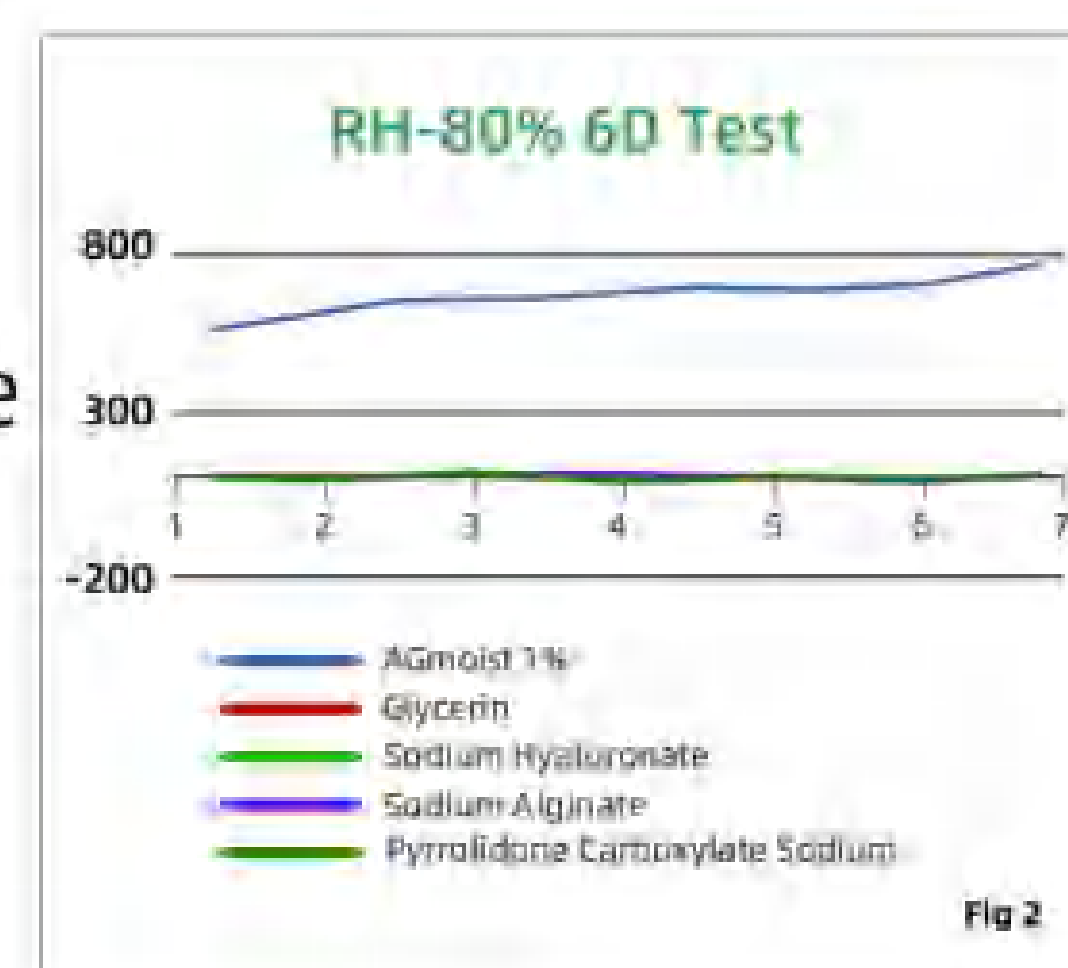
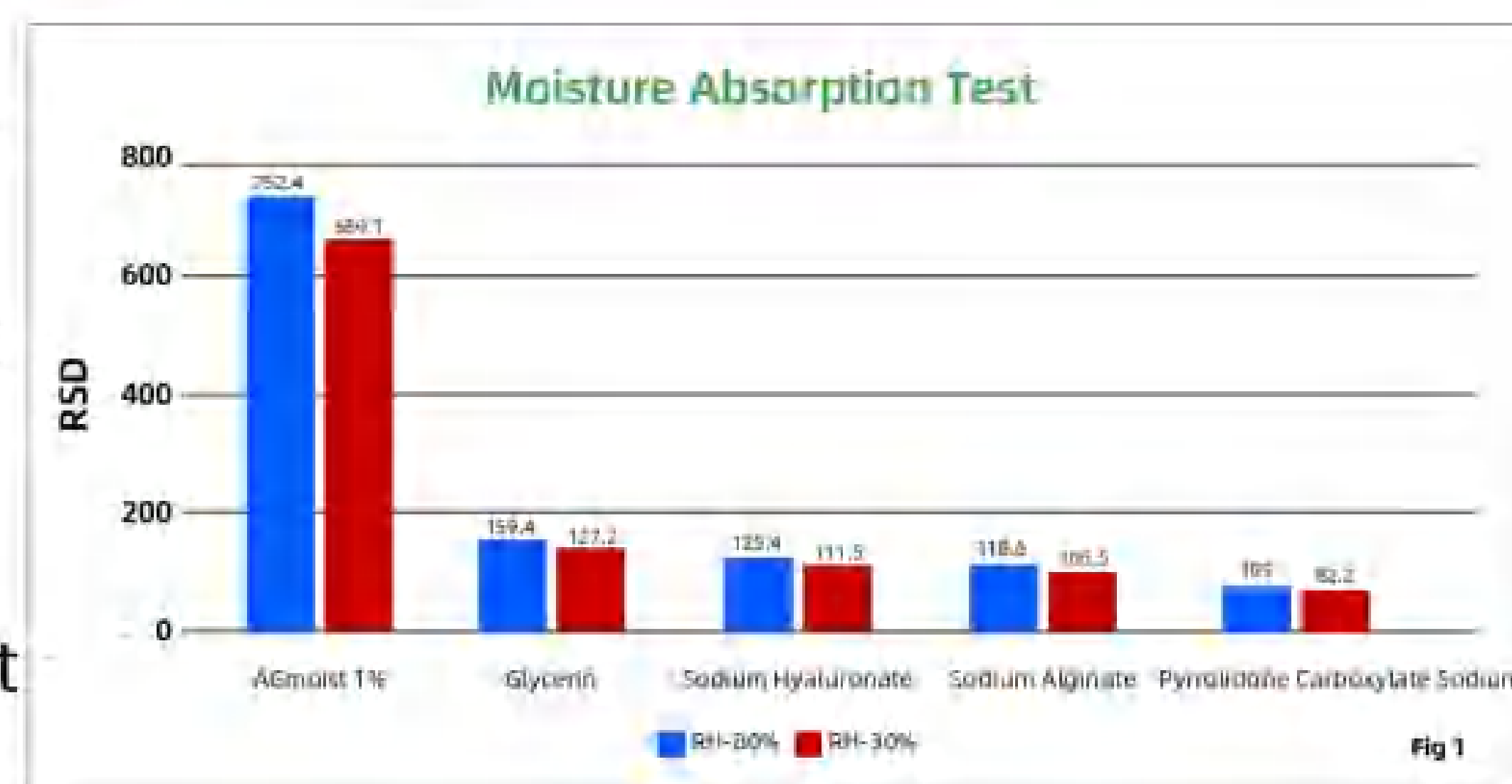
AGmoist



AGmoist is the first product developed by Huatai Biotechnology with moisturizing as its main function. More than 20 moisturizing ingredients have been carefully selected, with laver polysaccharides, Tremella polysaccharides, and hyaluronic acid as the main ingredients. Various natural ingredients work together to improve the skin's water control ability by repairing the skin barrier, improving moisture absorption, water locking ability, and maintaining smooth transmission channels. Overall, better skin moisturizing effects are achieved, combined with a small amount of other effective ingredients to achieve excellent moisturizing effects.

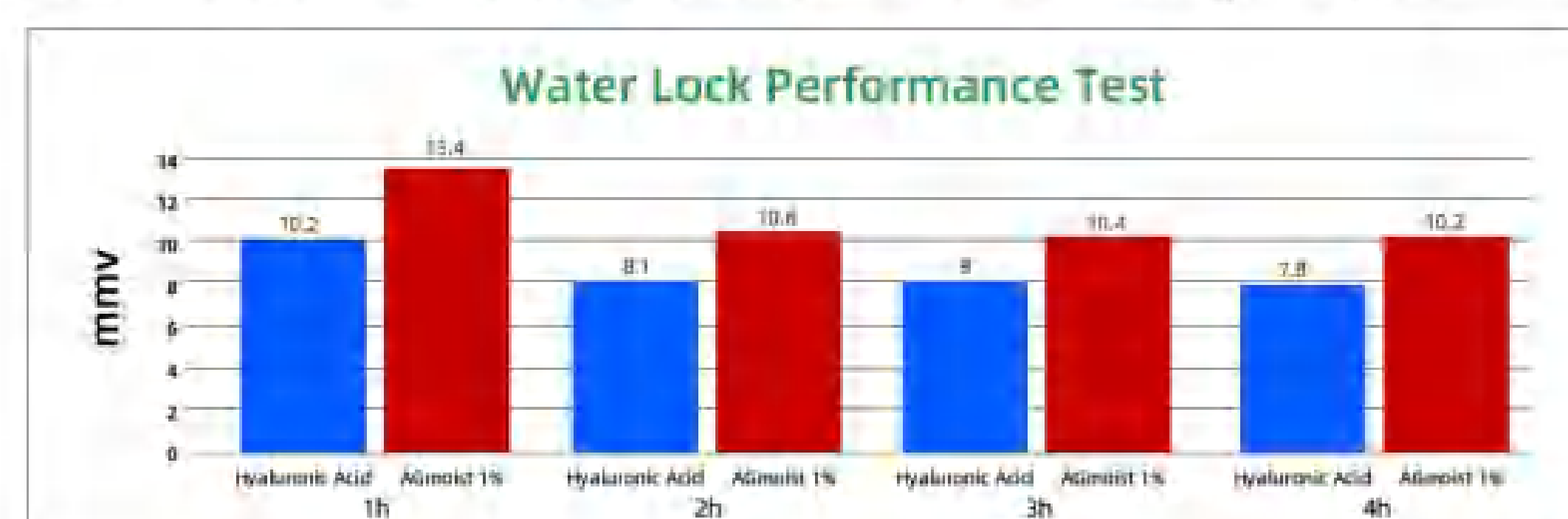
[Moisture Absorption Performance]

Fig 1. showed the moisture absorption capacity of AGmoist is about 8 times that of hyaluronic acid, and the moisture absorption performance is better under the condition of saline water. Figure 2 and 3 showed when RH was 80% and 30%, the moisture absorption rate of each humectant gradually increased with time. On the sixth day, the hygroscopic capacity of each humectant is AGmoist > glycerin > sodium hyaluronate > sodium alginate > pyrrolidone carboxylate sodium. Compared with hyaluronic acid, the moisture absorption capacity of AGmoist in pure water was increased by 6 times.



[Water Lock Performance]

(Test conditions: temperature: 25°C, humidity: 50%). After a application, both AGmoist and hyaluronic acid showed improved water-holding capacity, but AGmoist was as 30% more effective than hyaluronic acid. After 4 hours, although the water locking capacity was affected to some extent, AGmoist can still reach about 30% of the locking water power which was higher than hyaluronic acid. Compared with the control group (hyaluronic acid), the water-holding capacity of AGmoist increased by 30%.



[Human clinical data]

To verify the theoretical efficacy data, Shaanxi Huatai Biotechnology sent AGMoist to a third-party testing laboratory in Spain for human efficacy testing. The efficacy data proved that AGMoist has excellent moisturizing effects, far exceeding other similar cosmetic ingredients.

At each time point, the measured values for the treated and untreated areas were standardized to the baseline value at T0, with each subject having their own control value. The results showed that after treatment for 4 and 8 hours, the basal moisturizing level (untreated control group) significantly increased by 13.7±4.9% and 12.3±3.0%, respectively; As shown in Figure 1 and Table 1. Due to temperature and humidity being controlled at the measurement site, these results may be due to the specific working days of the subjects.

Figure 1: Graphical representation of skin moisture levels measured using an 8-hour skin moisture meter on the untreated control side, with 0 hours (before treatment) as the standard value. The mean and standard error mean have been displayed.

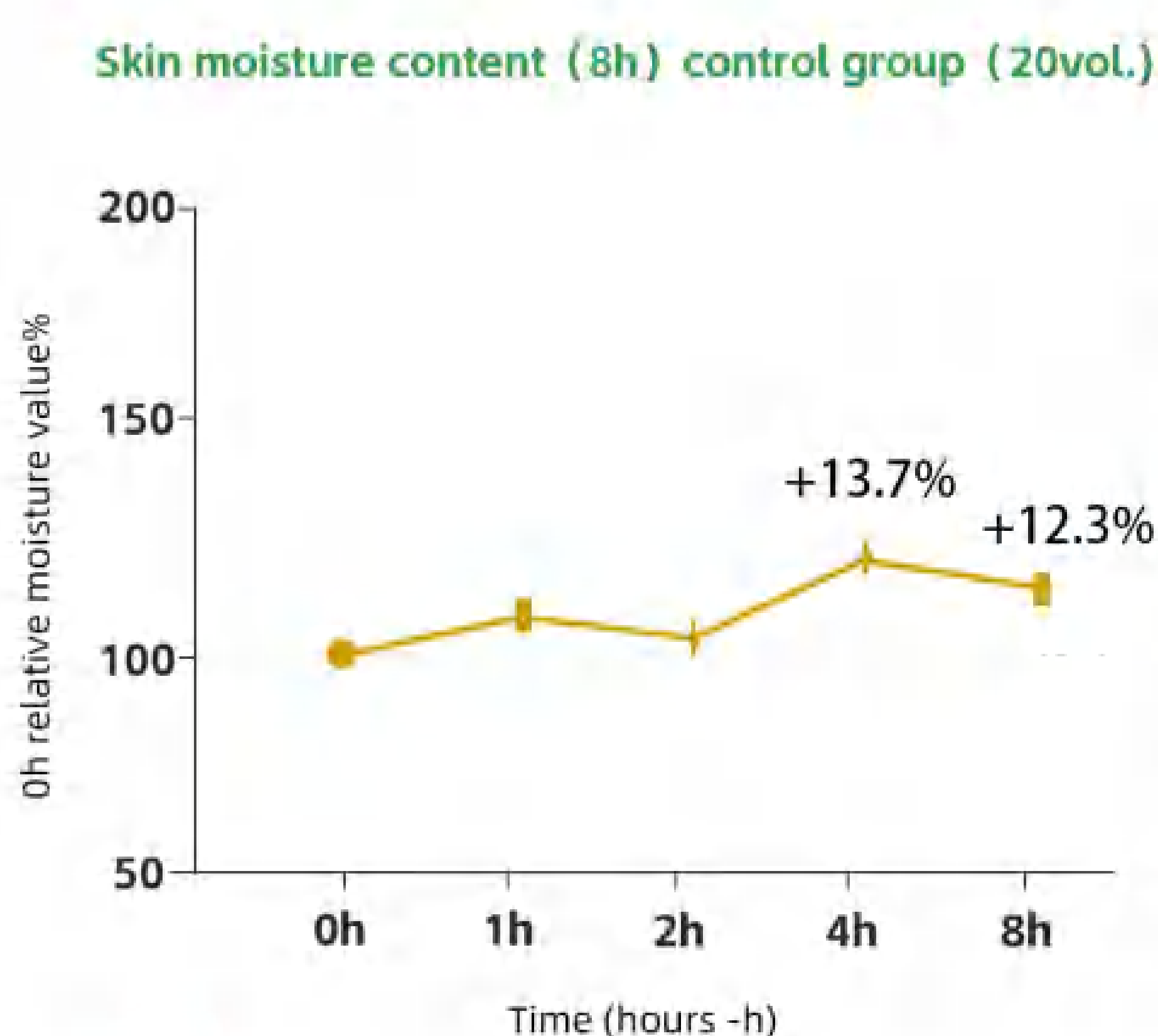


Fig.1

Analysis Table	Control group	Control group	Control group	Control group
COLUMN B	1h	2h	4h	8h
VS	VS	VS	VS	VS
COLUMN A	0h	0h	0h	0h
Paired t test				
P value				
Summary of P-values	0.0575	0.4596	0.0110	0.0005
Difference (P<0.05)	not have	not have	have	have
Unilateral or bilateral testing	Bilateral test	Bilateral test	Bilateral test	Bilateral test
t,df	t=2,022 df=19	t=0,7548 df=19	t=2,817 df=19	t=,178 df=19
Pairing number	20	20	20	20
Difference value				
Average difference value	6,241	2,923	13,70	12,34
Standard deviation difference value	13,80	17,32	21,74	13,21
Standard error difference value	3,087	3,872	4,861	2,953
95% confidence interval	-0,2194-12,70	-5,182 -11,03	3,522-23,87	6,156-18,52
R	0,1771	0,02911	0,2947	0,4788

[Description]

Specification	1%,2%
Appearance	Light yellow liquid
Recommended Dosage	1%-5%
Solubility	Soluble in water
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.
Shelf life	12 months when properly stored.
Application	Cream, lotion, mask.

Coenzyme Q10



[INCIName] Ubidecarenone

[Cas No.] 303-98-0

[Introduction] Coenzyme Q10, also known as Ubiquinone, is a fat-soluble quinone compound. The structure is similar to vitamin K, vitamin E and plastoquinone. Involved in energy production and activation in the human body cells . Ubiquinone is present in most eukaryotic cells, especially mitochondria. It is one of the respiratory chain components; the content in the mitochondrial inner membrane is higher than other components of the respiratory chain, cause the oil-soluble ability, it has a high degree of mobility on the intimae, so it is particularly suitable as a flow of the electron mediator.

[Function]

Cosmetic Personal Care	Anti Oxidant, Anti-aging, Anti-wrinkles
Health Care	<p>Reduces free radical</p> <p>Prevent and treat chronic fatigue syndrome</p> <p>Certain inhibitory effect in the formation and development of atherosclerosis</p> <p>Its antioxidant act a good role in the application of cardiovascular disease</p> <p>Cancer Prevention</p>

Tab1 Effect of serum with CoQ10 on apoptosis of human keratinocytes by irradiated UVB ($\bar{x} \pm s$, n=3)

Group	Apoptosis(1%)	
	Experiment	Control
10uL	6.38±0.07	7.14±0.79
20uL	3.74±0.88*	7.05±0.52
40uL	1.74±0.59*	7.58±1.08

*, P<0.05, compared with the control group (serum without CoQ10); P<0.05, compared with experiment group(10uL serum with CoQ10)

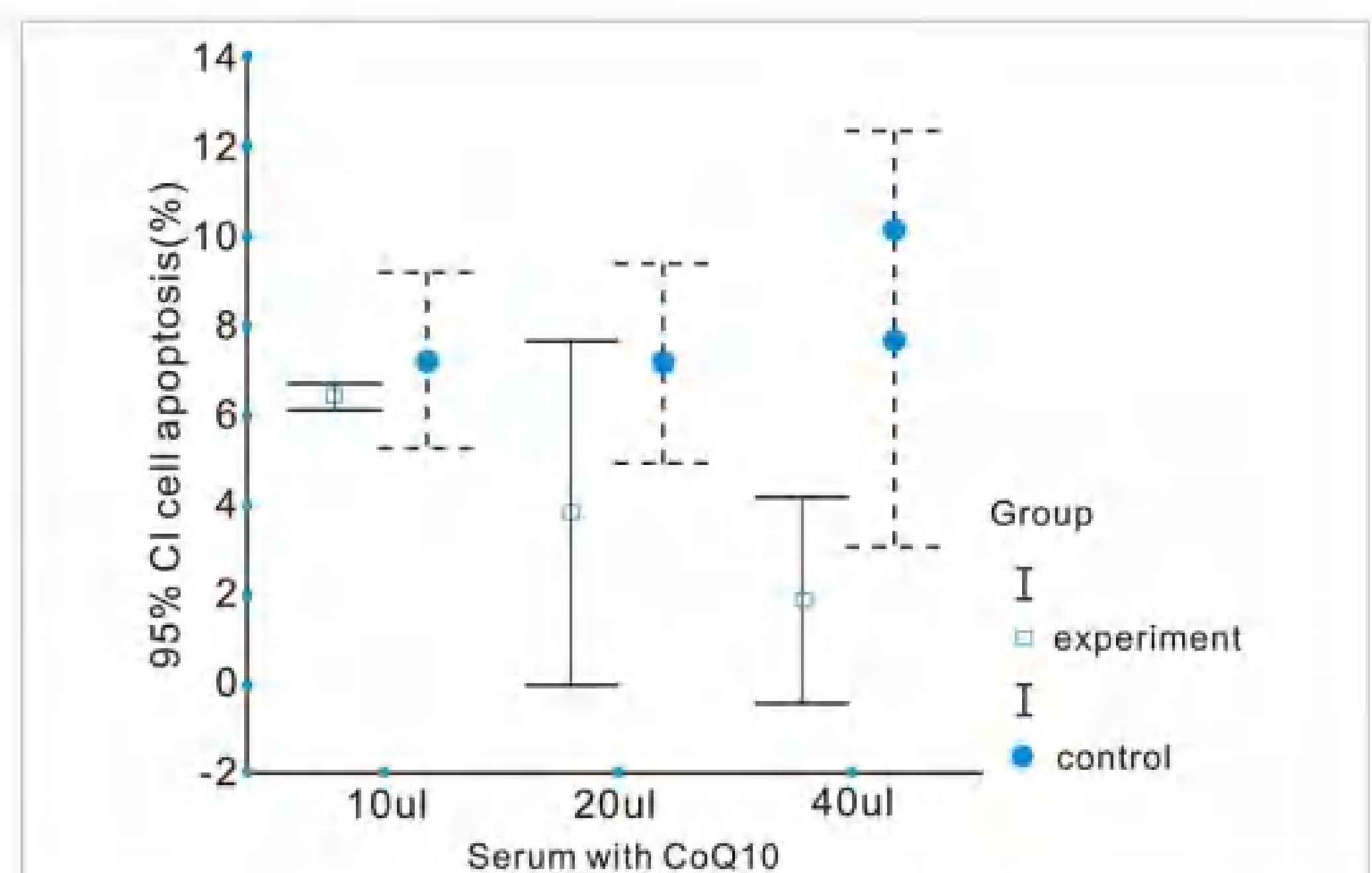


Fig1 Effect of serum with CoQ10 on apoptosis of human keratinocytes irradiated by UVB $\bar{x} \pm s$, n=3. P<0.05 vs Control.

Result shows the rates apoptosis were decreased significantly in CoQ10 group(40ul and 20ul), and CoQ10 can prevent UVB caused human keratinocytes oxidative damage.

Tab2 Effect of CoQ10 on cell proliferation index of human keratinocytes irradiated by UVB $\times \pm s$, n=3.

		Analysis of cell cycle(1%)			
Group		G0-G1	S	G2-M	PI
10uL	Experiment	61.48±1.87	23.29±2.85	15.23±0.98	38.52±1.87
	Control	63.76±1.63	21.43±2.44	14.81±0.80	36.24±1.63
20uL	Experiment	56.80±2.04	27.54±3.57	15.66±1.52	43.20±2.04
	Control	57.41±1.62	23.61±0.85	18.98±0.21	40.59±1.62
40uL	Experiment	49.11±1.73	30.45±1.52	20.44±3.25	5.89±1.73
	Control	58.30±2.86	26.47±1.40	14.83±1.23	41.30±2.63

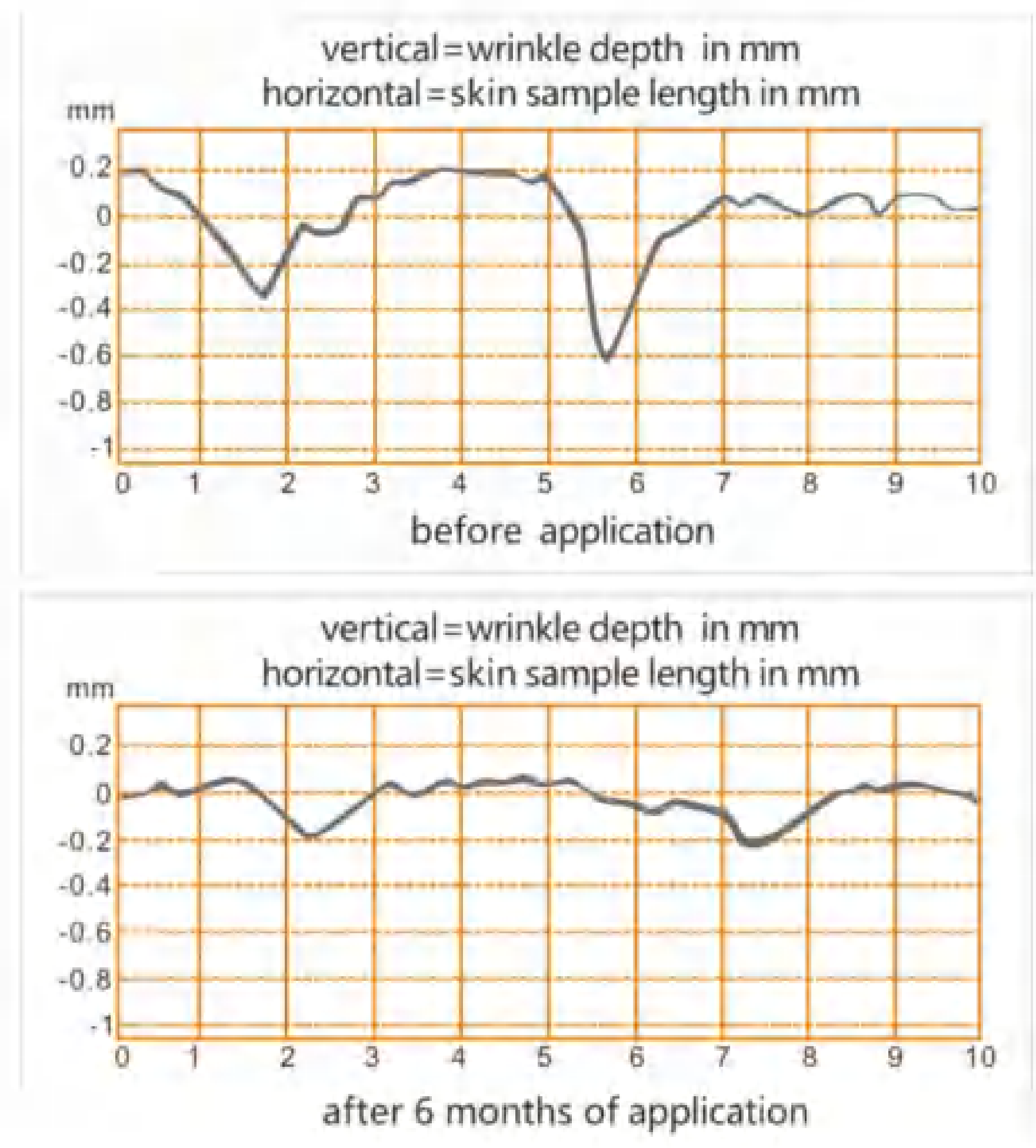
*, P<0.05(F=9.308), experiment group (40uL serum with CoQ10) compared with control group(40uL serum with CoQ10)

Result shows the cell proliferation index was increased in CoQ10 group(40ul) compared with group without CoQ10.

Tab3 Effect of CoQ10 on activities of antioxidant enzyme and content of MDA in the supernatants of cells.

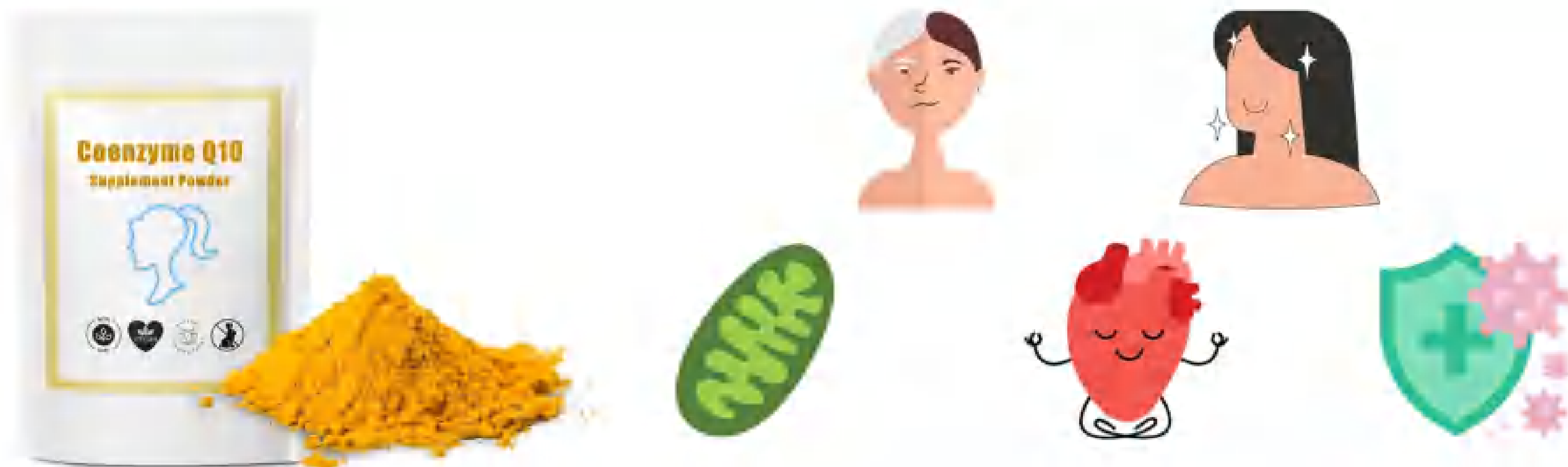
Group	SOD (U/105 cell)	GSH-Px (U/105 cell)	CAT (U/105 cell)	MDA (nmol/105 cell)
Control	48.80±0.89	24.802±1.066	1.592±0.199	2.432±0.546
UVB damage	35.90±1.70*	14.481±1.151*	0.621±0.337*	8.198±0.678*
UVB+10uL CoQ10	38.77±2.04	16.667±1.366	0.678±0.224	7.140±0.547
UVB+20uL CoQ10	46.95±1.42	20.238±1.624	0.723±0.215	5.653±0.547
UVB+40uL CoQ10	50.98±1.96	23.214±1.52	0.700±0.269	3.243±0.990

Result shows CoQ10 could enhance the activities of SOD, GSH-Px and decrease the contents of MDA in the supernatant of cells.



Photoaging is the presence of deep wrinkles caused by UVA irradiation. This study was done over a 6 month period and examined the effects of CoQ10 on 20 elderly volunteers, once daily around the eyes for six months. There was a 27% reduction in the mean peak to valley depth of the skin.

[Description]



INCI Name	Ubidecarenone			
Specifications	10%	20%	40%	99%
Form	Yellow Powder	Yellow Powder	Yellow Powder	Yellow Powder
Dosage	1%-5%			
Solubility	Water			Ethanol, 1,3-butanediol etc
Shelf life	24 months			
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.			
Application	Jan Marini: Jan Marini Regeneration Booster DHC: DHC eye cream, coenzyme Q10 Essence full face mask, DHC CoQ10 neck cream, serum			

Resveratrol



[INCI Name] Resveratrol

[Cas No.] 501-36-0

[Introduction] Resveratrol is a widely used ingredient founded in certain plants, foods and drinks. Huatai resveratrol is extracted from the root of polygonum cuspidatum. It is a very effective anti-oxidant with 95% efficiency in preventing lipid peroxidation as compared with 37% for Vitamin C or 65% for Vitamin E. It has very strong peroxy radical scavenging abilities, more than gallic and ellagic acids and epicatechins.

[Function]

- ◆ Anti-oxidation. One of the benefits of resveratrol is that it acts like a true anti-oxidant, Like anti-oxidant molecules.
- ◆ Whitening. Resveratrol is a natural skin whitening agent it appears to work by inhibiting tyrosinase, MiTE, and DCT activity.
- ◆ Anti-freckle. Because resveratrol is a naturally occurring type of antibiotic, it works to cleanse the body of pollutants and other contaminants, helps to keep the skin fresher, healthier and more elastic - preventing new wrinkles and reducing the appearance of existing ones.

[Data]

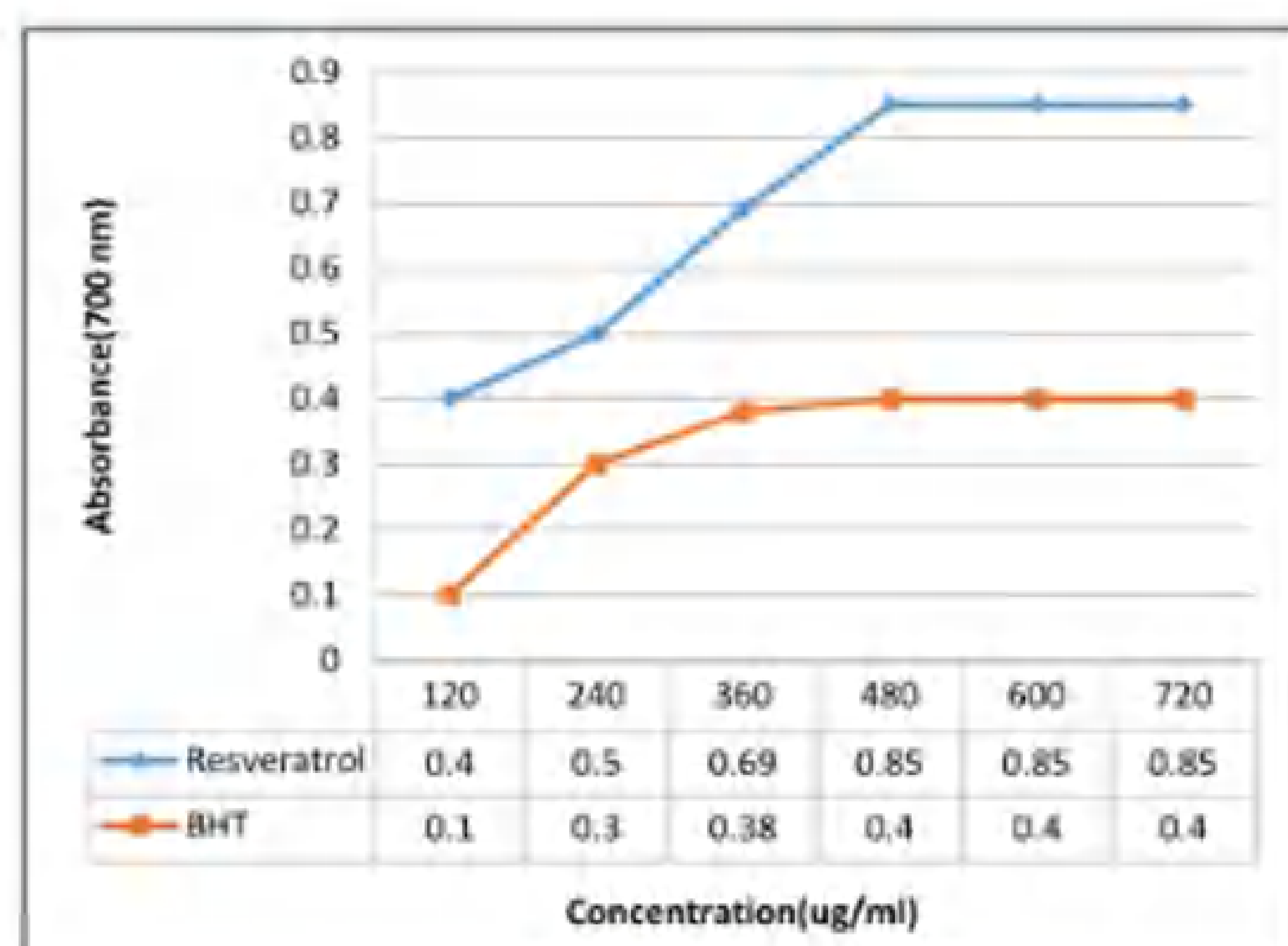


Figure 1. Reducing Power of Resveratrol

Figure 1 shows the reducing power of resveratrol. The reducing power of resveratrol increased with increasing concentration. Based on a comparison of the absorbance at 700 nm, the reducing power of resveratrol at a concentration of 120 ug/ml was similar to that of BHT at 480 ug/ml. This indicates that resveratrol was electron donors and could also react with free radicals converting them to more stable products and terminate the radical chain reaction. Also, 480 ug/ml resveratrol is the best concentration which exhibits the most reducing power. The reducing power of resveratrol and BHT decreased in the order of resveratrol > BHT.

Figure 2. Scavenging activities of different concentrations of resveratrol and trolox against the DPPH radical

The DPPH radical scavenging effects of resveratrol are presented in Figure 2 and showed appreciable free radical scavenging activities. The free radical scavenging activity of resveratrol was compared to trolox, as a synthetic anti-oxidant, Resveratrol of 150 ug/ml had the highest radical scavenging activity when compared with 150 ug/ml trolox.

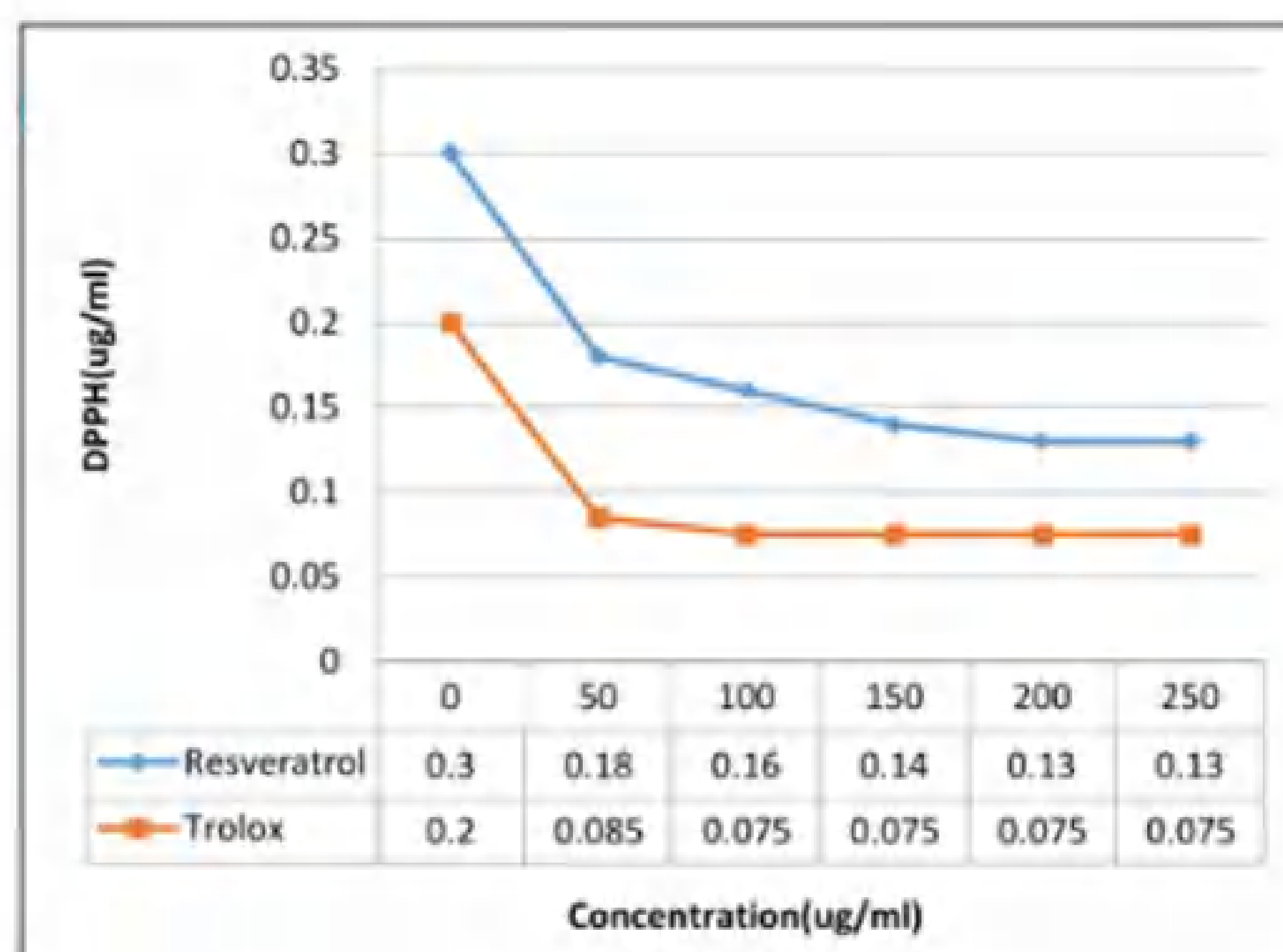
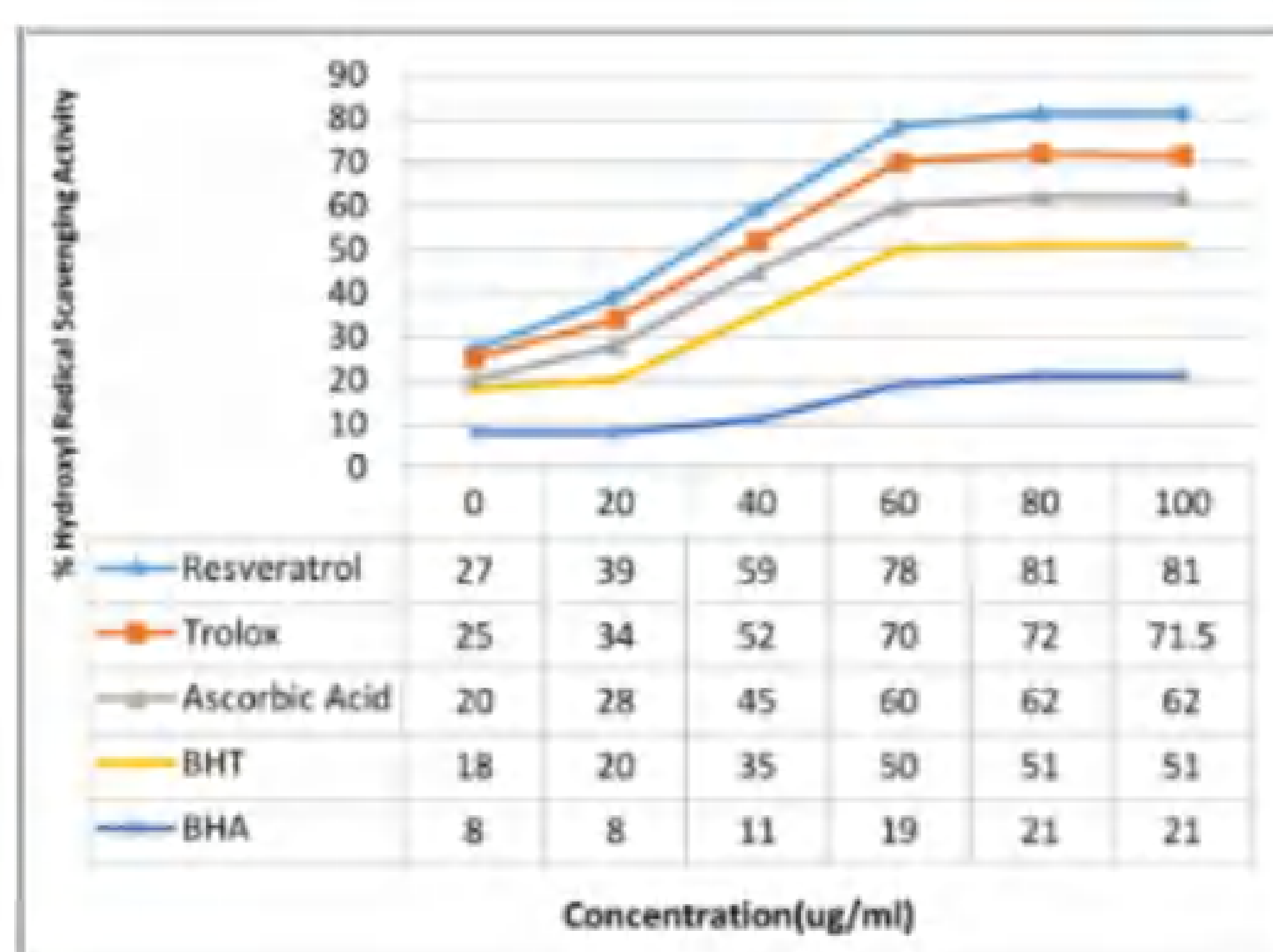


Figure 3. The Hydroxyl Radical Scavenging Effects

Figure 3 shows the hydroxyl scavenging effect determined by the 2-deoxyribose oxidation method. The scavenging effect of resveratrol on hydroxyl radical was concentration dependent. At 20100 ug/ml concentrations resveratrol exhibited higher hydroxyl radical scavenging activity than ascorbic acid. Among the oxygen radicals hydroxyl radical is the most reactive chemical species known. The hydroxyl radical scavenging activity of resveratrol and both standards decreased in the order of resveratrol > trolox > ascorbic acid > BHT > BHA.



[Practical Hint]

Specification	HPLC 98% HPLC 50%
Form	White Powder and Yellow Brown Powder
Dosage	1%
Solubility	Hardly soluble in water Soluble in ethanol, 1,3-butanediol etc.
Shelf life	24 months
Storage	Store in tightly sealed and preferably full containers in cool dry and ventilated area.
Brand application of the same material	Mentholatum: Pure White Wash Lancome: Renegie French Lift Shiseido: Shiseido New White Essence DHC: DHC Resveratrol Essence

Phloretin



[**Cas No.**] 60-82-2

[**Introduction**] Phloretin is a dihydrochalcone compound and a type of natural phenols. It is a new natural skin whitening agent, extracted from peels or root barks of apples. It helps anti-acne as it weakens estrogen activity.

[**Function**]

- ◆ Skin whitening. Phloretin can inhibit melanocytes and tyrosinase activity, has good effects on various skin pigmentation. Its inhibiting tyrosinase ability is better than arbutin and kojic acid. The blend of them can greatly improve the inhibition ratio of tyrosinase, about 100%.
- ◆ Anti-inflammatory and immunosuppressive. NO production and phagocytosis rate of macrophages can be significantly reduced by phloretin.
- ◆ Antioxidant. Phloretin can remove free radicals in the skin, effectively prevent aging, cell mutation, accelerate cell metabolism, reduce wrinkles, enhance the skin supporting structure, and immunity to UV light.

[**Date**]

Apply cream A, B, C, D, E according to the random number table, twice a day.

Cream A: without any bioactive substances;

Cream B: 3.0% arbutin ; Cream C: 0.5% phloretin;

Cream E: 3.0 % phloretin; Cream D: 1.0% phloretin;

The values of each pore after using these five kinds of cream are shown in the following figure: b is the color change from blue to yellow, MI is the melanin index;

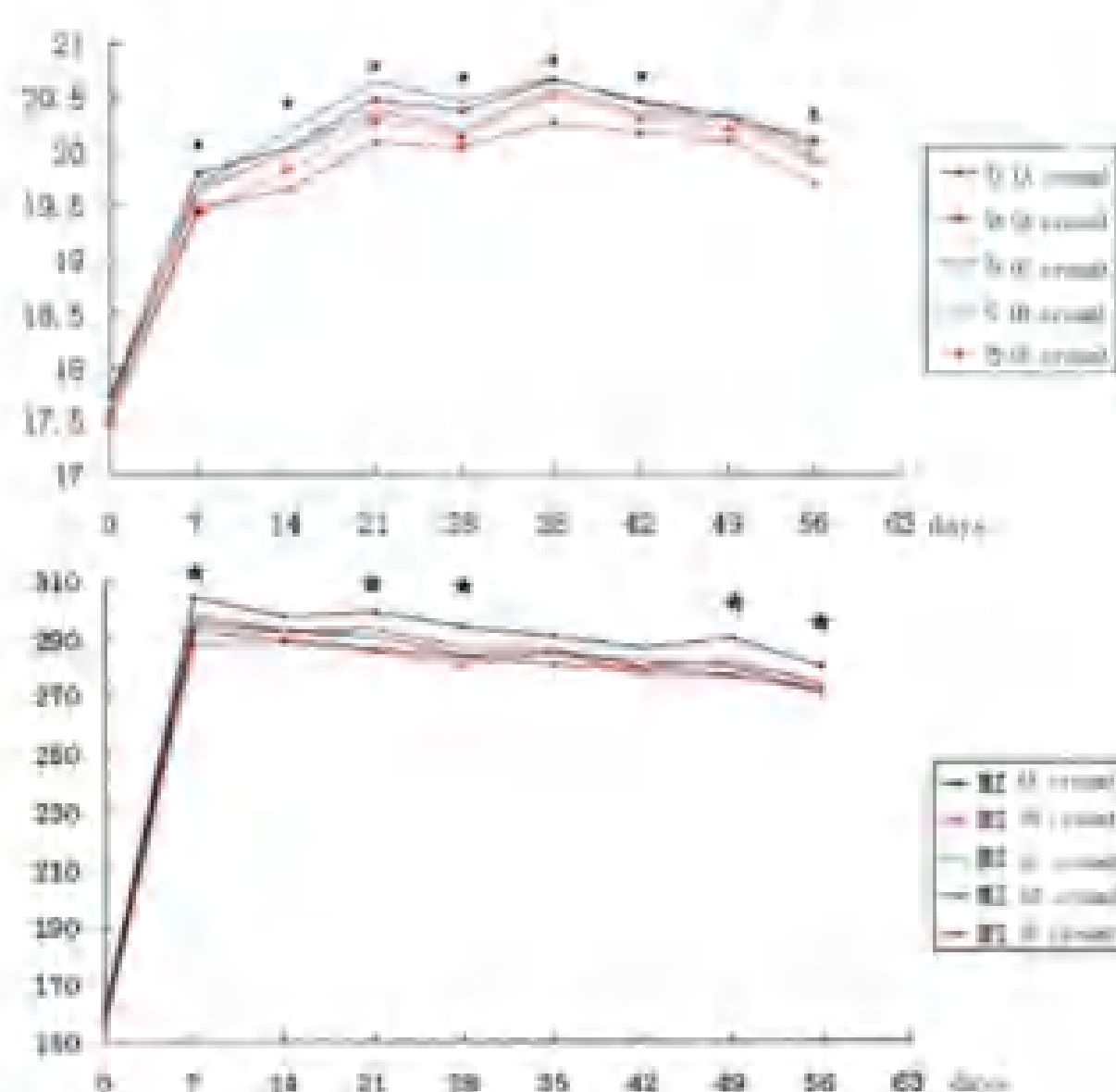


Figure 1: b values for each pores after used five kinds of cream.

Figure 2: MI values for each pores after used five kinds of cream.



Figure 3: Skin Photo with UVA-induced dark spots after applied the cream.

b value indicates the skin color from blue to yellow, it reflects the skin speckle situation after UVA-induced. The results suggest that 3% phloretin cream act on skin pigmentation in the late phase after UV-induced and it is superior to 3% arbutin.

From the MI value trend, it can be seen that the ability of 0.5%, 1%, 3% phloretin cream inhibit the formation of dark spots and the ability increase as the concentration increasing, there's a dose-dependent trend. The b value figure also shows that the efficacy of 3% concentration phloretin cream is better than 0.5% and 1%. The higher the concentration, the better whitening effect.

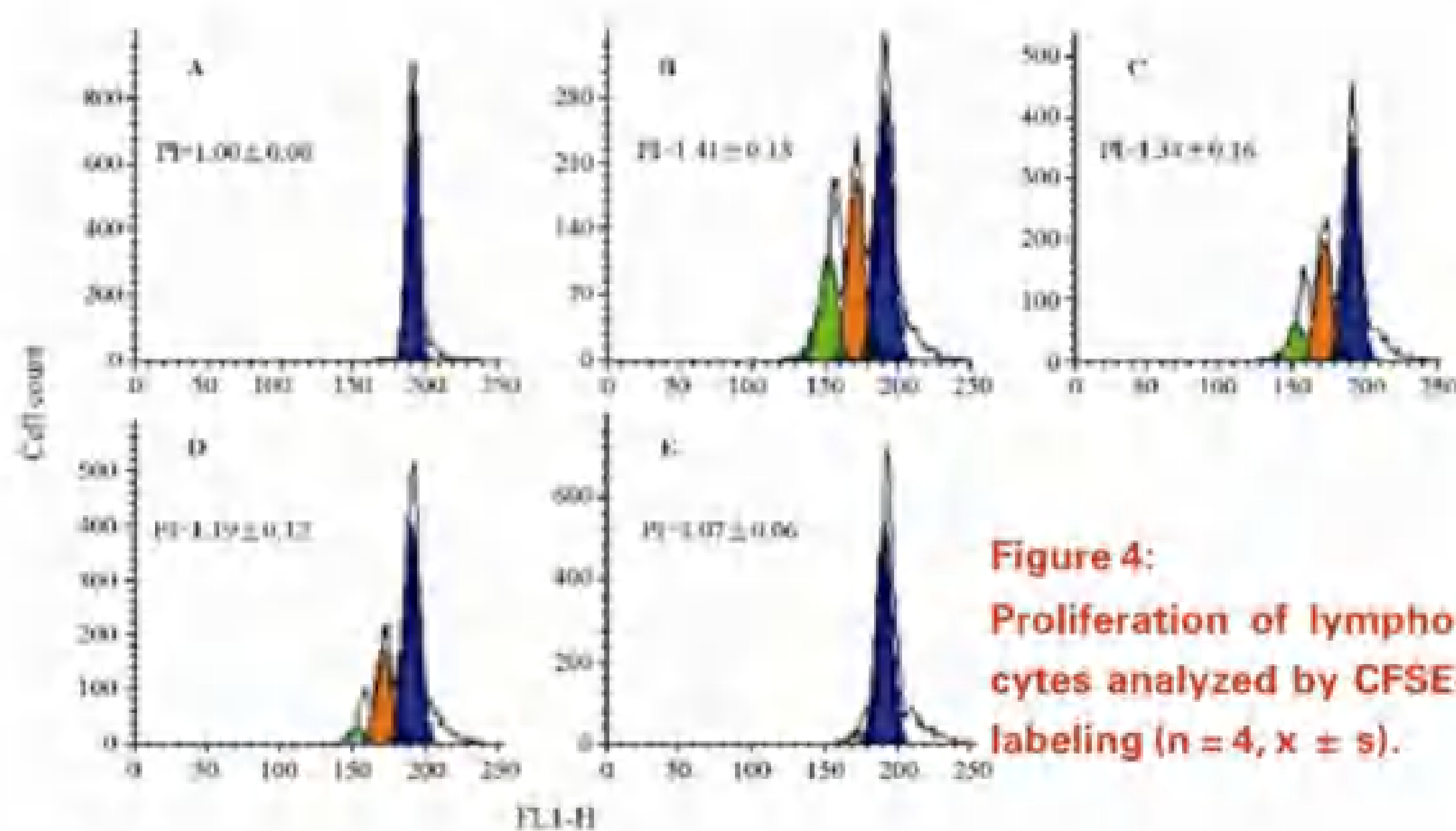


Figure 4: Proliferation of lymphocytes analyzed by CFSE-labeling (n = 4, x ± s).

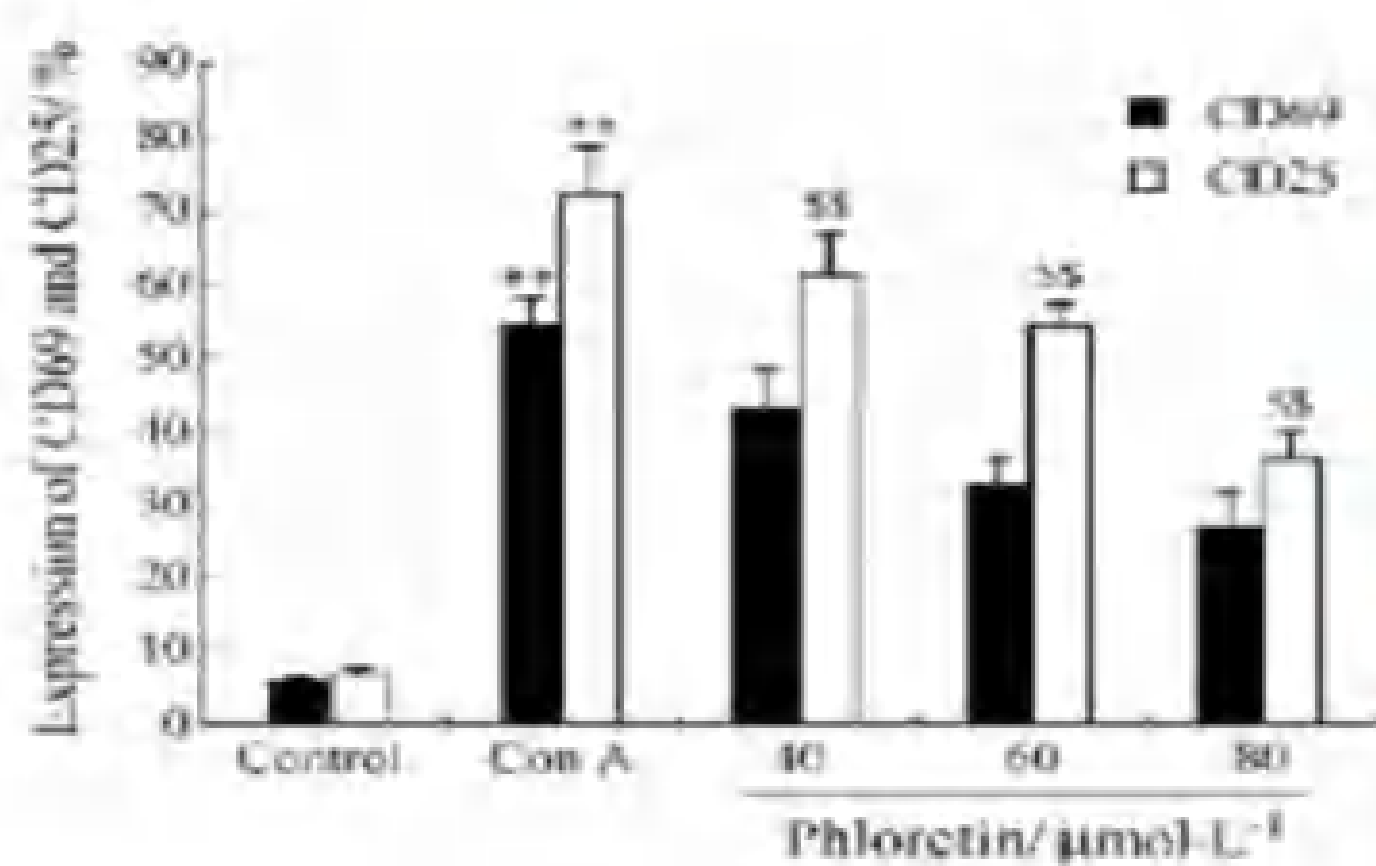


Figure 5: Phloretin inhibited the CD69 and CD25 expression of T lymphocytes.

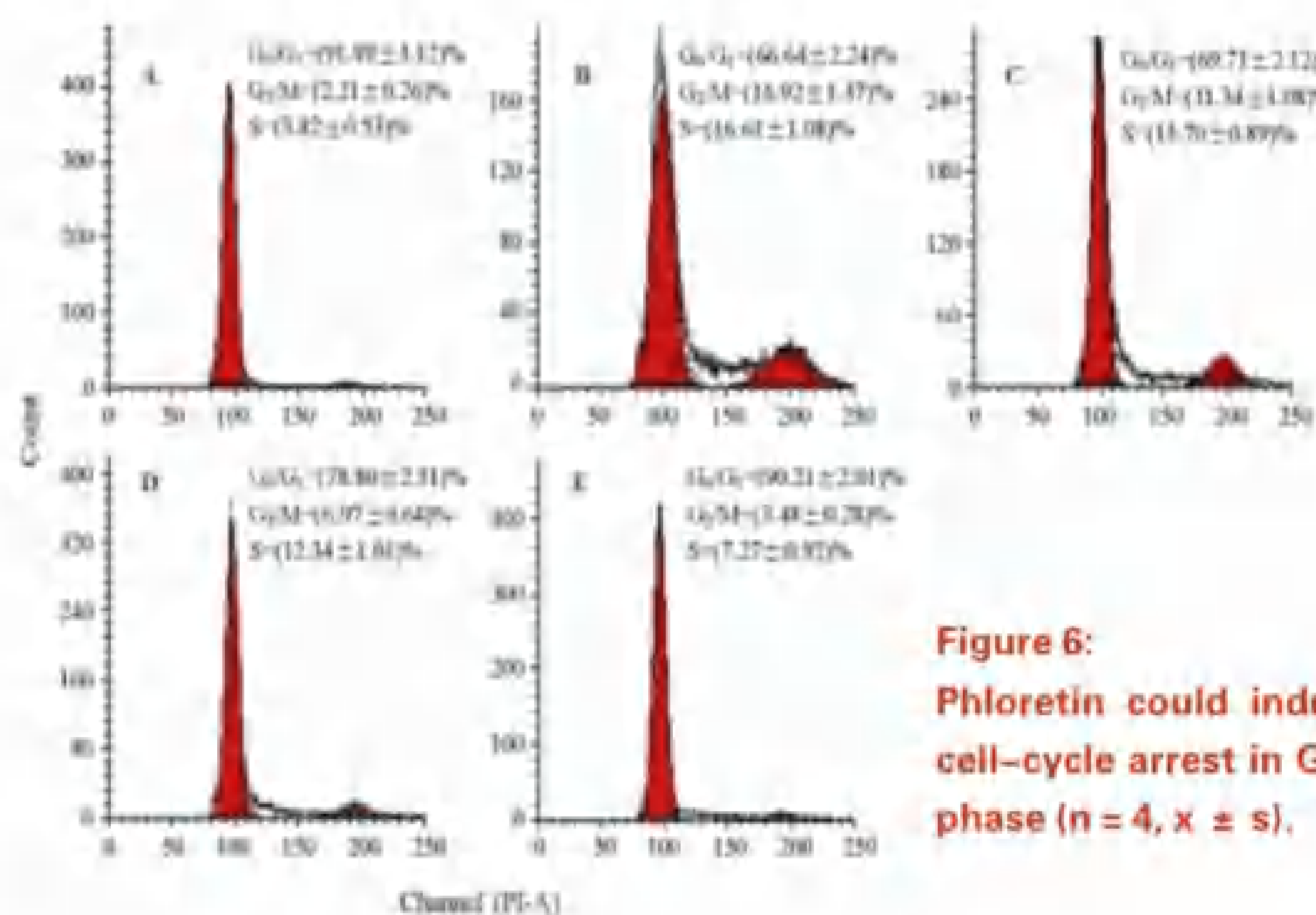


Figure 6: Phloretin could induce a cell-cycle arrest in G0/G1 phase (n = 4, x ± s).

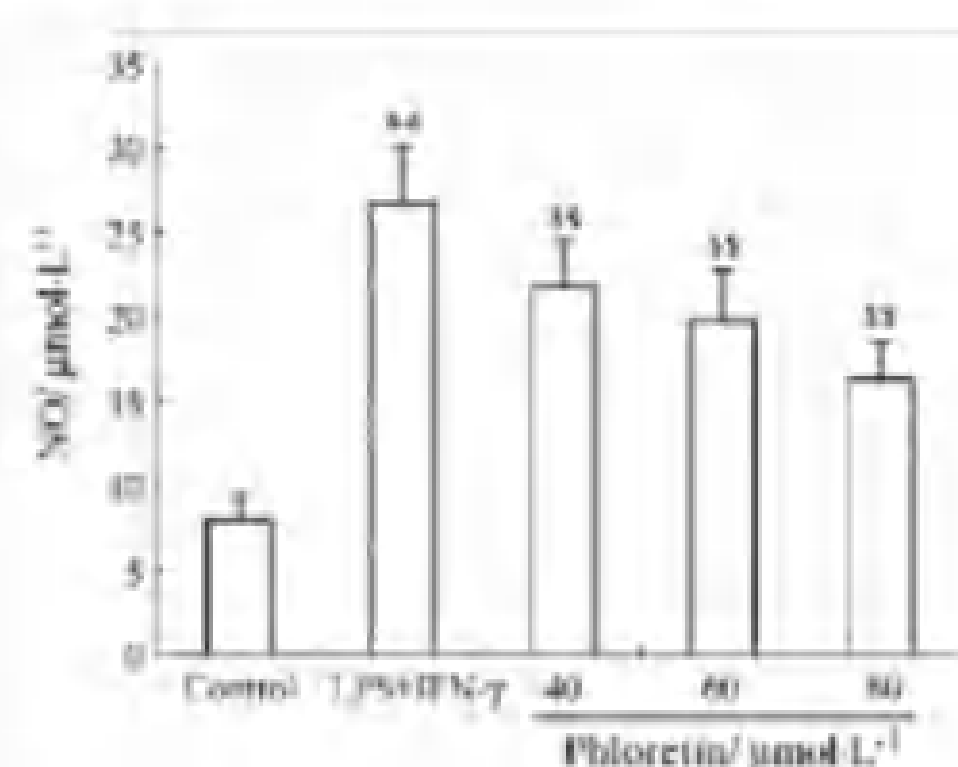


Figure 7: Effect of phloretin on the NO production of macrophages.

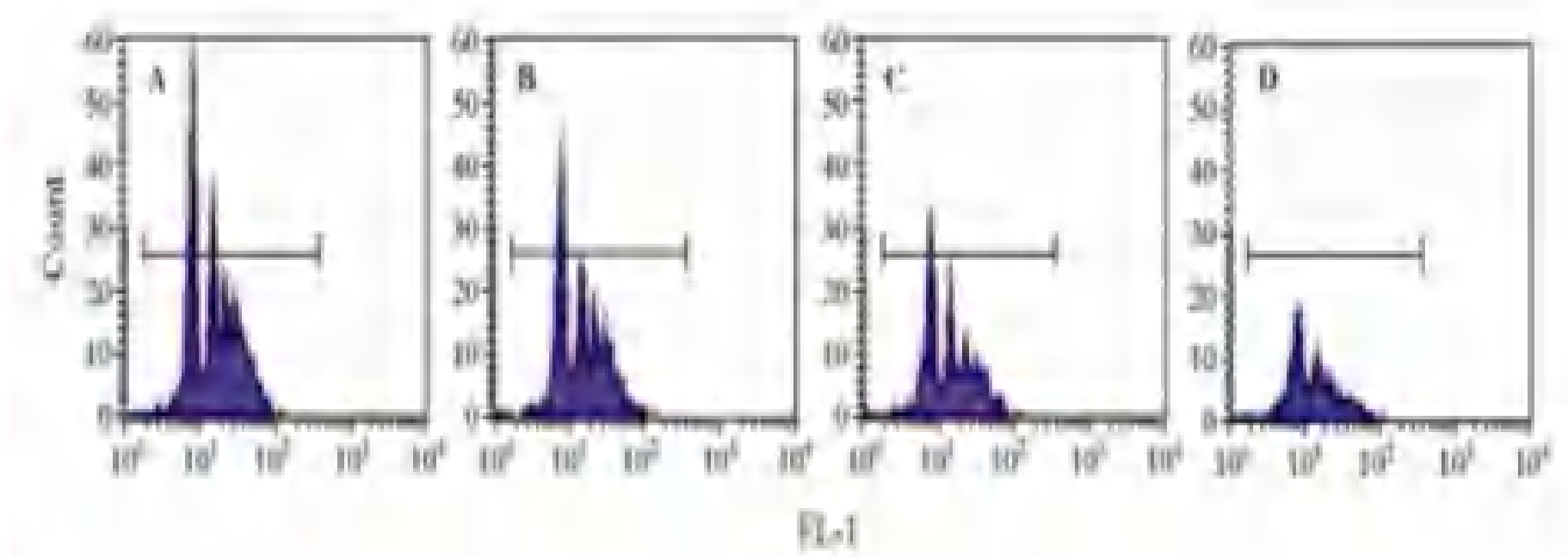


Figure 8: Effect of phloretin on the phagocytosis ability of macrophages (n = 3, x ± s).

The above results showed that phloretin 40, 60, and 80 mol · L⁻¹ significantly inhibited the proliferation of T lymphocytes and the PI reduced from 1.41 ± 0.13 to 1.34 ± 0.16, 1.19 ± 0.12 and 1.07 ± 0.06, respectively. Phloretin significantly inhibited the expression of CD69 and CD25 P 0.01. The cell cycle distribution analysis showed that phloretin could induce a cell cycle arrest at G₀/G₁ phase. NO production of LPS + IFN- γ group of macrophages was 26.72 ± 3.57 mol · L⁻¹, and was significantly reduced by phloretin P 0.01. And phagocytosis rate of macrophages was significantly reduced by phloretin P 0.01. The results demonstrate that phloretin might be developed into a new immunosuppressive drug.

[Practical Hint]

INCI Name	Phloretin
Dosage	Recommendation 5% - 1%
Specification	98%
Appearance	White powder
Solubility	Dissolved in ethanol, 1,3-butanediol etc. Do not dissolved in water.
Storage & Shelf Life	Store in tightly sealed and preferably full containers in cool, dry and ventilated area. 24 months when properly stored
Brand Application of the same material	Skinceuticals: Phloretin Cf Cosmetic Skin Solutions: Phloretin CF Serum Advanced Formula +

Alpha Arbutin



[INCI Name] Alpha Arbutin

[Cas No.] 84380-01-8

[Introduction] Alpha-arbutin(4-hydroxyphenyl-D-lucopyranoside) is a pure water soluble, biosynthetic active ingredient. Alpha-Arbutin blocks epidermal melanin synthesis by inhibiting enzymatic oxidation of Tyrosine and Dopa. It's a functional active ingredient for skin lightening, ensures an even and lighter skin tone, reduces the degree of skin tanning after UV exposure and also helps to minimize the appearance of liver spots. It's faster and more effective than kojic acid (another commonly used skin lightener) and it left hydroquinone in the shade.

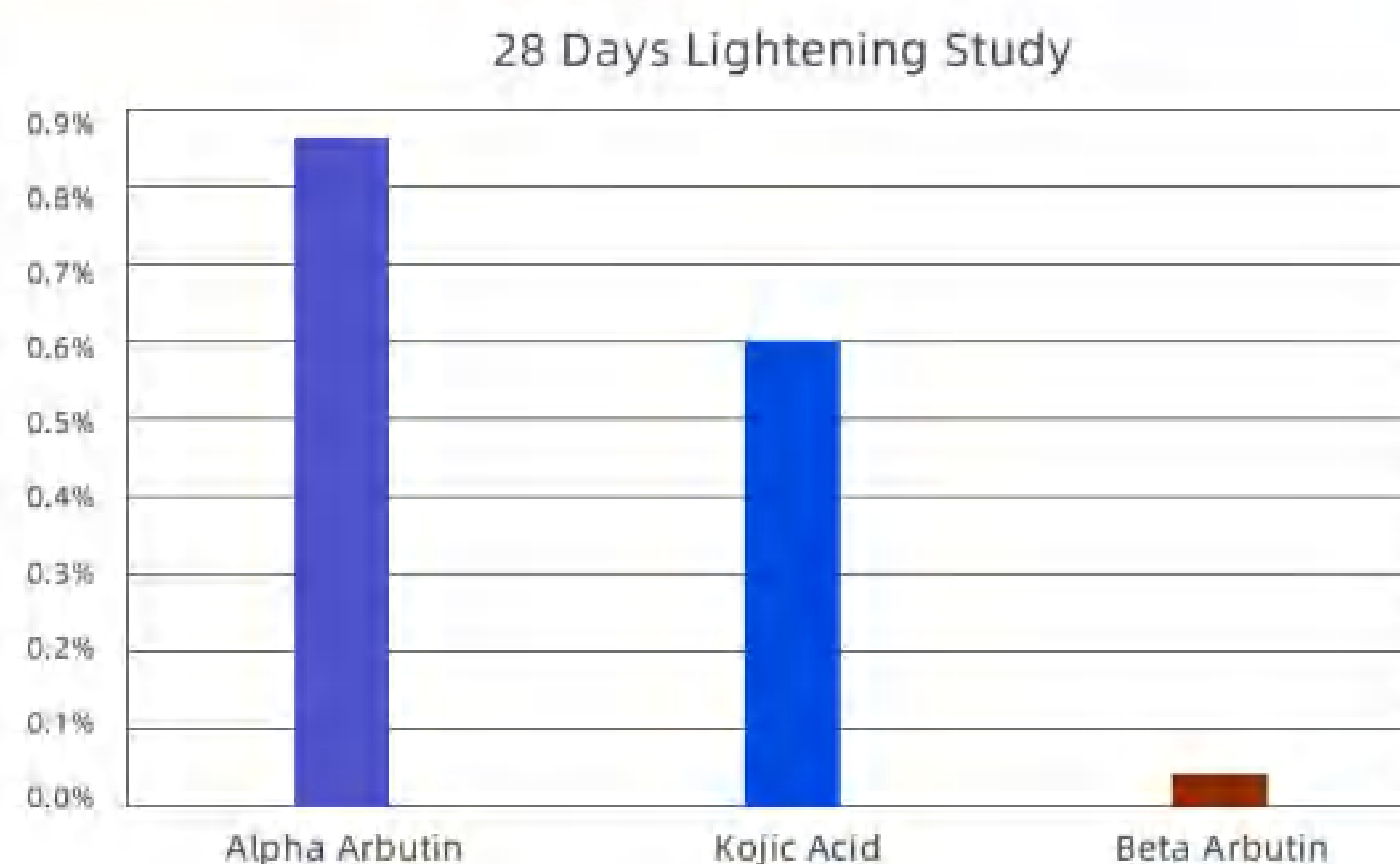
[Function]

- ◆ Skin Whitening and anti-freckle. Alpha arbutin is a skin whitening agent which is very popular in Japan and Asian countries for skin de-pigmentation.
- ◆ Alpha arbutin protect the skin against damage caused by free radicals.
- ◆ Alpha arbutin powder inhibits the formation of melanin pigment by inhibiting tyrosinase activity.
- ◆ Alpha-arbutin has anti-inflammatory and anti-bacterial properties.

[Efficacy Test]

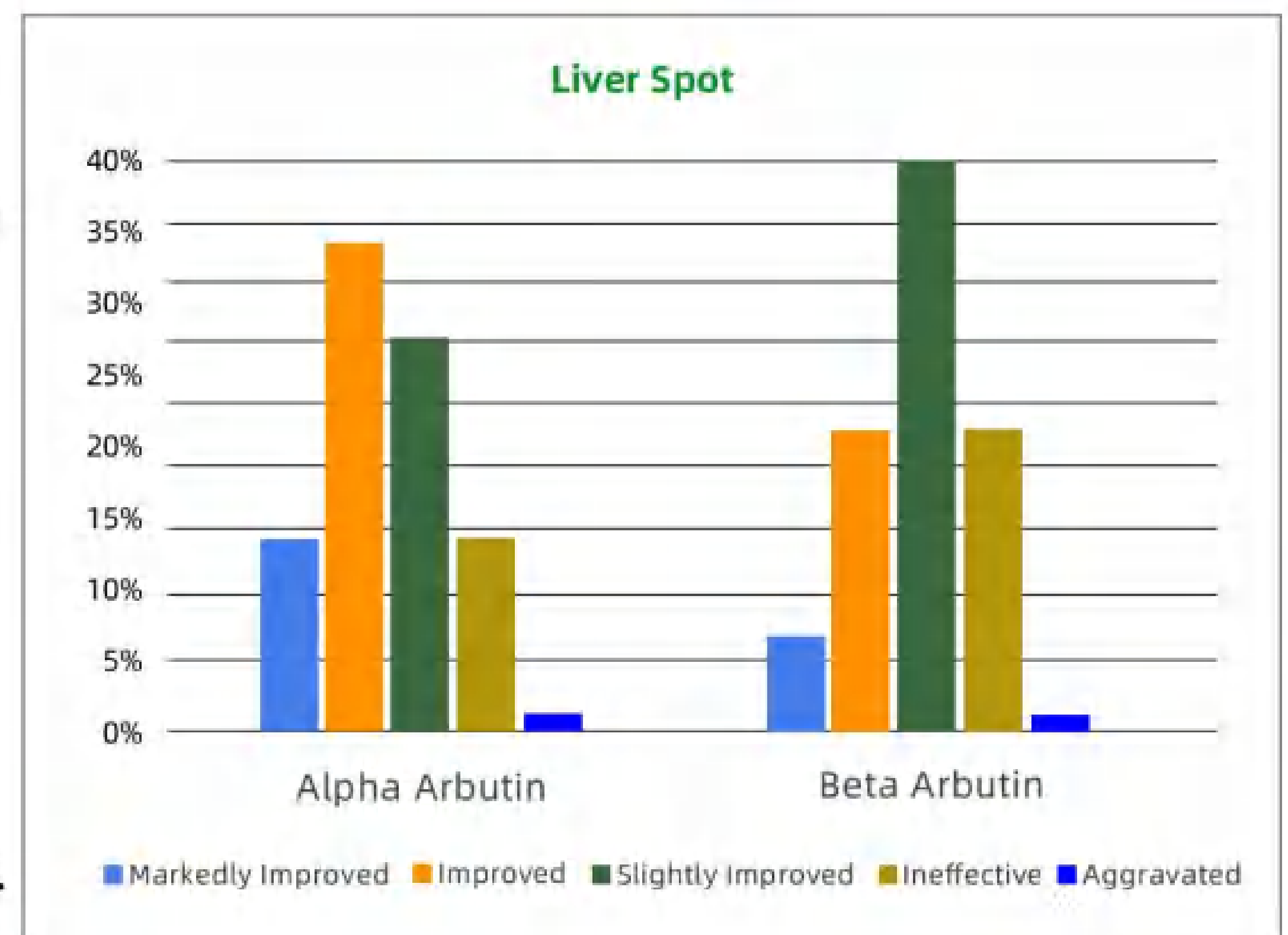
A skin whitening study on 60 chinese descent women demonstrated that an emulsion containing 1% alpha arbutin resulted in a faster and more pronounced skin lightening effect after 28 days when compared with kojic acid and β -arbutin at 1% use levels. The parameter L which represents the lightness of skin was determined by means of chromameter.

The results showed that the whitening effect is α -arbutin > kojic acid > β -arbutin at concentration 1%



[Liver Spot Study]

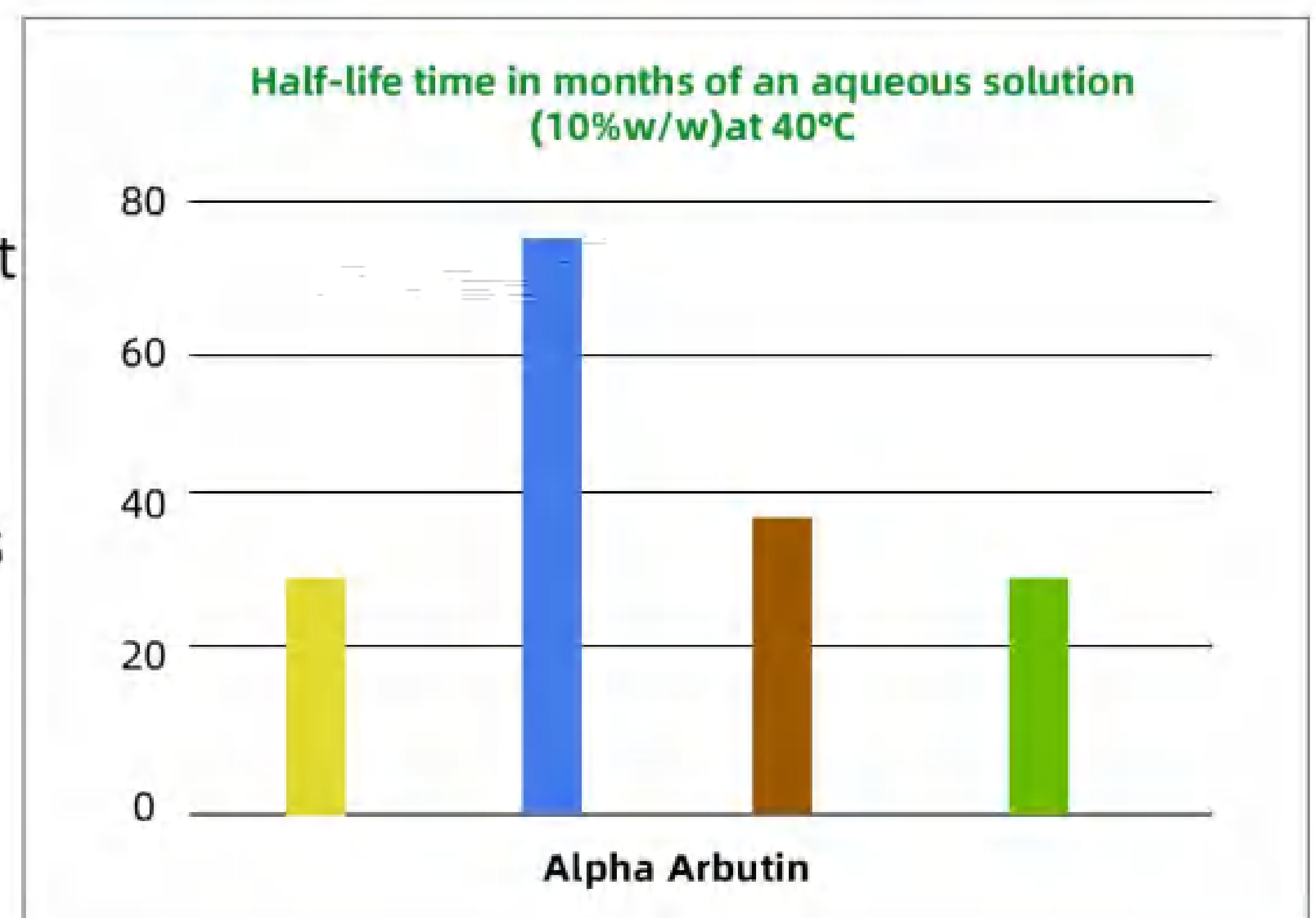
In a 3 month study on 40 female volunteers showed that 2% alpha arbutin was used in a cream formulation to minimize liver spots. The study demonstrated that α -arbutin is much more effective than β -arbutin in minimizing liver spot. After 3 month of usage, over 50% of the cases showed significant improvement in liver spots, a percentage higher than the β -arbutin group.



[The Stability Test of Alpha Arbutin]

10% Alpha arbutin aqueous solution was tested at 40°C for its active half-life period at different PH conditions. The results are as follows:

Alpha arbutin is stable at PH 3.5-6.5 and has an activity half-life period of at least 23 months.



[Usage Guide]

Specification	HPLC 98%
Form	White Powder
Dosage	0.5%-1%
Solubility	Water
Shelf life	24 months
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.
Brand application of the same material	DHC: DHC Alpha-Arbutin White Cream K.I.S.S: K.I.S.S Whitening Collagen Cream Mask Whitening Cream

Bakuchiol



[INCI Name] Bakuchiol

[Cas No.] 10309-37-2

[Introduction] Bakuchiol is extracted from the seeds of the herb psoralea. Phenolic substances, Bakuchiol and Retinol have similar structures, both of which can activate the same Retinol receptors in cells, stimulate collagen production, and achieve anti-aging effects. In addition, Bakuchiol and Retinol are just as good as promoting keratin metabolism and controlling oil. It supports the whitening effect, and there is also the effect of inhibiting Propionibacterium acnes that vitamin A does not have.

[Function]

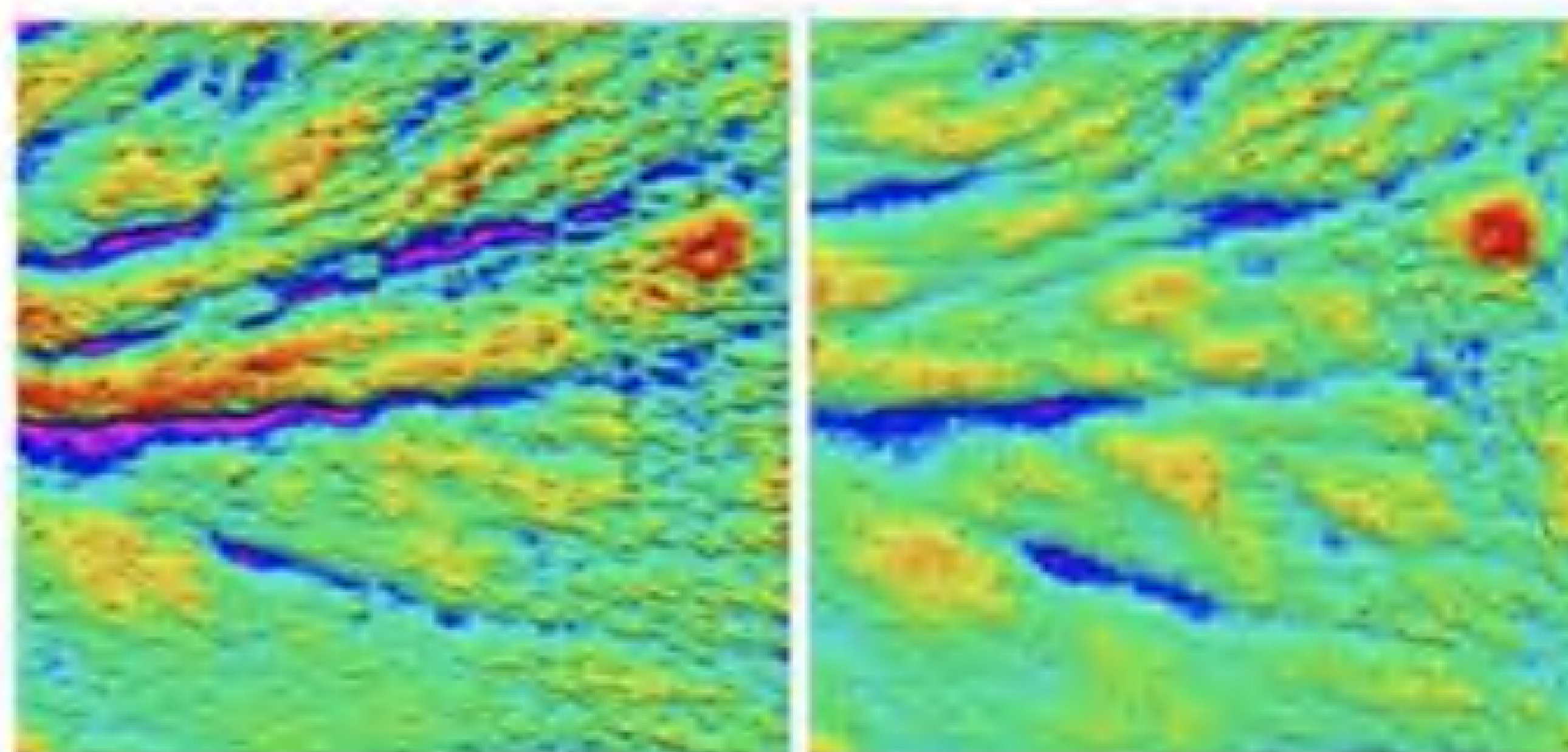
Anti-acne, oil control, reduction of fine lines around the eyes, anti-oxidant, spot lightening, anti-aging.



[Efficacy]

In 2018, scientists in Spain released the results of clinical trials, saying that the use of three-in-one night cream containing Bakuchiol (also contains melatonin and VC-IP) can effectively reduce the depth and area of wrinkles.

In addition to wrinkle removal and improving pigmentation, there is also a more obvious effect of Bakuchiol, which can reduce the trans epidermal water loss rate (TEWL) and increase skin moisture content.

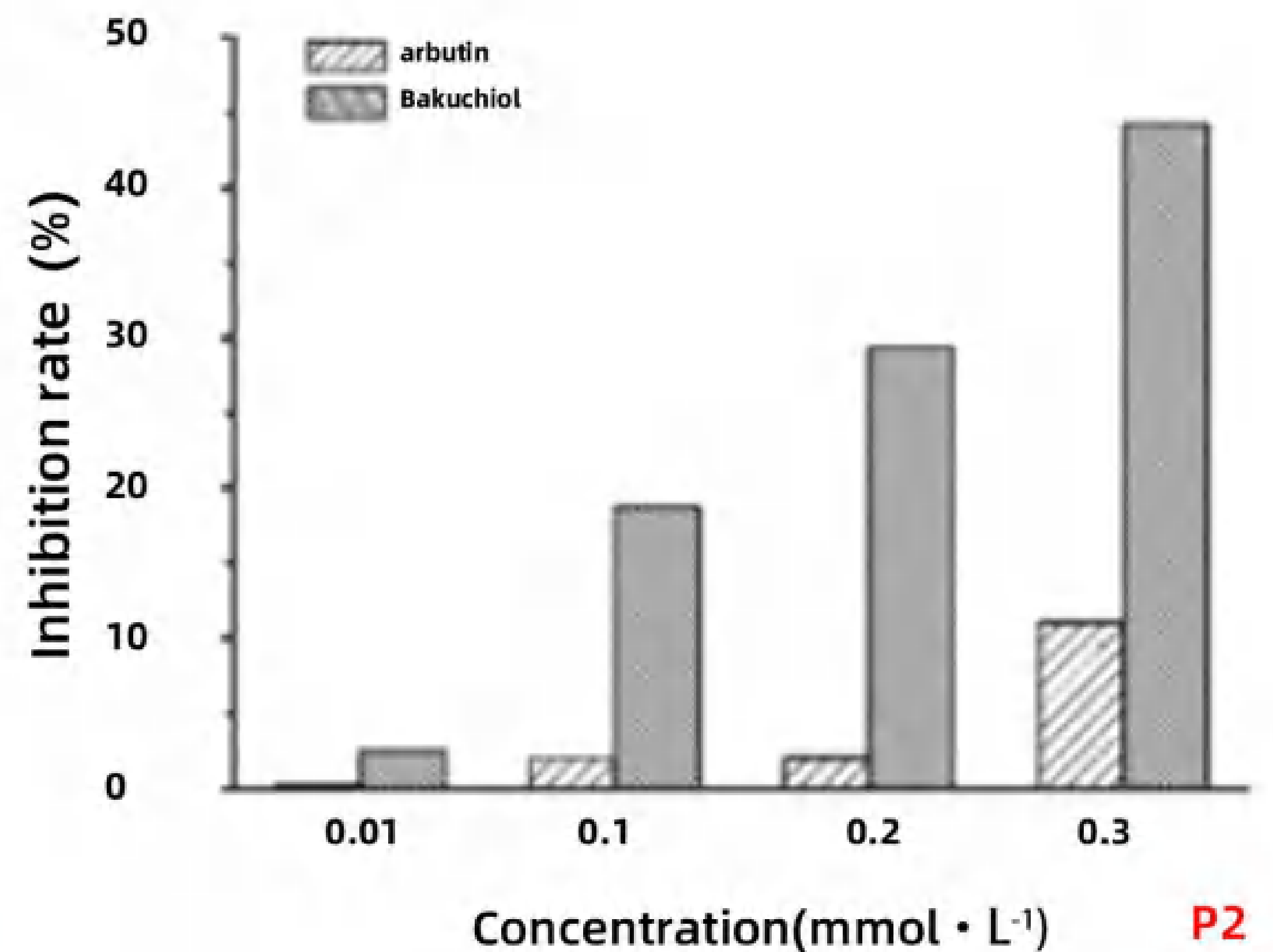
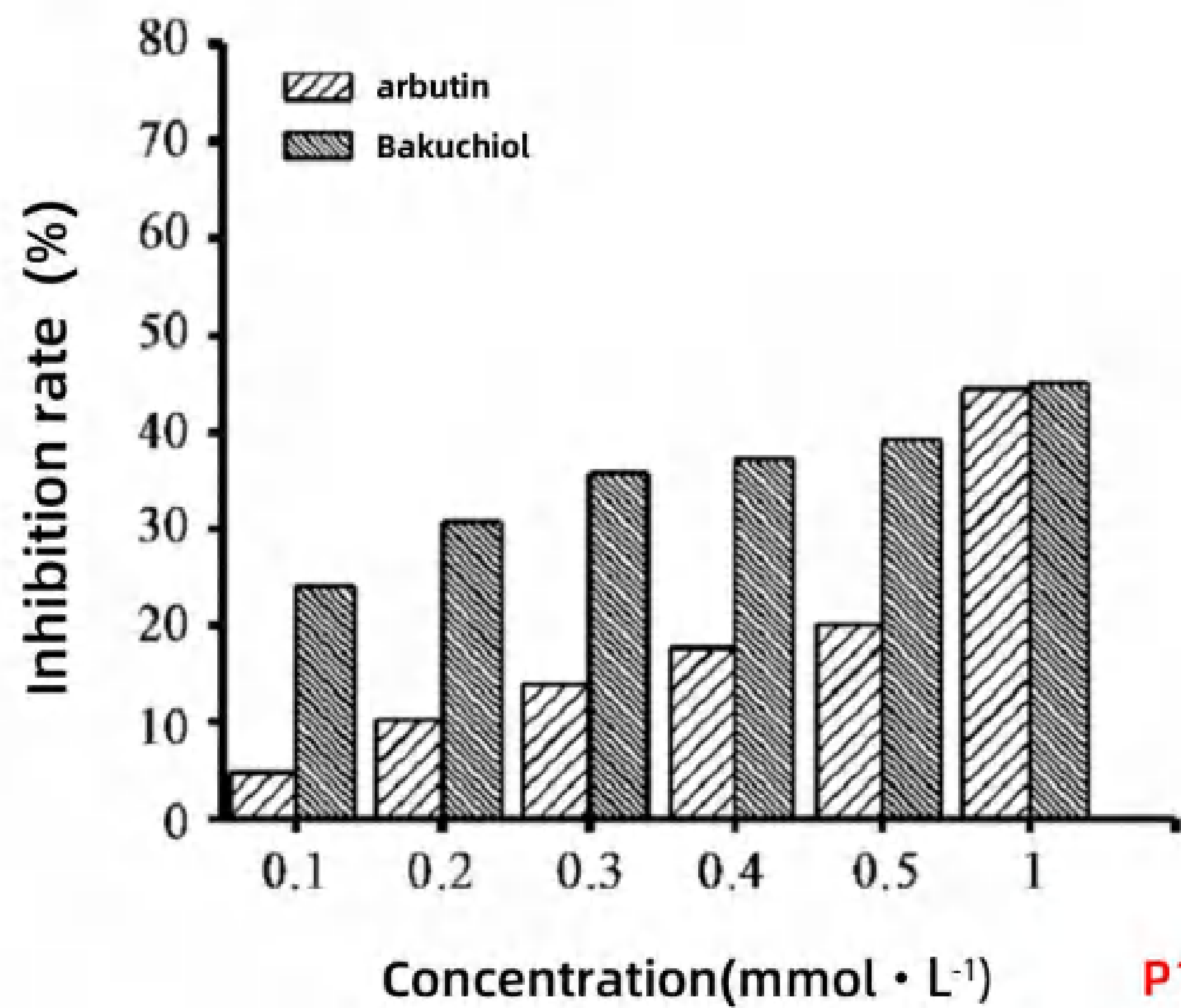


Baseline

D84

The inhibitory effect of Bakuchiol and Arbutin on tyrosinase monophenolase activity.(P1)

Inhibition of tyrosine diphenol activity by Bakuchiol and Arbutin.(p2)



[Clinical Data]

Clinical data on the use of 0.5% Bakuchiol cream

8 weeks & 12 weeks: Patient assessment: improvement in "acne".

≥53% (8 weeks), ≥ 68% (12 weeks) with improvement + significant improvement

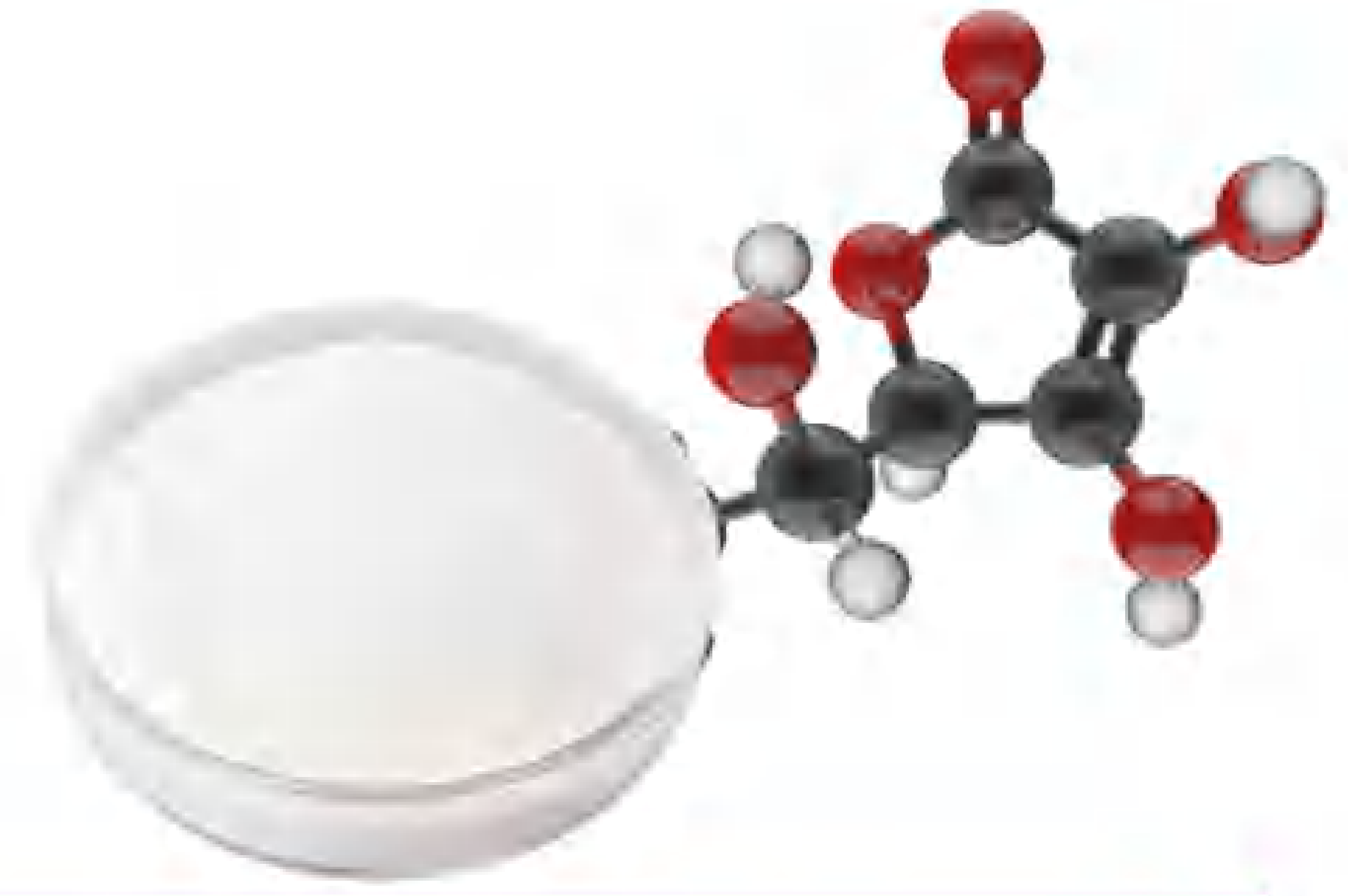
≥36% (8 weeks), ≥ 31% (12 weeks) Great improvement + almost no acne.



0.5% Bakuchiol cream used for 12 weeks clinical picture

[Guide to use]

Name	Bakuchiol	Shelf life	12 months
Solubility	Soluble in methanol, ethanol and other organic solvents	Specifications	60%-90% HPLC
Product Characteristic	red-brown oily liquid	Storage	Sealed, dry and ventilat
Application	Used in creams, creams; essences, ect.	Application brand	BIODERMA Hydroxatone OSKIA



AA-2G

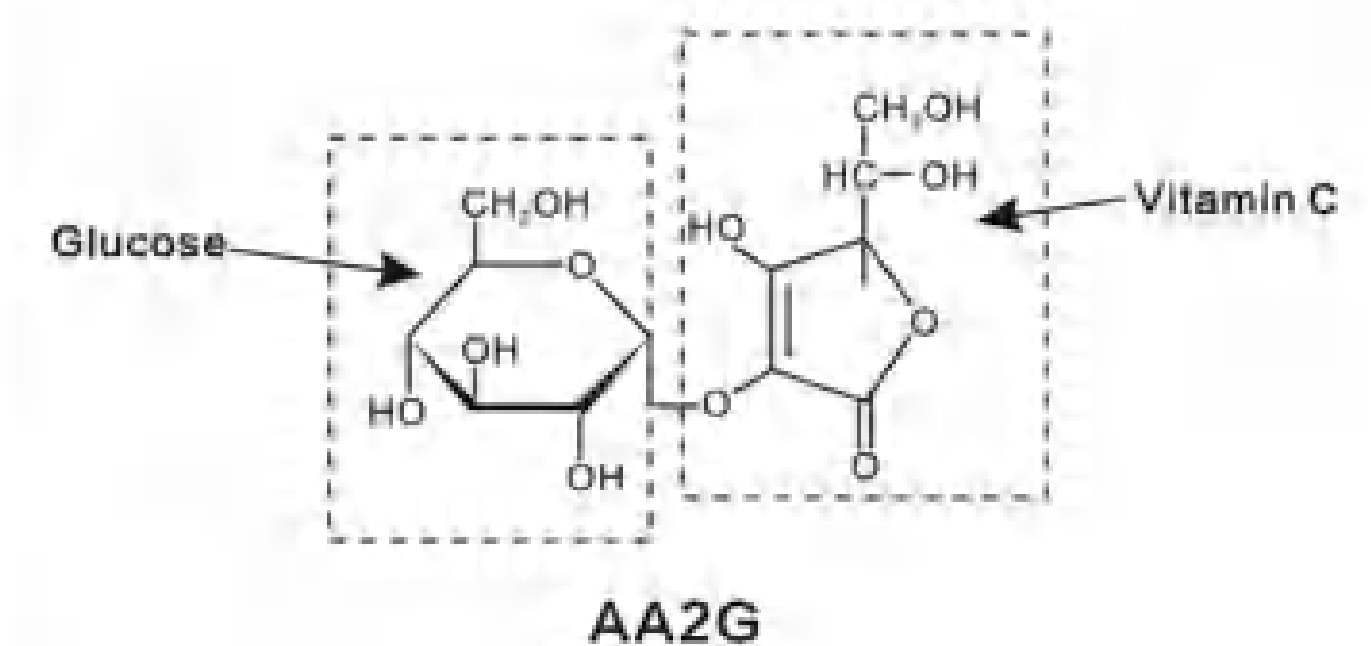
[INCI Name] Ascorbyl glucoside

[Cas No.] 129499-78-1

[Introduction] 2-O- α -D-glucosyl (AA-2G) is a derivative of L-ascorbic acid which is formed by the condensation of glucopyranoside and L-ascorbic acid under the action of a glycosyltransferase. Compared with ascorbic acid, it is more stable and easy to absorb and apply. As it is non-reducing and not prone to oxidation, its aqueous solution is particularly stable. With better light resistance and heat resistance, longer-lasting effect on scavenging free radicals and promoting collagen synthesis, AA2G is mainly used as sunscreen and anti-aging agent in the cosmetics industry.

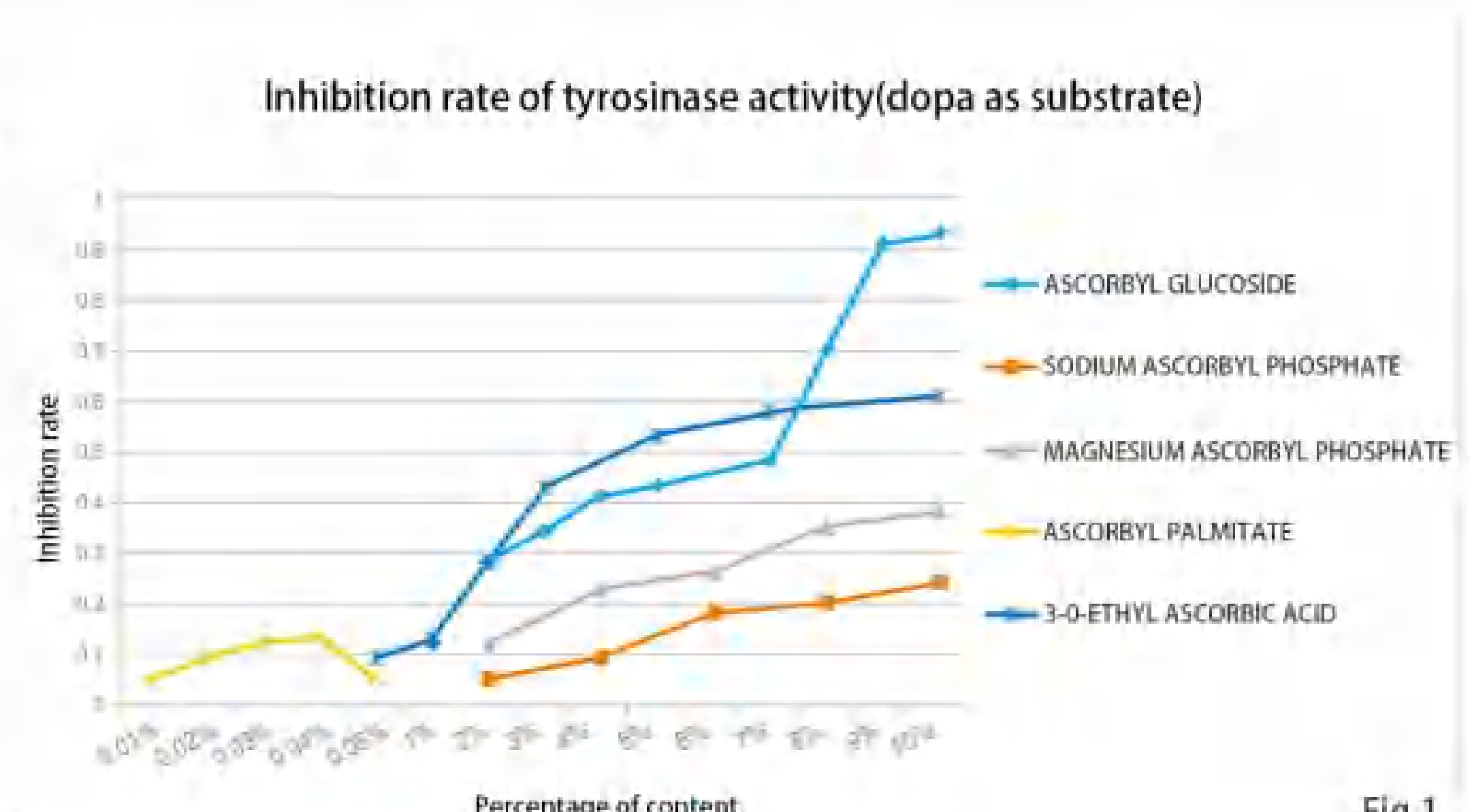
[Function]

- ◆ Skin Whitening: The melanin produced by tyrosinase can be inhibited by AA2G better than other VC derivatives at the same concentration.
- ◆ Repair UV Damage: AA2G can inhibit free radicals and promote collagen synthesis with more lasting effects, it can also repair UV damage.



[Comparison with other Vc derivatives]

When AA2G, VC ethyl ether, sodium ascorbylphosphate, magnesium ascorbylphosphate, and magnesium ascoroylpalmitate were at the same concentration of 0.375%, VC ethyl ether and AA2G worked better than others on tyrosinase. The relative tyrosinase activity of VC ethyl ether and AA2G was 104% and 75% respectively, and the relative melanin content was 138% and 72%.

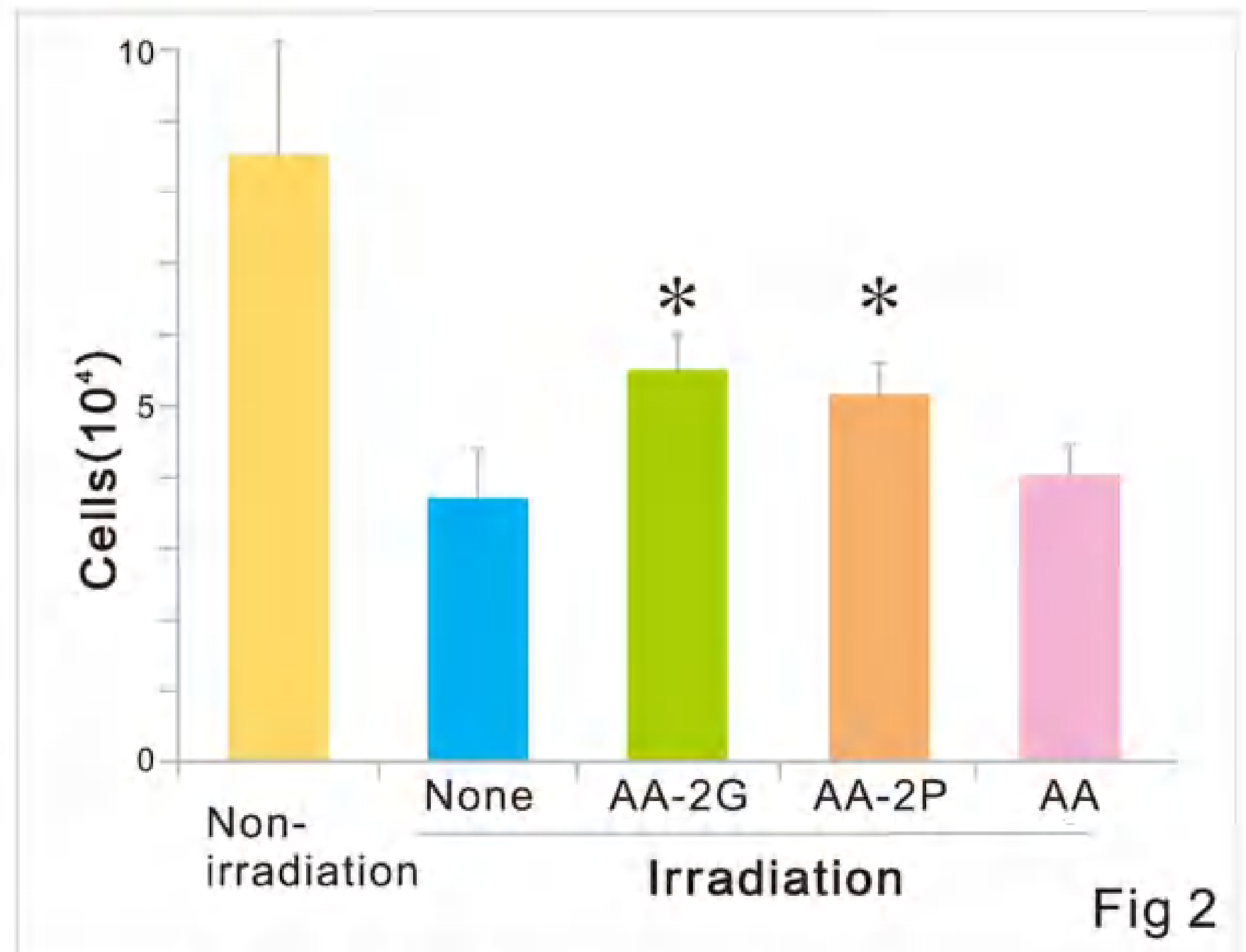


[Anti-aging and repair UV damage]

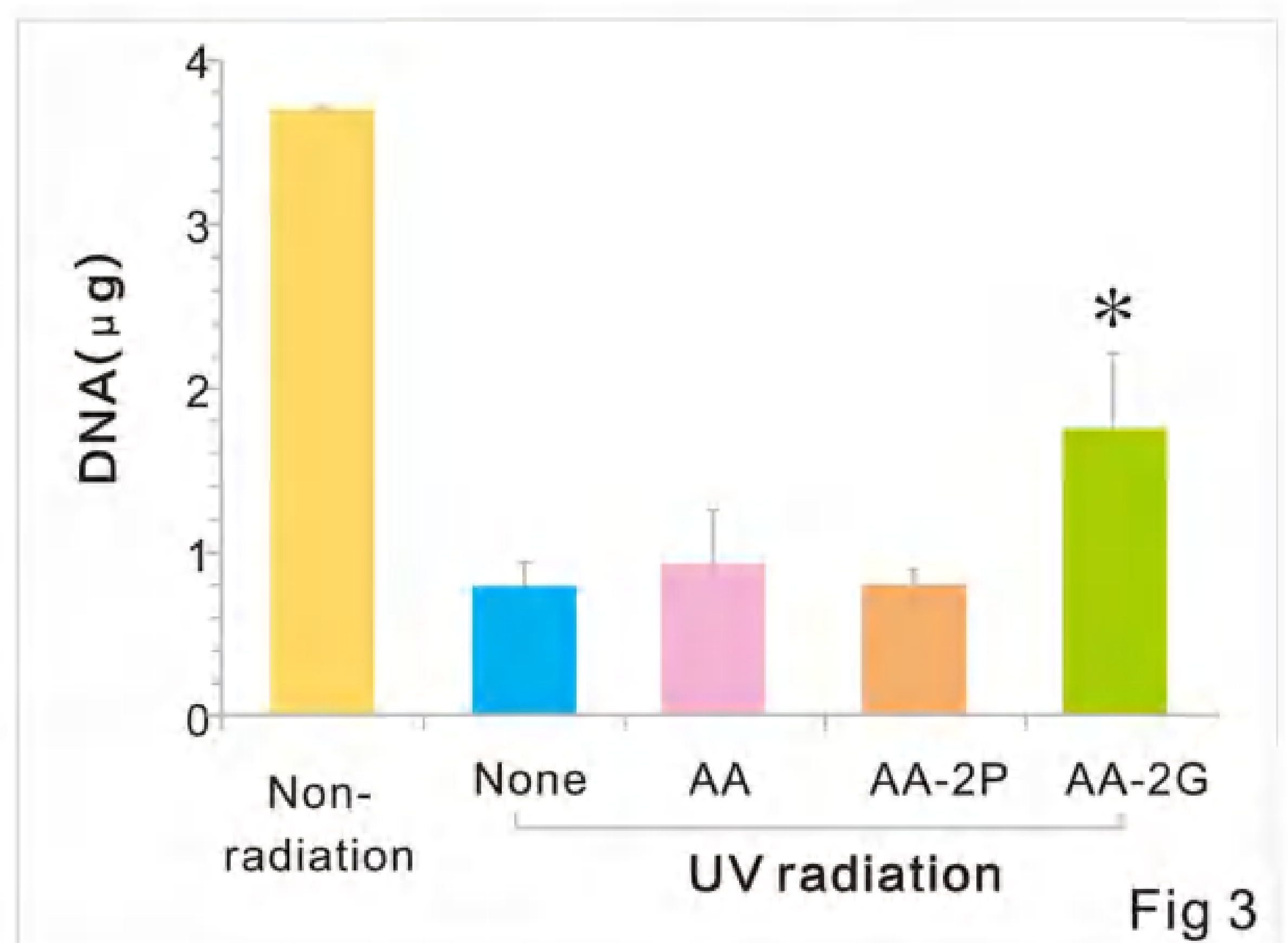
Compared with VC and AA-2P, AA2G is more effective at promoting collagen synthesis and inhibiting melanin formation.

UV exposure can cause skin damage. Fig 2 showed how VC derivatives work after UV radiation. Without VC derivatives, the number of living cells decreased by about 44% after UVB irradiation. When AA-2G or AA-2P was added, cell viability increased to approximately 65%. It indicated that AA-2G and AA-2P were helpful in preventing cell death.

By detecting the DNA to determine the cell activity after UV irradiation, it showed AA-2G can effectively repair cells damaged by UV light. When ascorbic acid or vitamin C derivatives were not added, the amount of DNA dropped to 20% compared with the unirradiated status, which showed a large number of cells death. When AA-2G was added, it maintained about 50% amount of the DNA, which showed less number of cells death, while AA-2P and AA had no effect at all.



AA= Ascorbic Acid
AA-2P=L-Ascorbic Acid 2-phosphate



[Description]

Specification	99 %
Appearance	White powder
Recommended Dosage	1%-7%
Solubility	Soluble in water. Insoluble in ethanol, 1,3-butanediol, etc.
Storage	Store in tightly sealed and preferably full containers in cool, Dry and ventilated area.
Shelf-life	24 months when properly stored.
Brand Application of the same material	Loreal, Shiseido etc.



Tranexamic Acid

[INCI Name] Tranexamic Acid

[Cas No.] 1197-18-8

[Introduction] Tranexamic Acid is a synthetic derivative of aminomethylbenzoic acid, which has Anti-fibrinolytic activity. It has strong affinity for the five lysine binding sites of plasminogen. Tranexamic Acid inhibits fibrinolysis by inhibiting the conversion of plasminogen into plasmin. The half-of this raw material is longer, and its efficacy is about ten times that of aminocaproic acid. Its toxicity is much smaller and it has a similar mechanism of action.

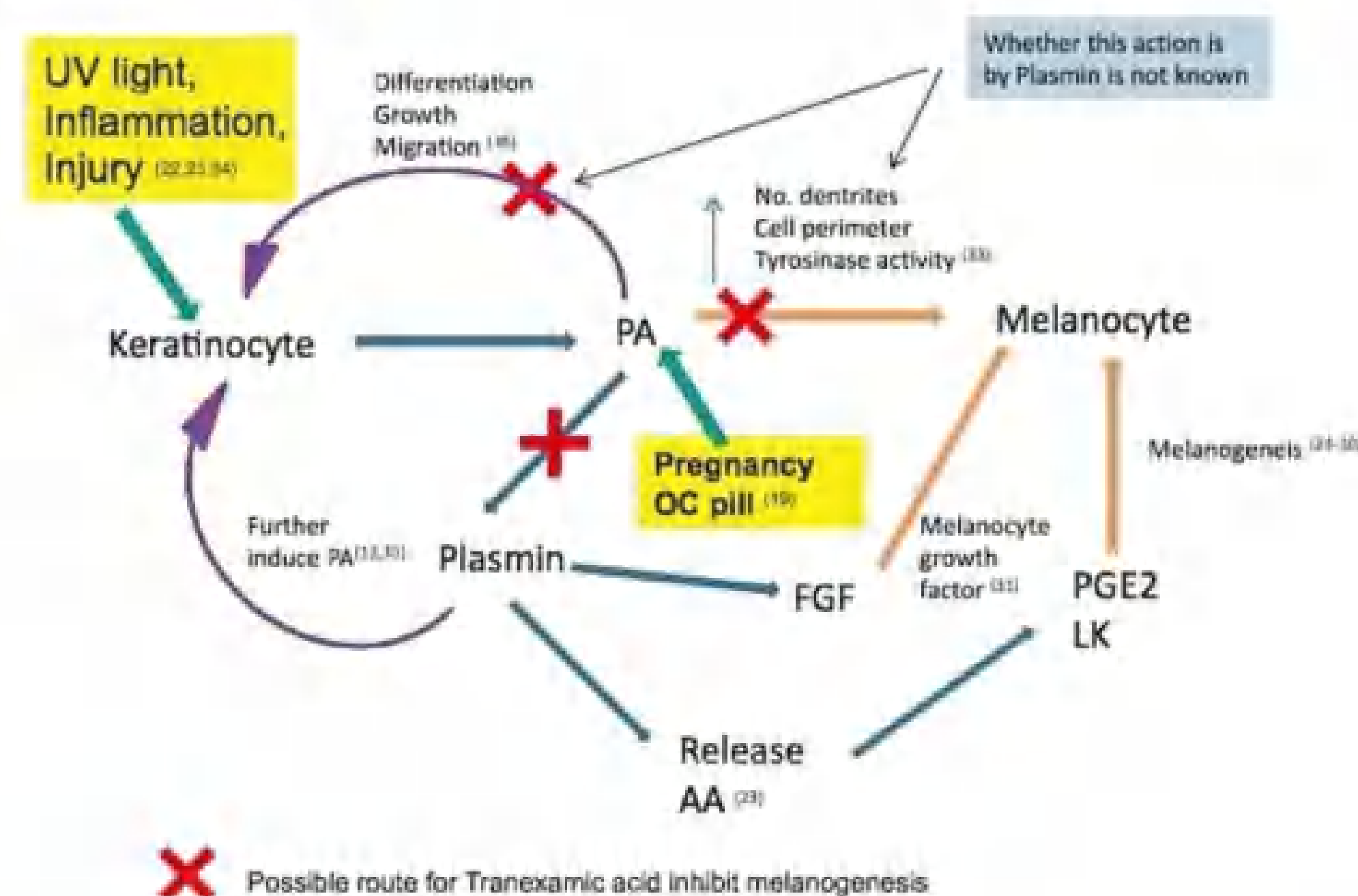
[Function]

- ◆ Easily soluble in water, colorless, odorless, not easily discolored.
- ◆ Performance with other whitening materials, good stability.
- ◆ High thermal stability.
- ◆ Low irritation, no irritation for masks.
- ◆ Fast effect, make skin white and bright within 1-2 weeks, quick effect products.

[Efficacy Test]

The importance of Tranexamic Acid in the treatment of chloasma

UV induced keratinocyte PA system leads to melanin formation. In subsequent clinical studies, Tranexamic Acid was shown to reduce the severity of Chloasma.



Tranexamic Acid versus hydroquinone and dexamethasone

Patients characteristic	Mean ± SD/ frequency (percentage)
Age (year)	40.00±4.63
Age onset of melasma (year) (minimum-maximum)	29.60±8.13 (29-51)
Duration of melasma (year) (minimum-maximum)	10.34±7.18 (3 months-31)
Family history	
+	24 (61.5)
-	15 (38.5)
History of endocrine disease	
+	6 (15.4)
-	33 (84.6)
History of usage of antisolar cream	
+	34 (87.2)
-	5 (12.8)

SD = Standard deviation

Time	TA group	Hydroquinone + dexamethasone group	P*
Baseline	31.68±10.32	29.52±11.72	0.49
Week 4	22.60±10.37	19.48±10.93	0.31
Week 8	15.84±12.01	13.40±6.90	0.38
Week 12	10.76±9.43	10.48±7.84	0.91
P*	0.00	0.00	

*Repeated measure; MASI = Melasma Area and Severity Index; SD = Standard deviation; TA = Tranexamic acid

Group	Side effect	
	Yes	No
TA	9 (23.1)	30 (76.9)
Hydroquinone + dexamethasone	20 (51.3)	19 (48.7)

TA = Tranexamic acid

The aim of this study was to compare the safety and efficacy of 3% Tranexamic Acid local solution with 3% hydroquinone and 0.01% dexamethasone in the treatment of chloasma.

[Spot removal Test]

In this study, Tranexamic Acid had the same cumulative effect as hydroquinone and dexamethasone in the treatment of chloasma but was safer.

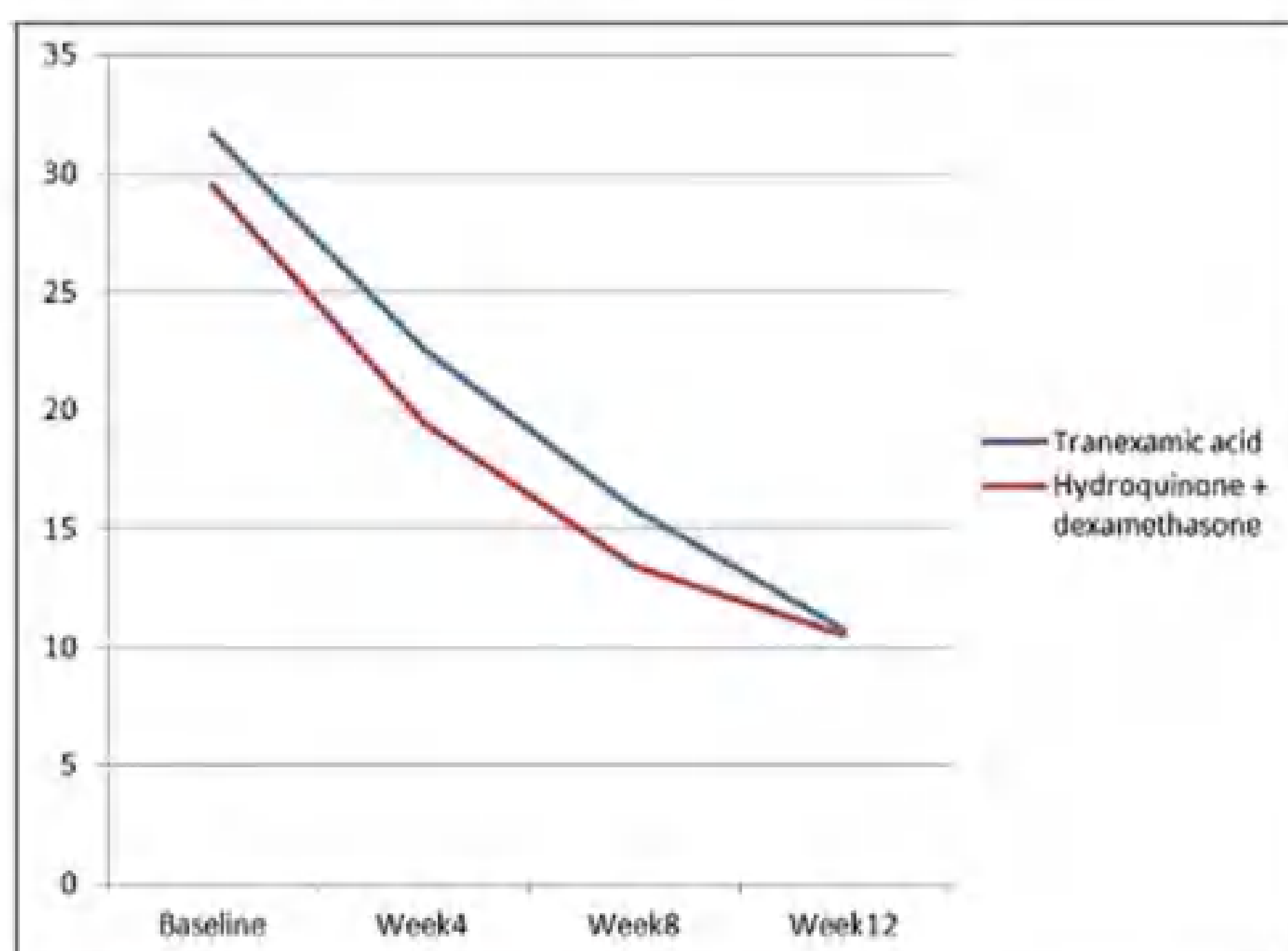


Figure 1: Changes of Melasma Area and Severity Index score of two groups

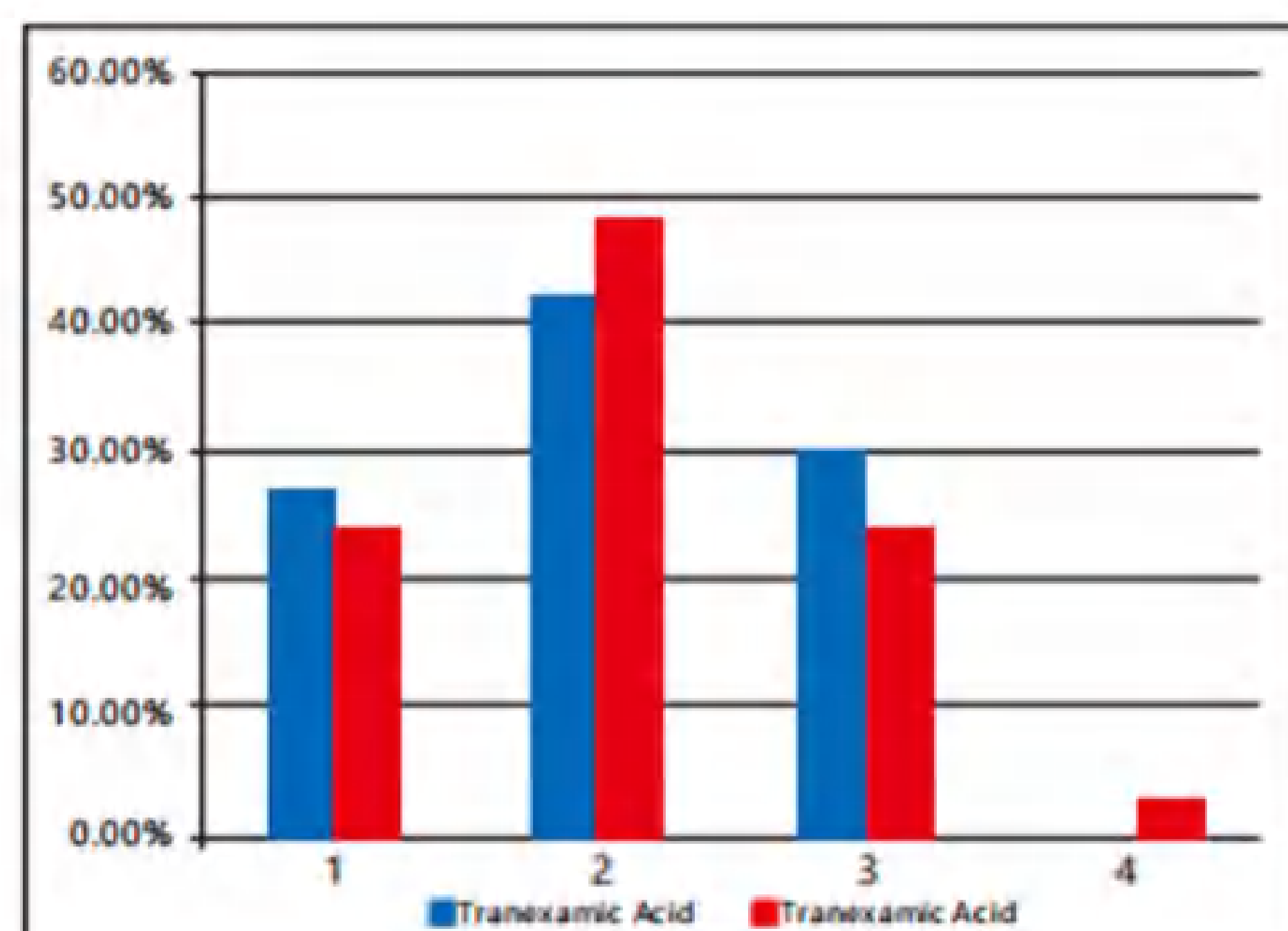
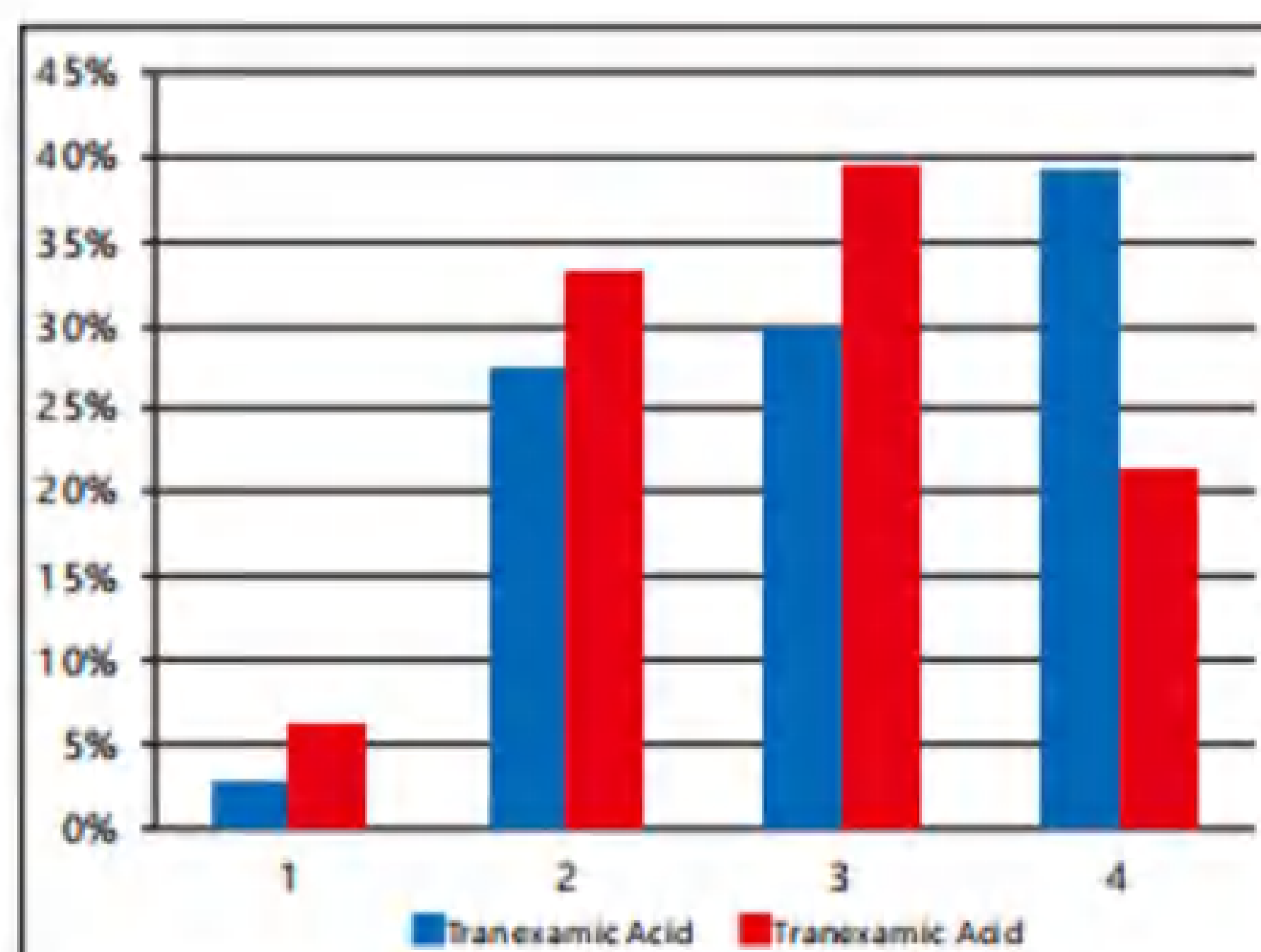


Figure 2: Representative the side which was treated with hydroquinone + dexamethasone (a: At baseline, b: After 12 weeks)



Figure 3: Representative the side which was treated with tranexamic acid (a: At baseline, b: After 12 weeks)

The results showed that Traxmic TM not only whitened chloasma and freckles by inhibiting melanin synthesis, but also prevented the appearance of new pigment spots and freckles.





Ferulic acid

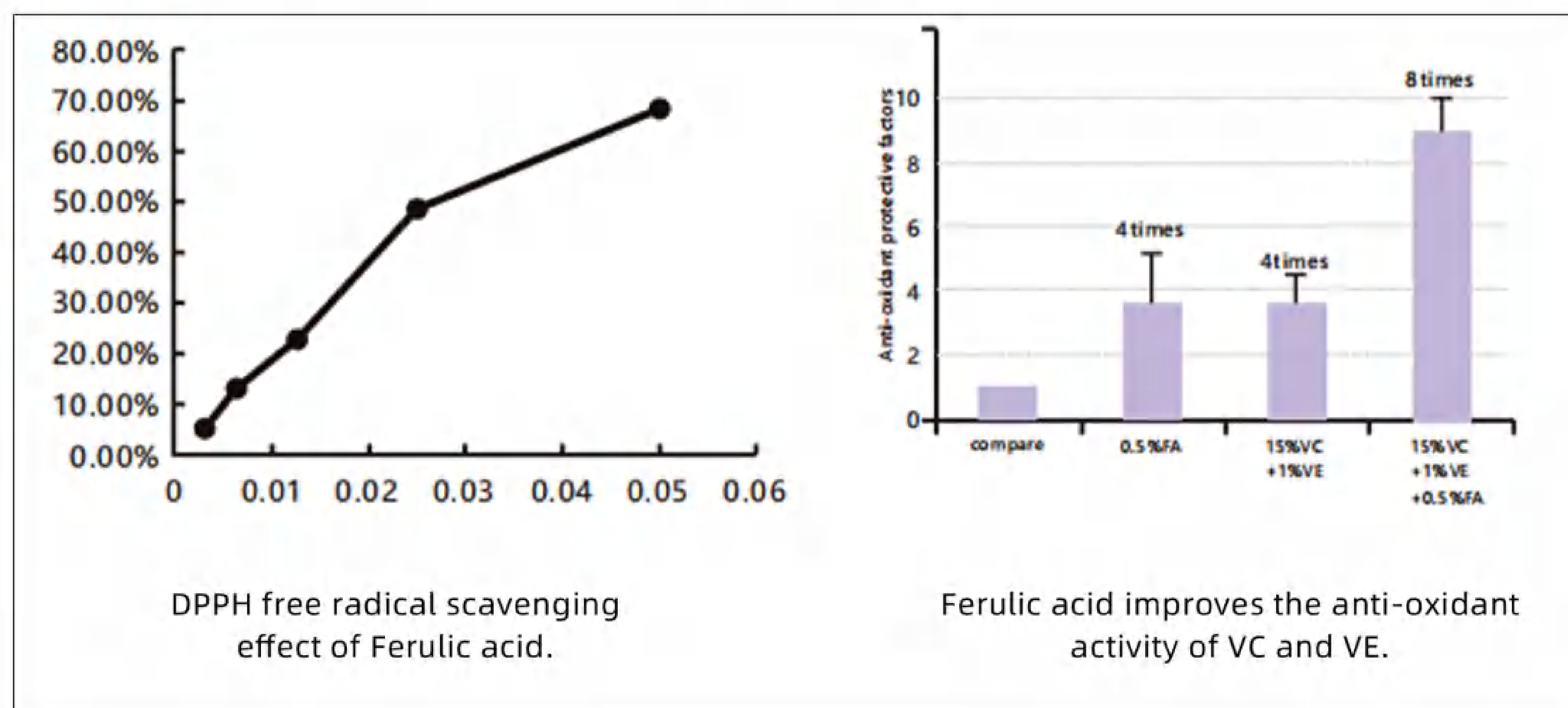
[INCI Name] Ferulic acid

[Cas No.] 1135-24-6

[Introduction] Ferulic acid, a natural plant ingredient from nature, and its chemical name is 4-hydroxy-3-methoxycinnamic acid. Ferulic acid can scavenge free radicals, promote the production of free radical enzymes, increase the activity of glutathione transferase and quinone reductase, and inhibit the activity of tyrosinase, thereby regulating human physiological functions. In cosmetics, it has anti-dark, anti-aging, anti-inflammatory, anti-erythema, anti-collagen degradation and other effects on the skin; It is used in the food industry as an anti-oxidant and by fermentation to produce vanillin.

[Efficacy Test]

Anti-free radicals, inhibit tyrosinase, anti-oxidant.



[Efficacy-Whitening]

Determination of melanocyte melanin synthesis by NaOH lysis method: Cells were pre-cultured with different concentrations of Ferulic acid solution for 72 h. Cells were lysed by adding 100 μ L of NaOH solution at a concentration of 1 mmol/L per well, bathed in a water bath at 37 $^{\circ}$ C for 1 hour, and the absorbance A value of each well was measured by a microplate reader at a wavelength of 450 nm (A value refers to the absorbance of melanin).

The effect of Ferulic acid on Melanin synthesis(A value,x \pm s)

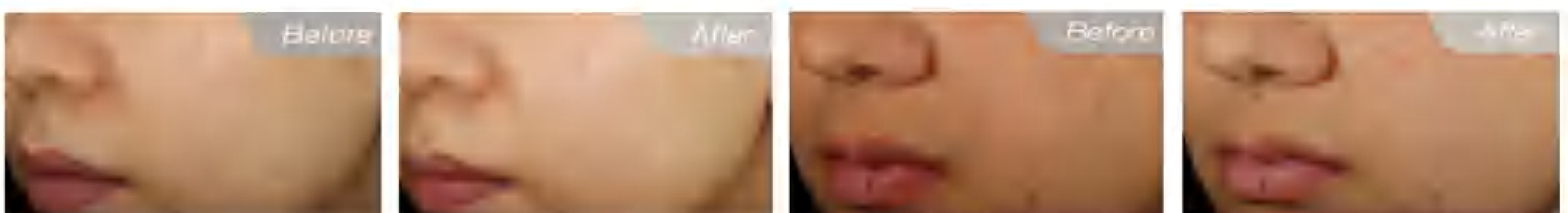
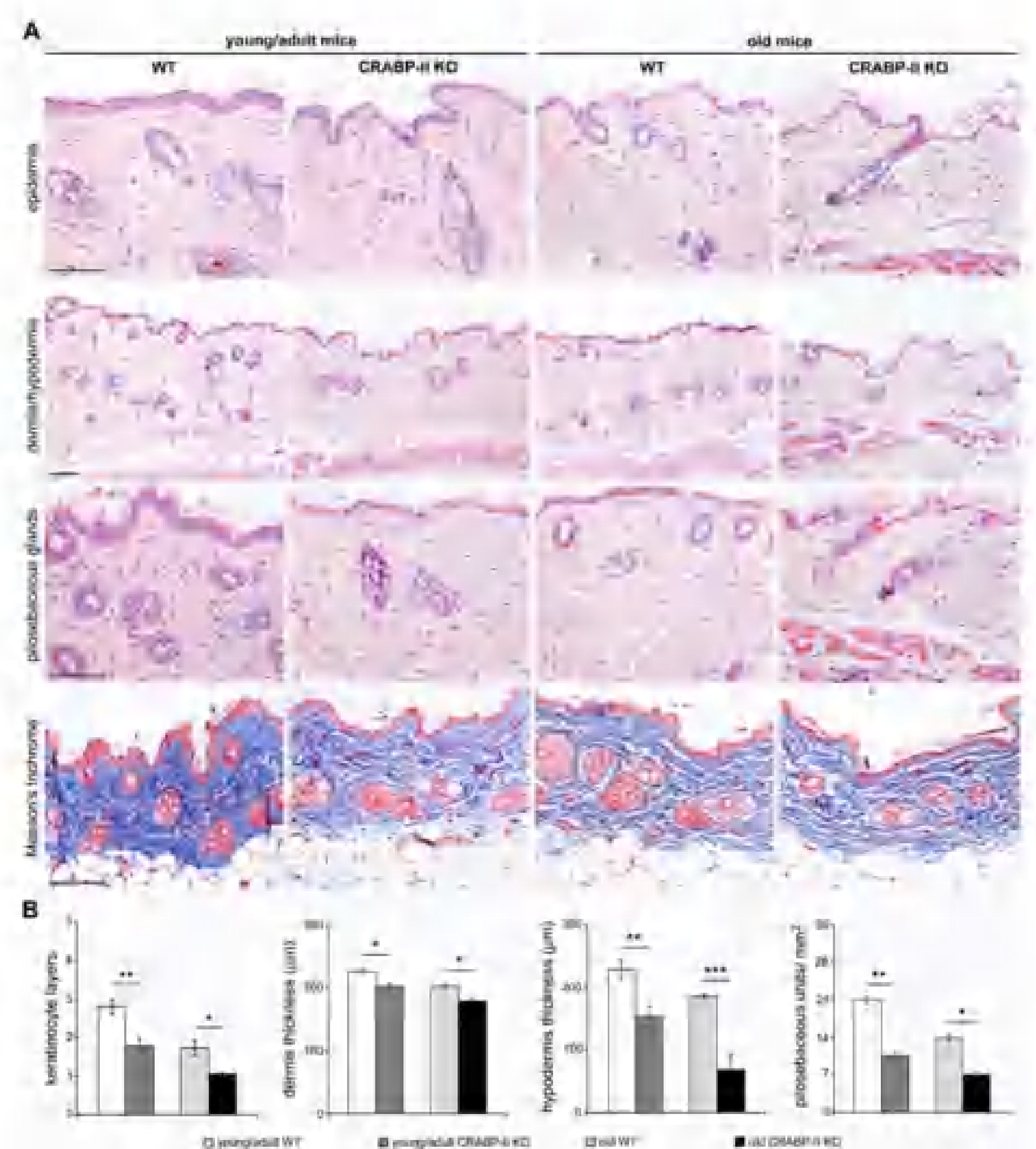
Group	Treatment group	A value
Control group	5	0.039 \pm 0.006
0.01mg/mL	5	0.028 \pm 0.002a
0.1mg/mL	5	0.025 \pm 0.001a
1mg/mL	5	0.021 \pm 0.001ab

Note: Compared with the control group, a: P < 0.05; Compared with the 0.01 mg/ml group, b: P < 0.05.

The experiment indicates that as the concentration of Ferulic acid increases, melanin synthesis decreases, demonstrating the inhibitory effect of Ferulic acid on melanin.

[Anti-oxidant Efficacy]

A study conducted in 1999 suggested that when used in combination with vitamin E, arbutin can serve as a whitening agent for pigmentation, as it "can inhibit melanin production, possibly by indirectly inhibiting the activity of tyrosinase." While arbutin is effective on its own, it works even better synergistically with vitamin C and E, helping to maintain their stability and enhance their anti-oxidant properties.



91% agreement on reducing dullness. 94% agreement on enhancing radiance.

Mandelic acid



[INCI Name] Mandelic acid

[Cas No.] 611-72-3

[Introduction] Mandelic Acid, also known as alpha-hydroxybenzeneacetic acid, is a gentle alpha hydroxy acid (AHA) derived from bitter almonds or synthetically produced. It's increasingly popular in skincare for its ability to exfoliate the skin's top layer, revealing a radiant complexion. Suitable for various skin types, especially sensitive ones, it's a key ingredient in many cosmetic formulations.

[Whitening pathways]

- ◆ Prevent and inhibit the formation of melanin protein.
- ◆ Remove old keratin, lighten melanin protein, quickly and gently break down dark spots and other phenomena that have already formed, achieving the effect of later-stage whitening.
- ◆ When used in conjunction with modern cosmetic lasers, it enhances the effects of laser treatments and effectively improves post-laser pigmentation.
- ◆ Highly effective in improving inflamed acne and acne.

[Efficacy]

Anti-acne, anti-aging, anti-bacterial, skin-whitening, anti-oxidant.

[Advantage]

1. It is more gentle ordinary water-soluble traditional fruit acid.
2. Have super exfoliating, acne removal.
3. The chemical structure is similar to anti-biotics, so it can inhibit the proliferation of a variety of bacteria.

[Date]

Results: DL-Mandelic acid can tightly combine with the active center of SrtA and interact to form a stable complex, which ultimately inhibits the biological activity of SrtA, and has the potential to become an anti- *Staphylococcus aureus* infection inhibitor.

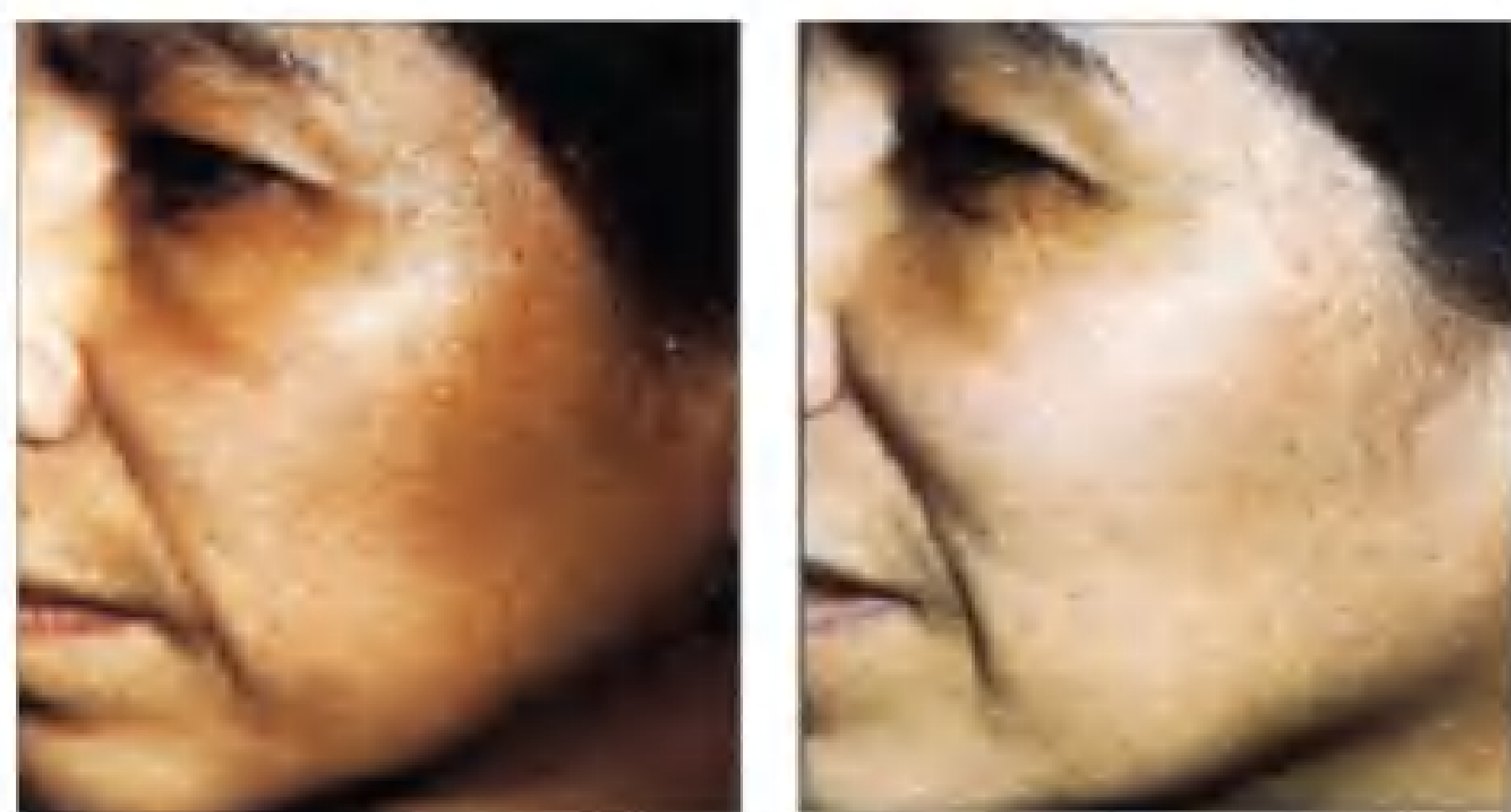
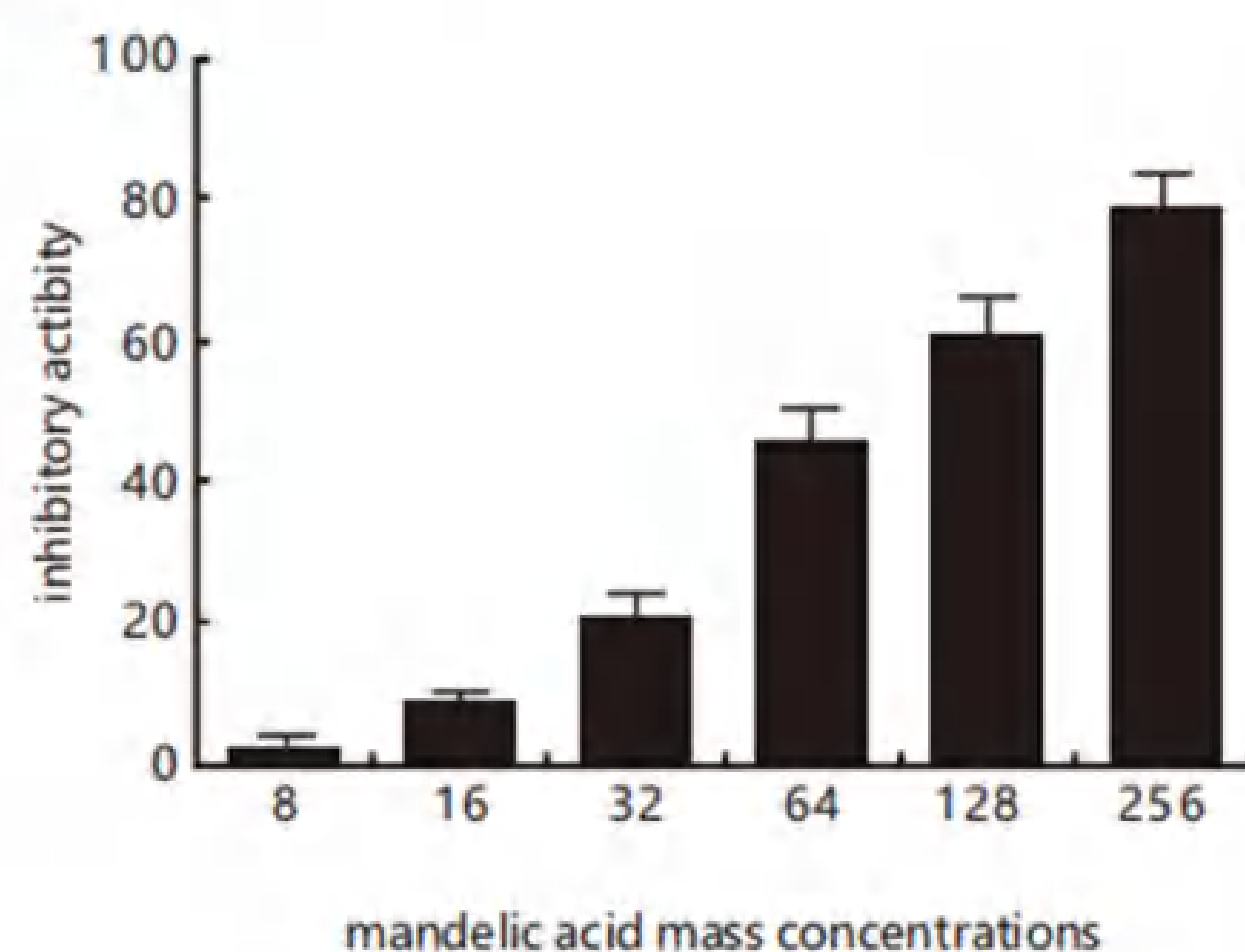


Fig.1

Fig. 1: Melasma in 45-year-old female (left) with hyperpigmentation caused by glycolic acid plus hydroquinone, and same patient (right) 9 months after use of mandelic acid BID.

Fig. 2: Melasma and lentigenes in 48-year-old female (left), and same patient one month after use of mandelic acid (dark lesion under left eye removed with liquid nitrogen).



Fig.2

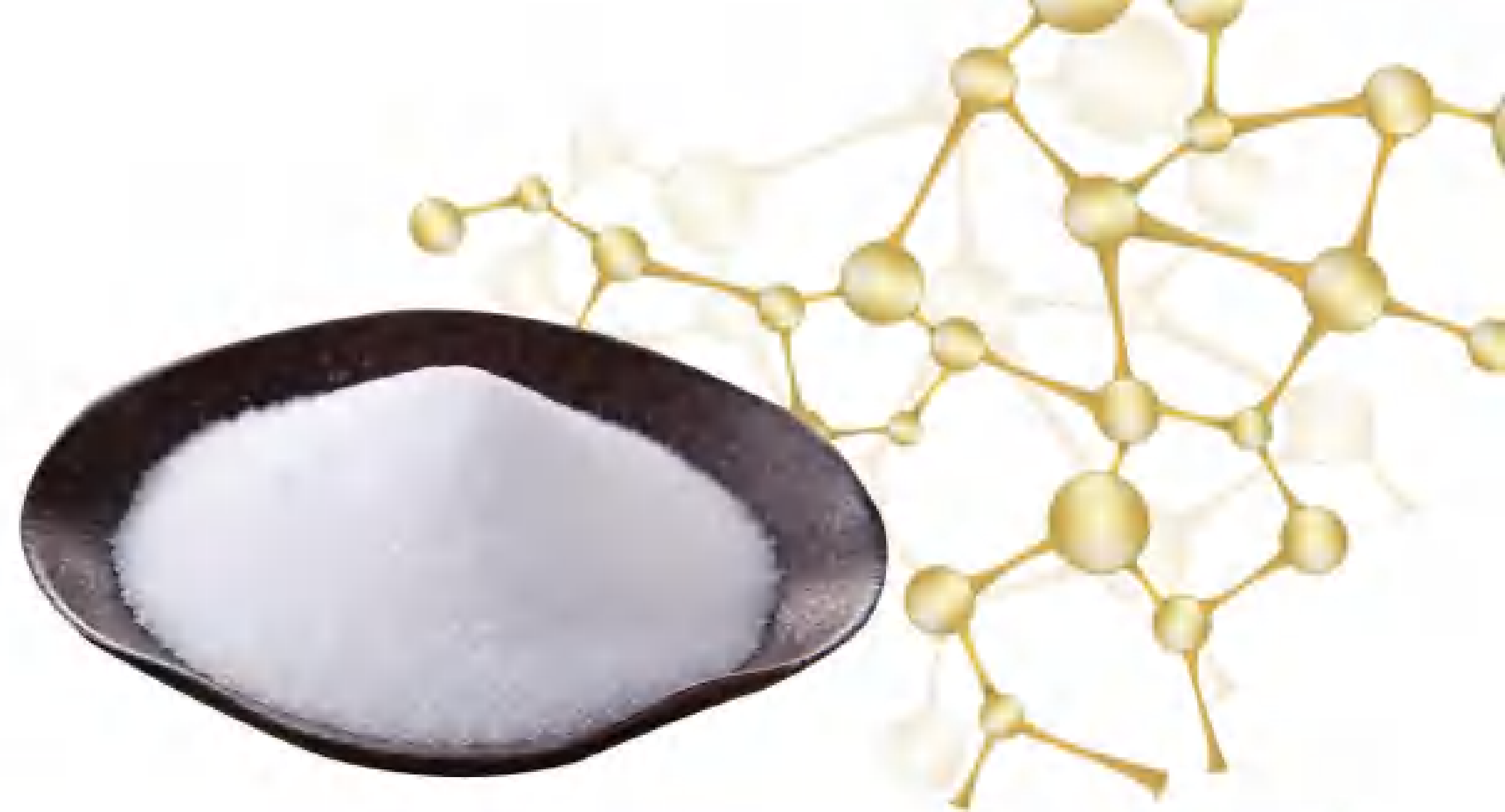
Pharmacological study of mandelic acid

Experimental project	Concentration	Effect description
Elimination of Ultraper oxygen Liberty	1%	Elimination rate:30.3%
Elimination of free radical DPPH	1%	Elimination rate:28.1%
Inhibition of tyrosinase activity	1%	Inhibition rate:16.9%

[Product Description]

Concentration	Description	Solubility	Dosage	Shelf life	Storage
99%-100%	White powder	Soluble in water	0.5%-1%	24 months	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.

Kojic Acid



[INCI Name] Kojic Acid

[Cas No.] 501-30-4

[Introduction] Kojic acid is a weakly acidic organic compound made of microorganisms through fermentation pathway. Kojic acid is in the brewing of soy sauce, bean paste, and alcohol. The existence of Kojic acid can be detected in many fermented products fermented by mold.

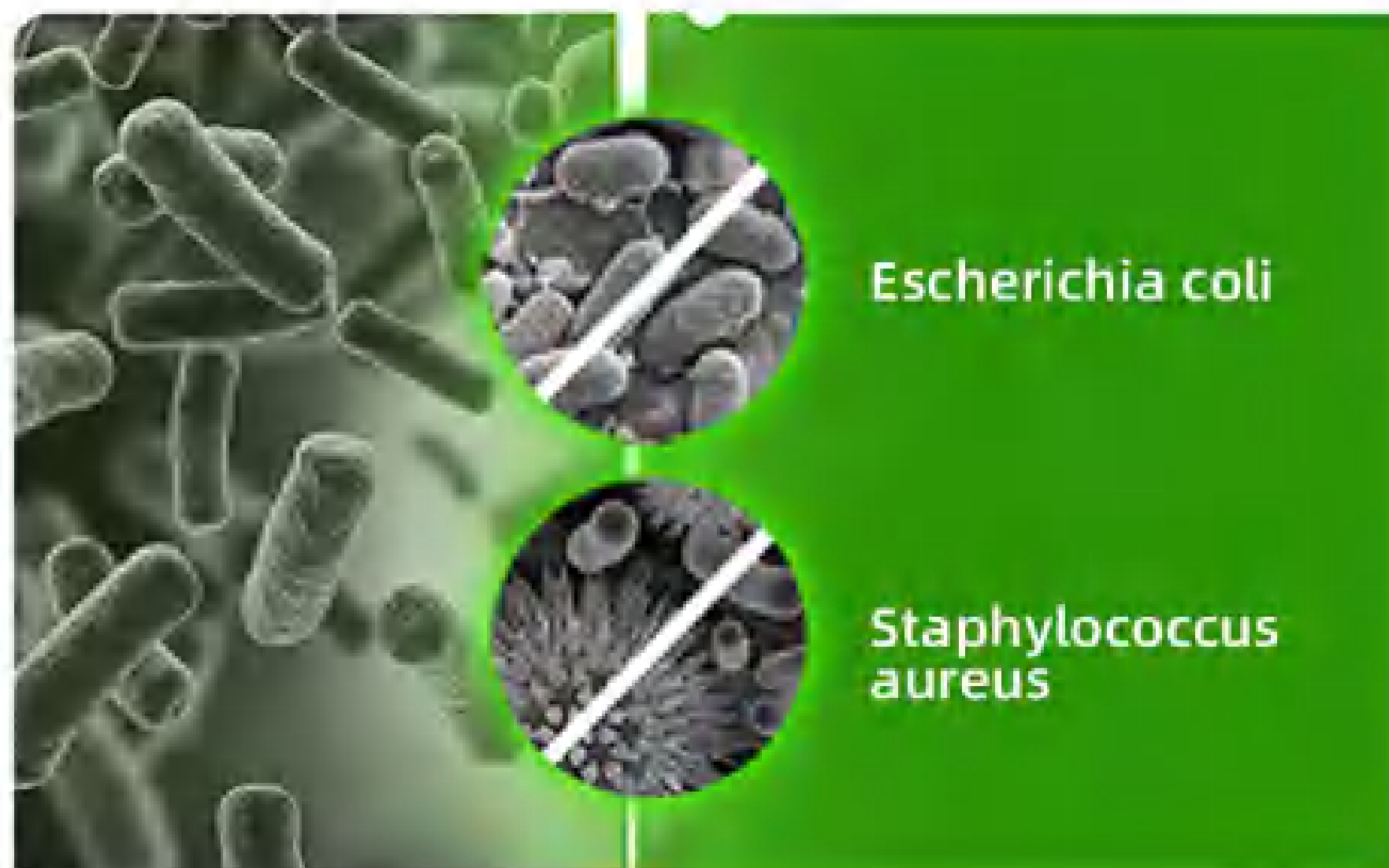
[Whitening efficacy]

Kojic acid can inhibit the synthesis of tyrosinase, thereby strongly suppressing the formation of skin melanin. Moreover, it is safe and non-toxic, without causing post-leukoderma sequelae. Therefore, Kojic acid has been incorporated into high-end whitening cosmetics such as toners, masks, lotions, and skincare creams, which can effectively treat freckles, age spots, pigmentation, acne, and other conditions. A concentration of 20ug/ml of Kojic acid can inhibit the activity of various tyrosinases (or polyphenol oxidases PPO) by 70-80%, with a generally recommended addition of 0.5-2.0% in cosmetics.



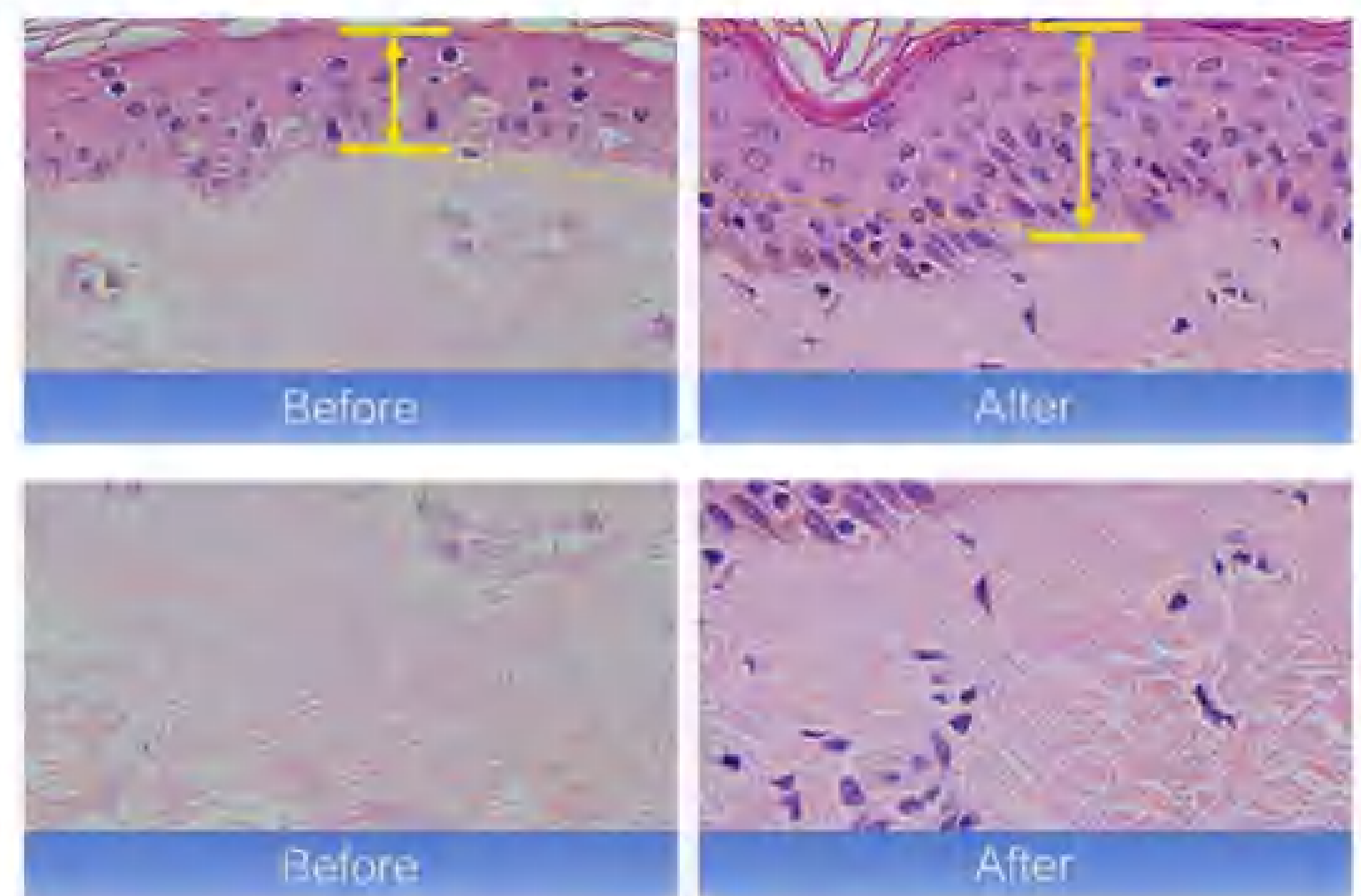
[Anti-bacterial efficacy]

Kojic Acid exhibits good inhibitory effects on most bacteria and some yeasts. Even at concentrations as low as 0.2% to 0.4%, Kojic Acid demonstrates significant inhibition against bacteria, especially pathogenic bacteria such as *Escherichia coli*, *Staphylococcus aureus*, and *Streptococcus*. Kojic Acid and its derivatives can be used as anti-bacterial agents.



[Anti-oxidant efficacy]

Many Japanese scholars have conducted extensive research on the application of Kojic Acid as a preservative, resulting in numerous patents for composite food preservatives with Kojic Acid as the main component. Research on Kojic Acid has shown that it has anti-oxidant and antibacterial properties, is completely non-toxic, soluble in water, and effective in small amounts, making it an ideal substance for pharmaceutical preservation.



[Usage Guide]

Specification	≥ 99%
Form	White to beige-brown crystalline Powder
Melting point	152 - 155°C
Solubility	Water, alcohol, acetone [DMSO(slightly),Methanol(slightly,smioated)]
Shelf life	24 months
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.



Kojic Acid Dipalmitate

[INCI Name] Kojic Acid Dipalmitate

[Cas No.] 79725-98-7

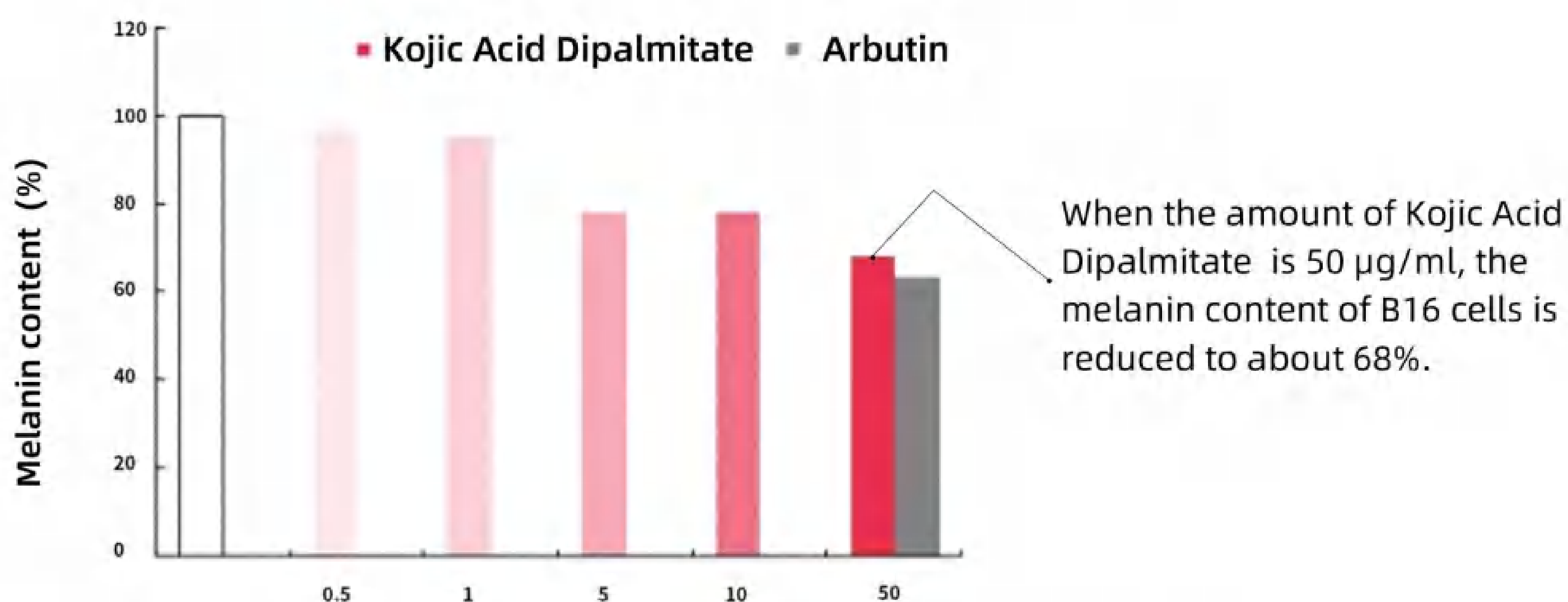
[Introduction] Kojic Acid Dipalmitate is an efficient whitening agent that effectively suppresses the activity of tyrosinase and blocks or delays the formation of melanin. Without side effects, with antioxidant effects, it can quickly penetrate the skin, absorb the skin, soften the stratum corneum, and is often used by the medical community to fade the face spots. It is a whitening ingredient that can have a whitening effect, safety and texture.

[Function]

- ◆ Kojic Acid Dipalmitate is a new generation of whitening additives after Arbutin , Kojic Acid, etc.
- ◆ KAD -15 By suppressing tyrosinase activity (neat CU^{2+}), it blocks melanin formation, with an effective rate of more than 80%.
- ◆ High -efficiency, stable, and safe whitening agent, better complexity with vitamin C ethylether and cyanoside.

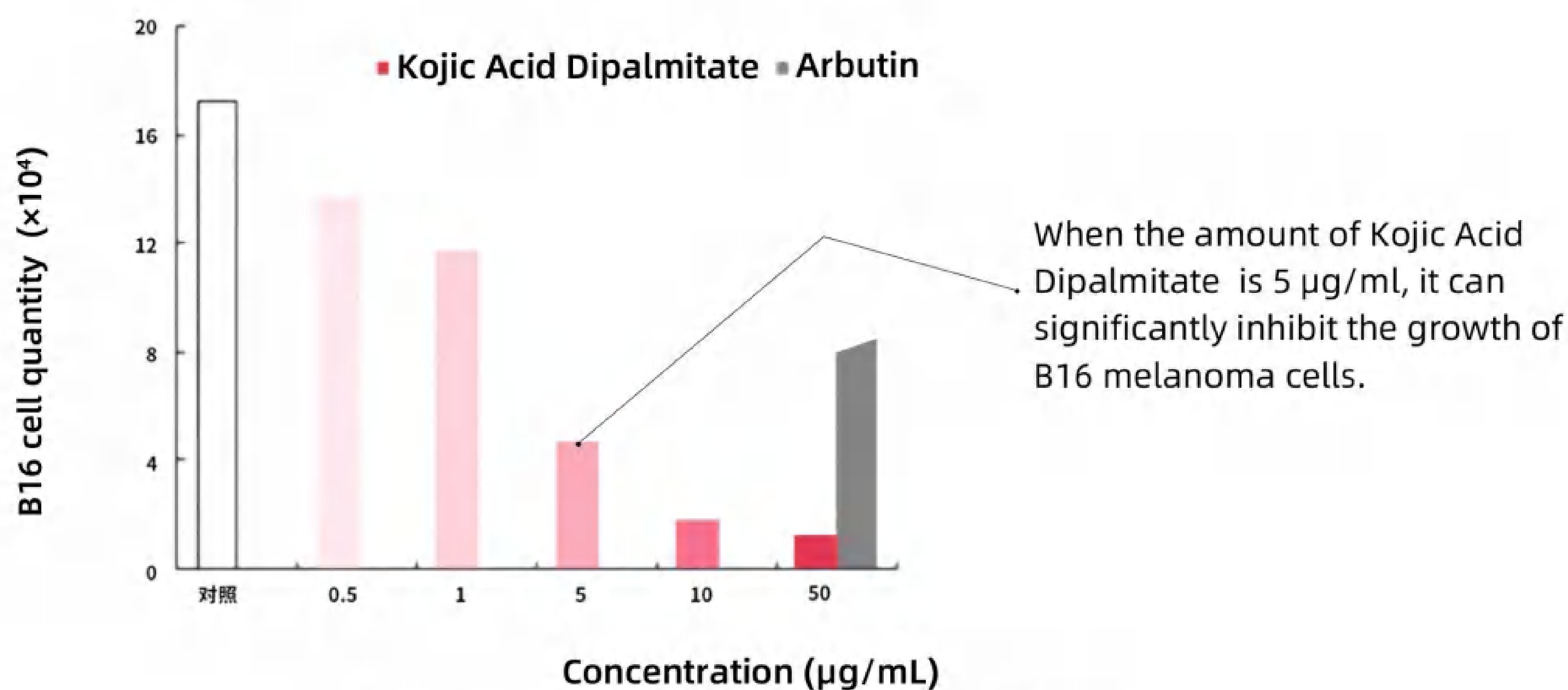
[Efficacy Data]

The inhibitory effect of Kojic Acid Dipalmitate on tyrosinase.



The inhibitory effect of Kojic Acid Dipalmitate on tyrosine activity

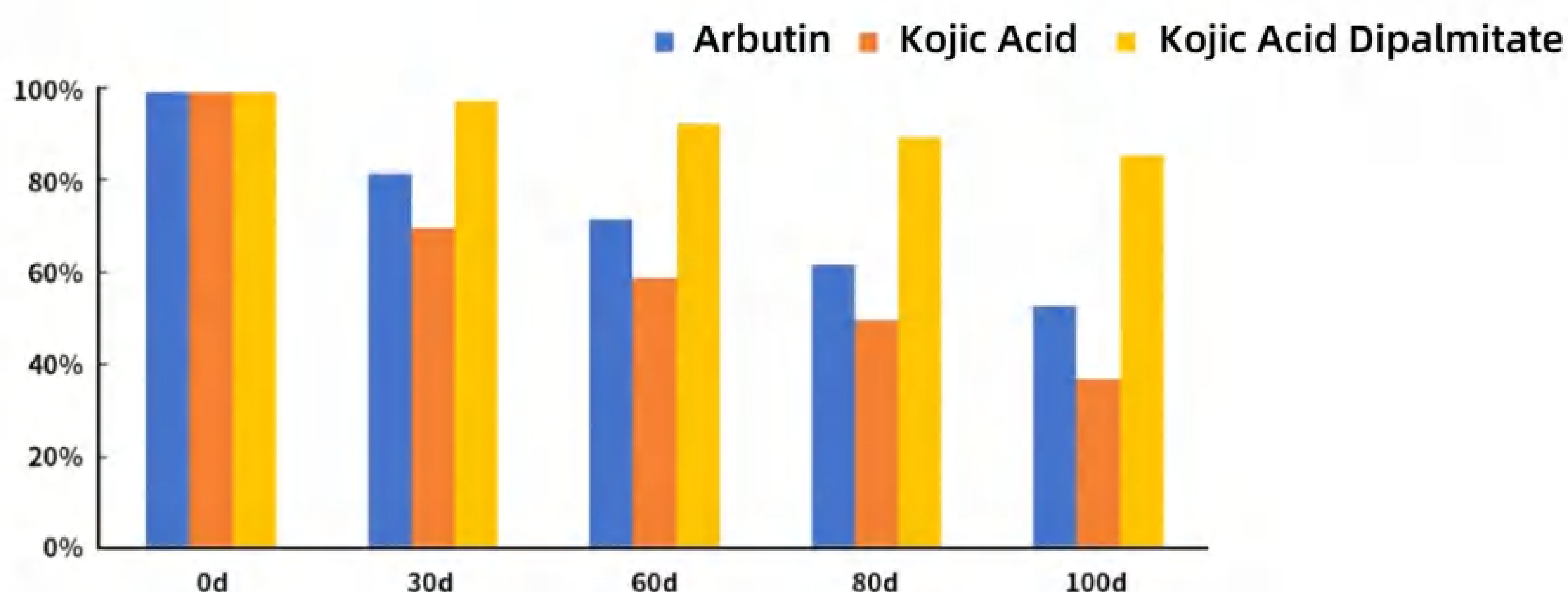
The ability to inhibit B16 melanoma cells.



The effect of Kojic Acid Dipalmitate on B16 cells

[Stability]

The protection of the active 2,5-hydroxyl groups in the molecular structure of Kojic Acid Dipalmitate by esterification with palmitic acid significantly reduces its sensitivity to light and heat, making it less prone to yellowing due to oxidation in air.



The stability of Kojic Acid Dipalmitate

[Usage Guide]

Specification	99%
Appearance	white crystalline powder
Additive quantity	1%~5%
Solubility	insoluble in water, oil soluble
Shelf life	24 months
Storage	Store in tightly sealed and preferably full containers in cool, dry and ventilated area.

Bosonine



[INCI Name] Hydroxypropyl Tetrahydropyrantriol

[Cas No.] 439685-79-7

[Introduction] A xylose derivative discovered from the mountain birch tree is essentially a raw material group composed of water+propylene glycol+light propyl tetrahydrofuranetriol, with the core functional component being light propyl tetrahydrofuranetriol. Bosonine not only has good wrinkle resistance, but is also easily biodegradable, does not accumulate in organisms, and is not toxic, so it is widely used in cosmetics production.

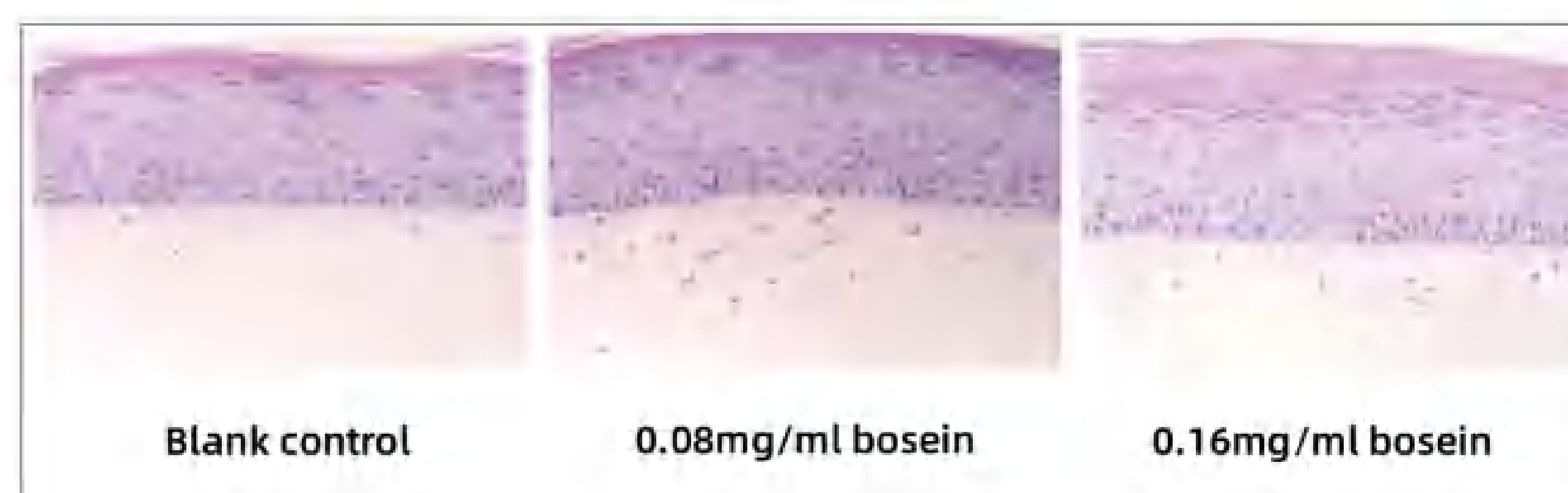
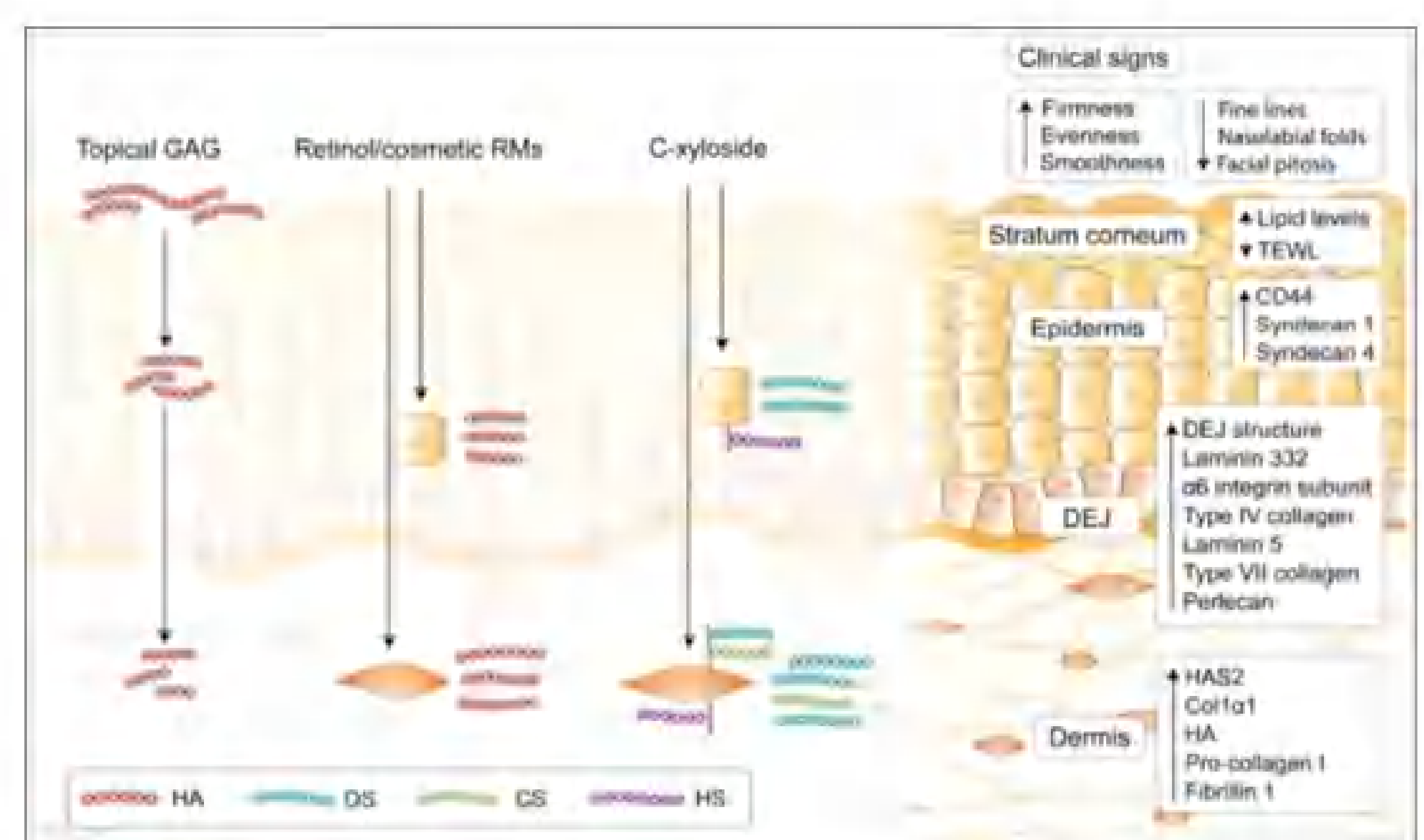
[Effect]

Bosonine is a C-glycoside anti-aging active ingredient in beech xylose, which has anti-aging effects on the skin.

(1) The components that affect the production of GAG

- ◆ Hyaluronic acid: directly provides the backbone of GAG
- ◆ Alcohols: Stimulate keratinocytes and fibroblasts to enhance endogenous HA production
- ◆ Bosonine: Promoting the generation of endogenous GAG

(2) Improve the ultrastructure of the epidermal junction (DEJ), promote the synthesis of collagen VII and IV, and make our epidermis and dermis more tightly connected.



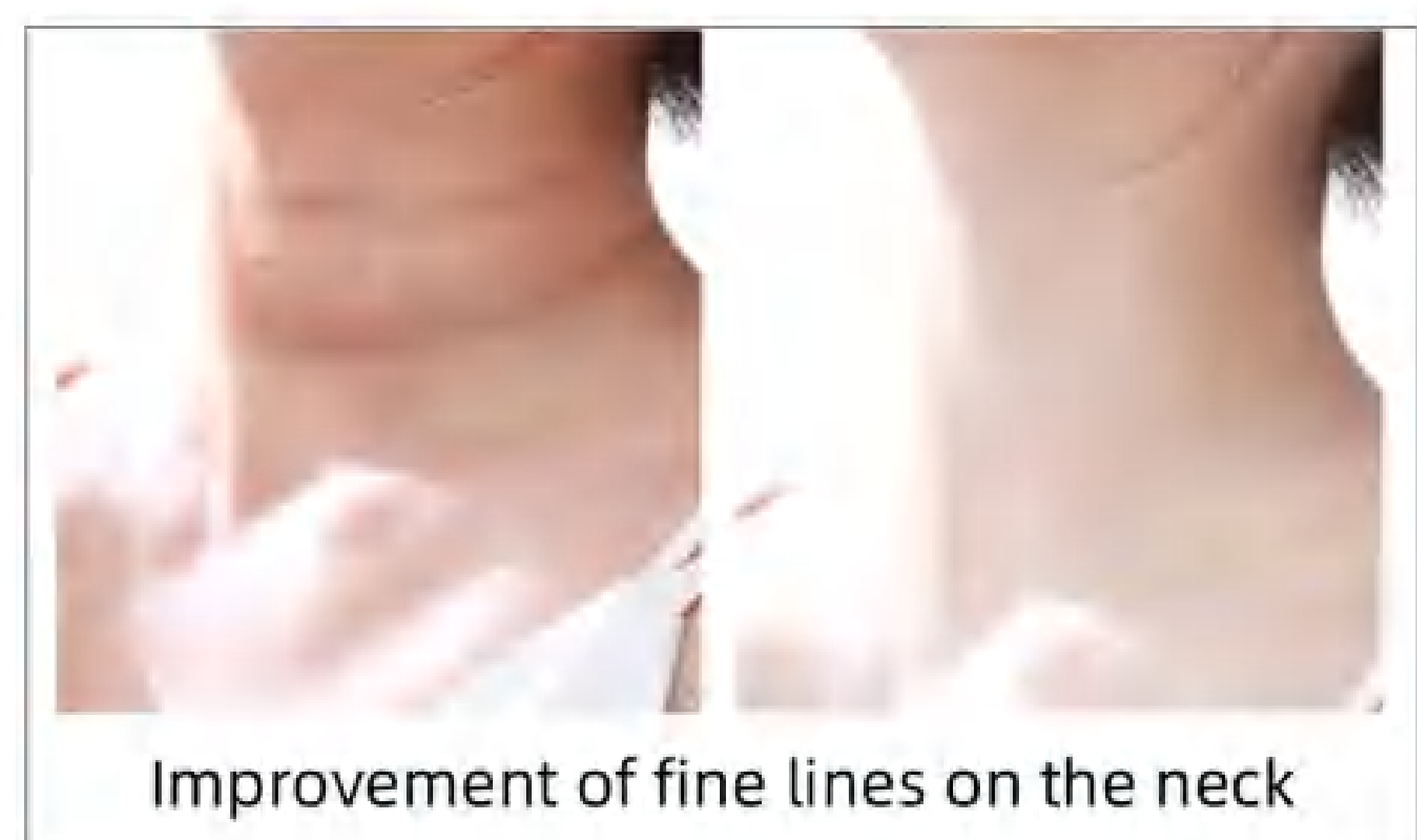
The 3D skin model showed an increase in epidermal tissue thickness after 8 days of cultivation with 0.08mg/ml and 0.16mg/ml hyaluronic acid, demonstrating significant potential for skin barrier repair.

(3) Repair the skin, reduce wrinkles, appear more delicate, and make the entire skin appear fuller, tighter, and more elastic.

Regularly use moisturizing cream containing 8% hyaluronic acid daily for 15, 30, and 45 days before and after use. Performance in eliminating wrinkles at the corners of the eyes.



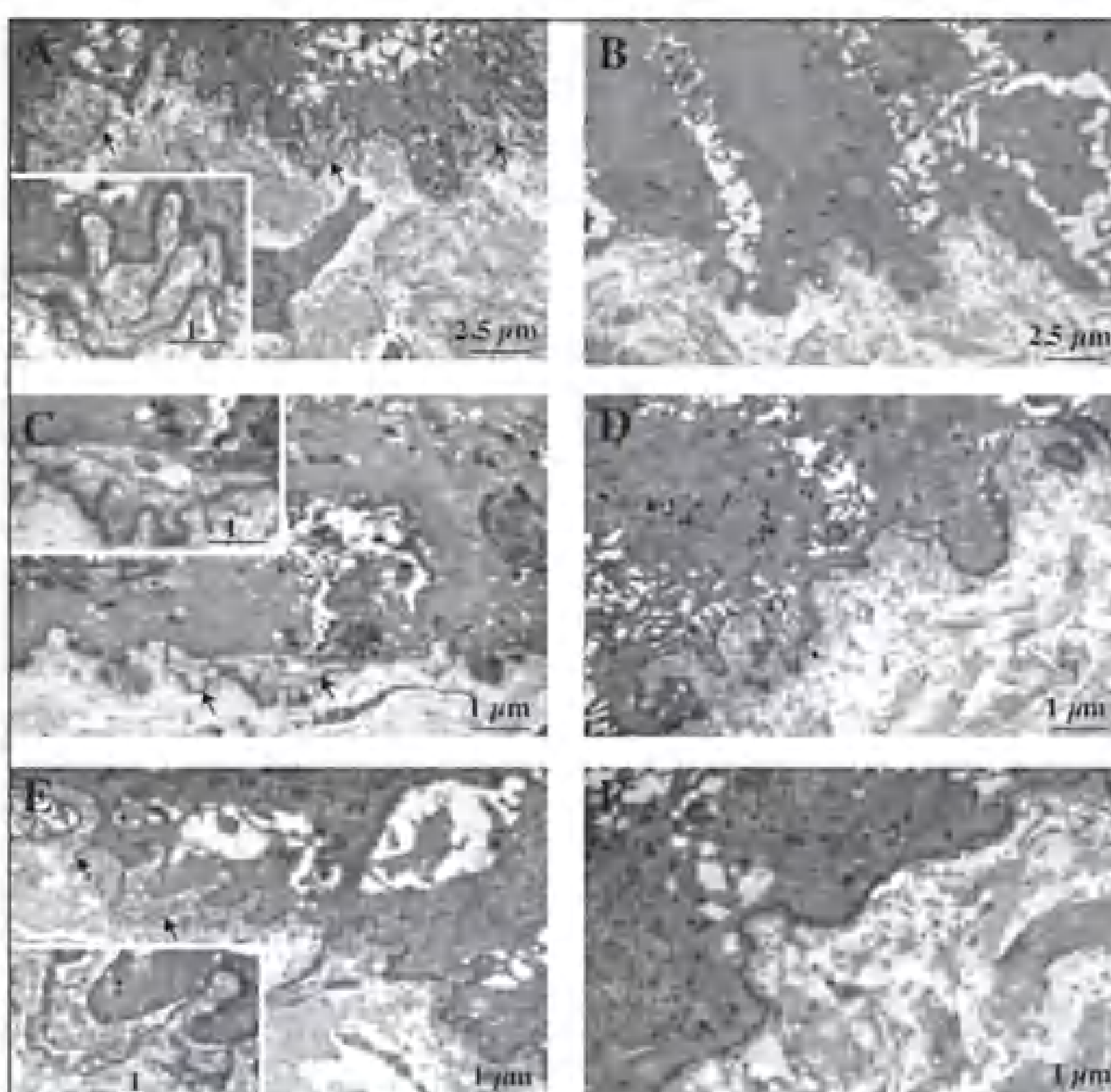
Regular use of moisturizing cream containing 3% hyaluronic acid every day, a 50 person group experiment has shown that 60 days can significantly improve neck fine lines.



[Related research]

Control group

Bosonine group

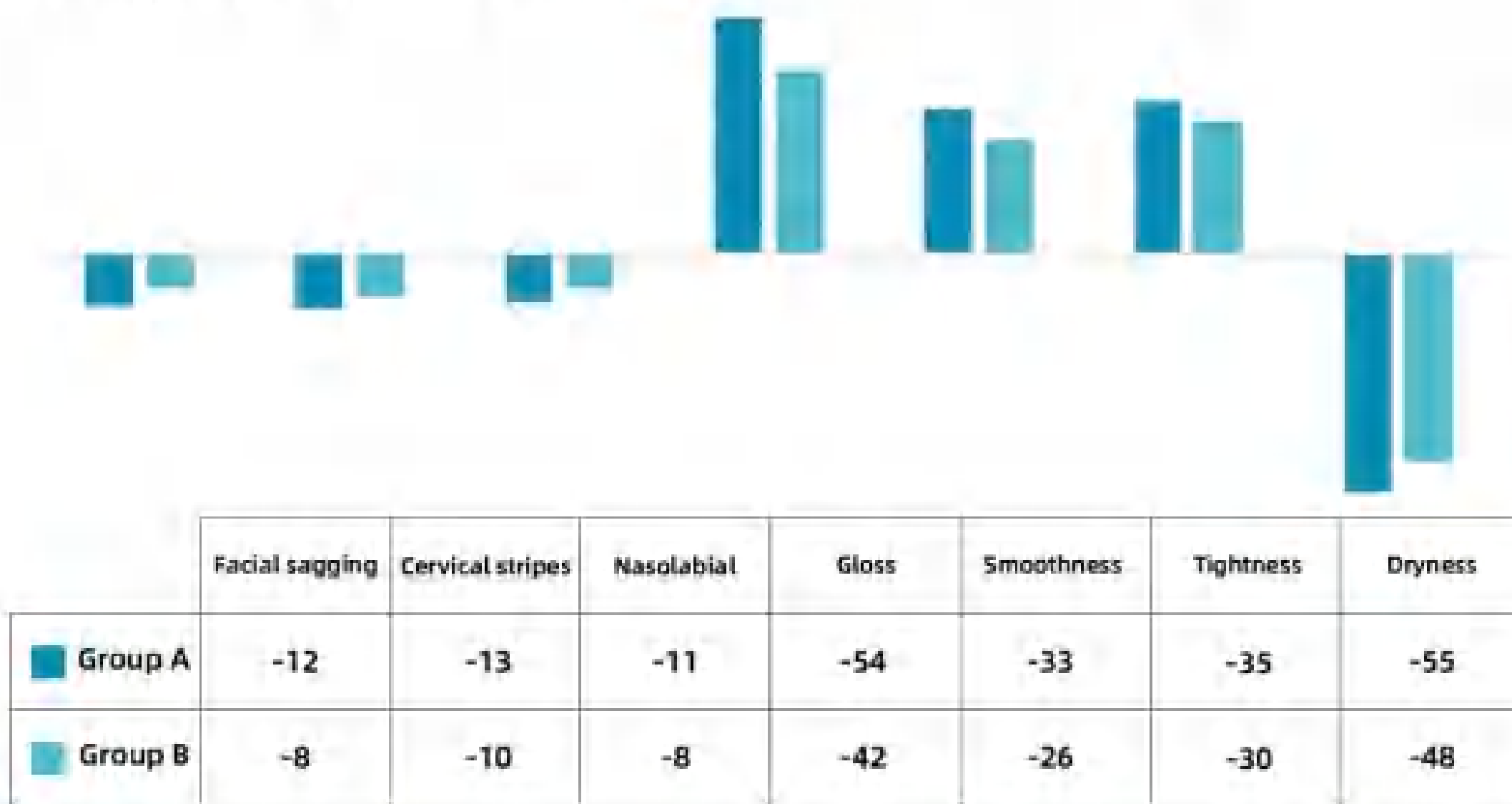


Aging skin samples (A, C, E) that have not been treated with hyaluronic acid will exhibit repetition of the dense layer along the basement membrane and other areas, while skin samples (B, D, F) that have been treated with hyaluronic acid will exhibit more uniform DEJ structure, and the repetition of the dense layer will be significantly reduced. **As people age, the skin ages, and the flattening of the DEJ layer and the repetition of the dense layer are all factors that lead to skin aging.**



[Experimental data]

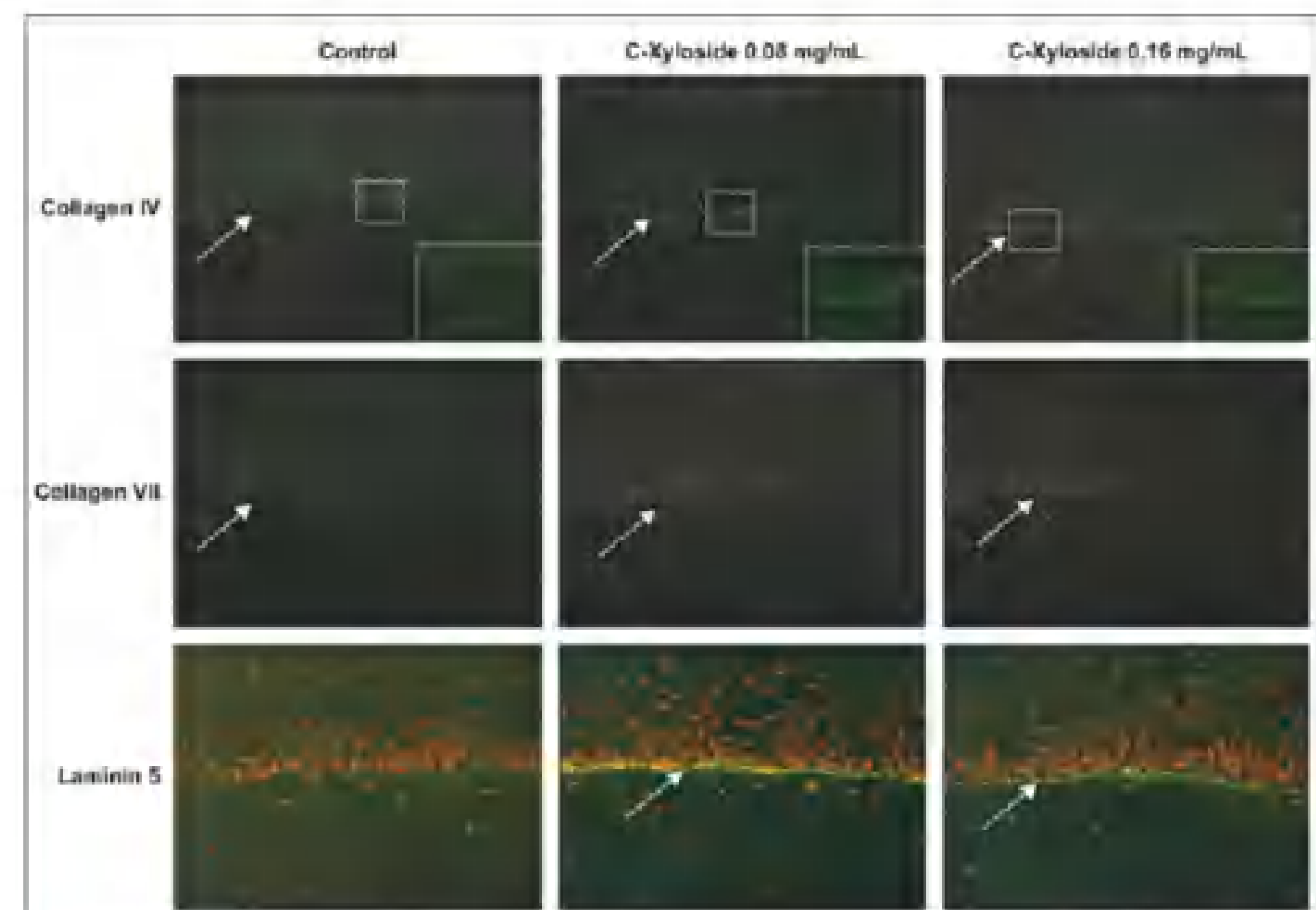
Skin evaluation data on day 0 and day 60:
Group A is a group containing hyaluronic acid;
Group B is the control group.



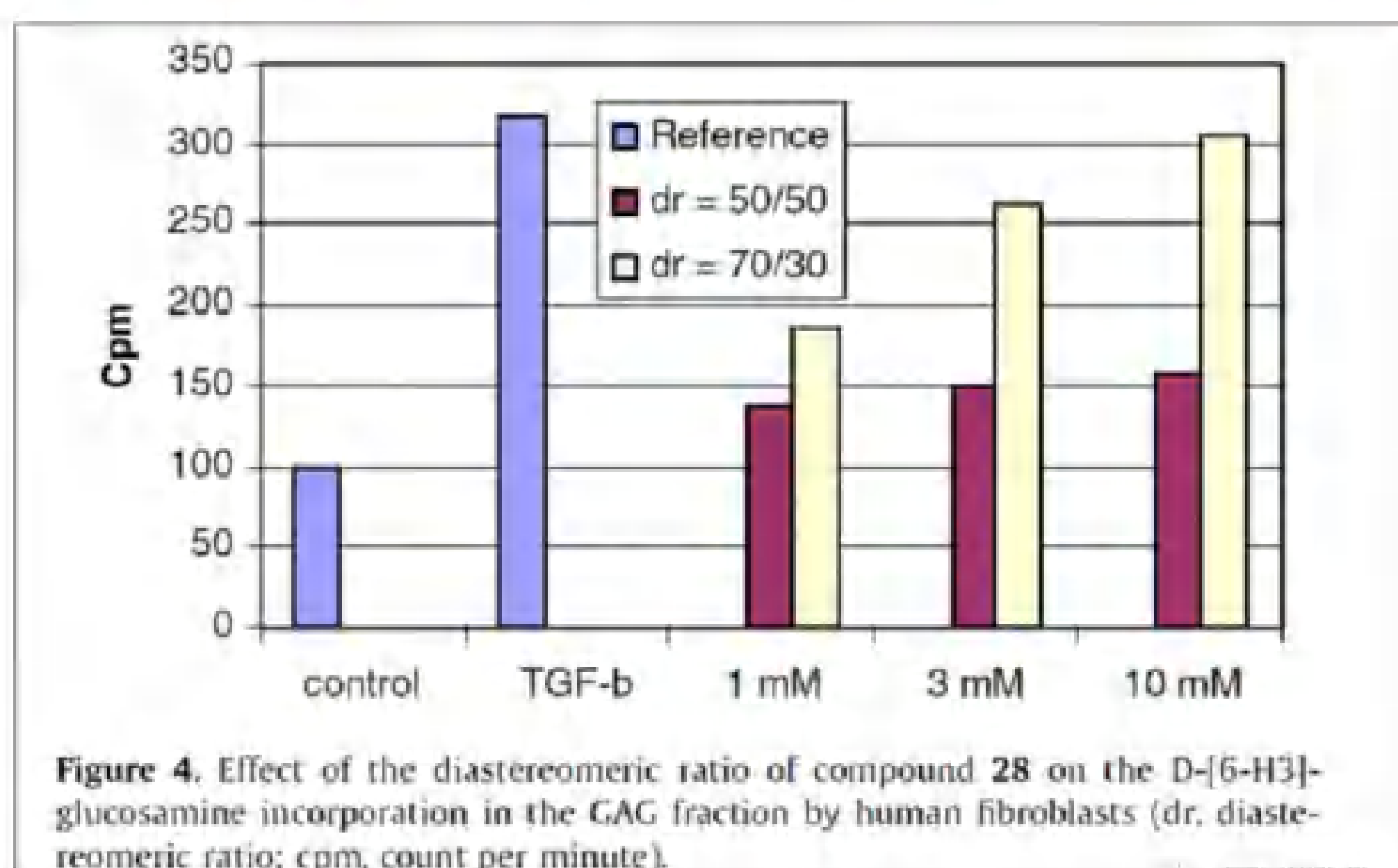
For 240 healthy women (aged 55-65), two products were applied in the morning and evening during a 60 day trial period: a moisturizer containing 3% hyaluronic acid; A moisturizing cream without added substances (as a control group). The skin of the subjects in the Bosonine group showed improvement in all indicators.

Promote the synthesis of type IV and VII collagen and laminin-5.

Bosonine can promote the accelerated production of type IV and type VII collagen by dermal cells, and enhance the strength of the dermal epidermal network connection.



Promoting the synthesis of glycosaminoglycans by fibroblasts in the dermis.



Bosonine can indirectly increase the production of collagen in the dermis by promoting the synthesis of glycosaminoglycans, achieving the effects of promoting dermis repair, improving skin elasticity, and increasing skin firmness. The Bosonine activity of S/R=70/30 is better than that of S/R=50/50.

[Technical Index]

Inspection items		Standard	
Appearance		Colorless viscous liquid	White Powder
Smell		Slight characteristic odor	Slight characteristic odor
Conductivity		≤20us/cm	≤20us/cm
PH (1%)		5-7	5-7
Moisture		≤5%	≤5%
HPLC	Purity	≥98%	≥98%
	Content	≥30%	≥98%
	Non enantiomeric ratio	R:S=50:50/70:30	Pure S-type



CATALOGUE

ANTI-INFLAMMATORY & ANTI-ALLERGY

Dipotassium Glycyrrhizinate (D.P.G) 98%, 73%, 75%

Portulaca Oleracea Extract 1%-5%

18 β -Glycyrrhetic Acid 98%

ANTI-MICROBIALS & ACNE-REMOVEMENT

Roharol 1%-10%

Roharol 80%

Roharol 99%

ACTI-Acne 1%, 2%

ANTI-OXIDANT & ANTI-AGING

Coenzyme Q10 10%, 99%

NMN(Nicotinamide Mononucleotide) 99%

Resveratrol 98%

EternalBloom Elixir 99%

Bosonine 30% Colorless liquid

Bosonine 99% White Powder

MOISTURIZING & ANTI-WRINKLE

Oat Beta Glucan Liquid 1%-5%

Hyaluronic Acid 10-2000kDa

AGmoist 1%, 2%

γ -Polyglutamic Acid 92%

EGCG 90%

SKIN WHITENING & ANTI-FRECKLE

Glabridin 10% White Powder

Glabridin 40% Reddish Brown Powder

Glabridin 40% White Powder

Glabridin 60% Reddish Brown Powder

Glabridin 90% White Powder

Glabridin 98% White Powder (can up to 99%) -

(1%-99% can be customized)

Phloretin 98%

Alpha Arbutin 99%

Beta Arbutin 99%

Bakuchiol 60%

Tranexamic Acid 99%

Glutathione 98%

Ellagic Acid 40%, 90%

Kojic Acid 98%

Kojic Acid Dipalmitate 98%

SAP(Sodium Ascorbyl Phosphate) 98%

MAP(Magnesium Ascorbyl Phosphate) 98%

Melatonin 99%

Ferulic Acid 99%

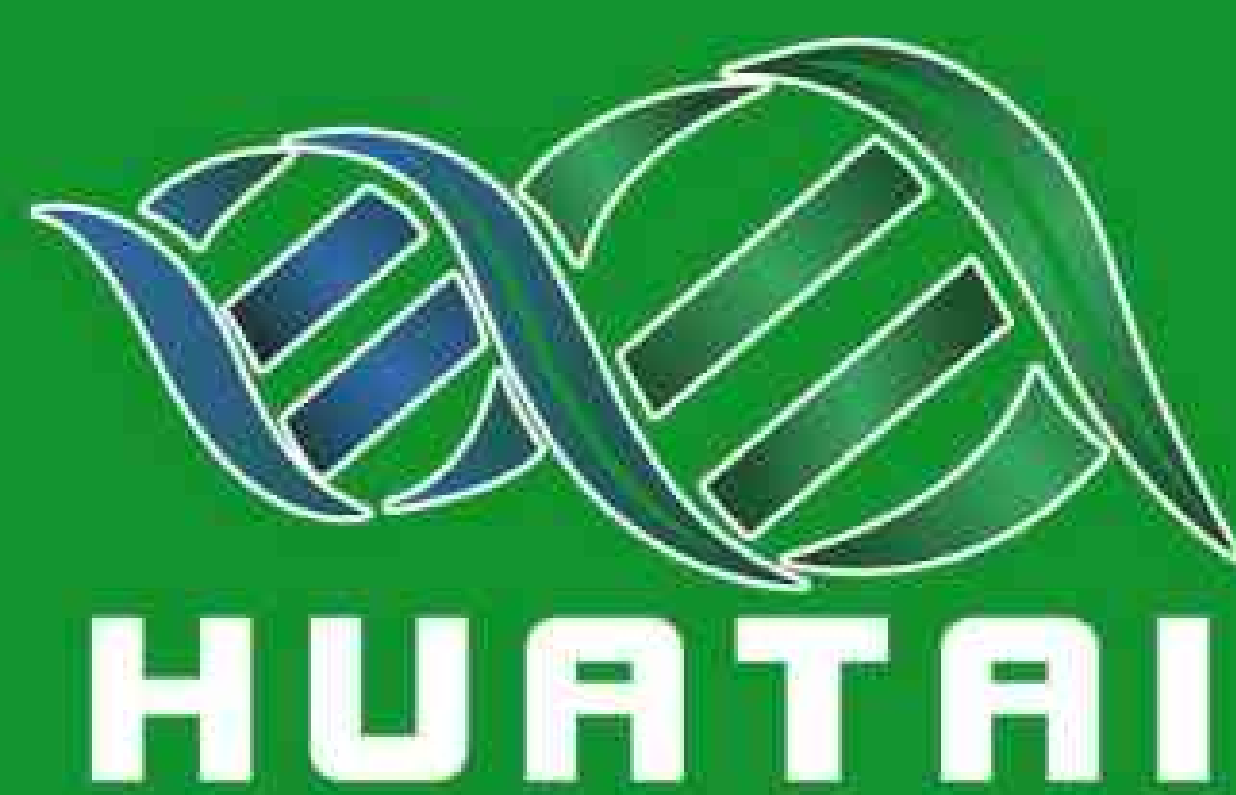
Nicotinamide 99%

Mandelic Acid 98%

AA2G 99%

OTHERS

Vanillyl Butyl Ether(VBE) \geq 99%



SHAANXI HUATAI BIO-FINE CHEMICAL CO., LTD.

Add: Room 1901, Unit 1, Building 2, Wanda Plaza, Lijia Village, Xi'an, Shaanxi

Tel: 0086-029-87862197 0086-15399085458

Website: www.natural-ingredient.com

E-mail: info@huataibio.com

