

# CareCella

## CareCella Bio K AppleTamin C Serum



# CareCella



## Purpose of Product Development

Brightening is a skincare process where the results may be difficult to see due to the complex process of melanin pigment production and excretion and your personal skin type.

After receiving professional brightening treatment, it is important to have a home skincare routine for best possible outcome.

We designed CareCella Bio K AppleTamin C Serum to be a part of that home skincare routine.

# CareCella



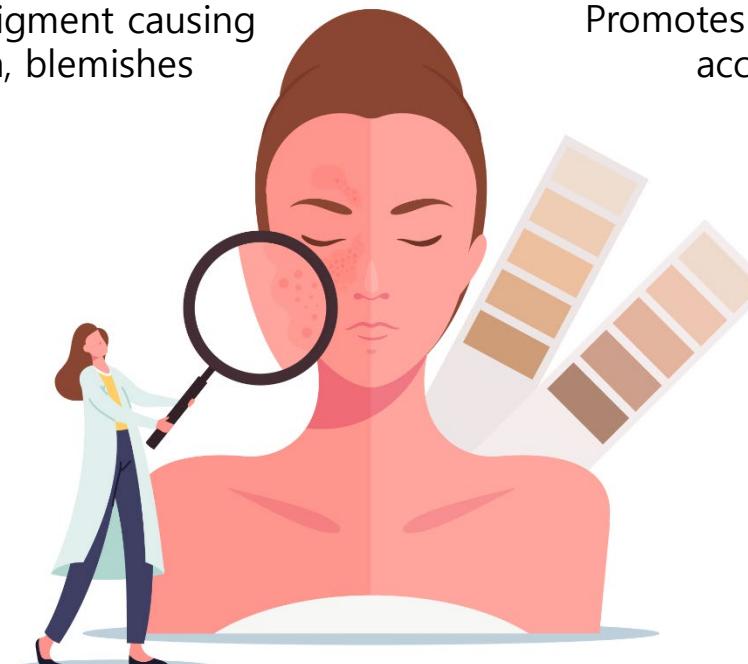
## 1. Why Skin Tone Darkens

### UV Rays

Increase in melanin pigment causing freckles, melasma, blemishes

### Active Oxygen

Promotes melanin production and accelerates skin aging



### Dietary Habits

Lack of sleep and nutrients induces melanin pigmentation

### Environment

Environmental pollutants  
Stress



## 2. Why Brightening is Difficult

### ✓ Time Investment

Long-term management is necessary due to the complex process of melanin pigment production and excretion. It takes about 28 days for the generated melanin pigment to be excreted through the skin epidermis to the stratum corneum. Therefore, long-term management is required to see effective results in a short period.

### ✓ Variable Recovery Time

Due to differences in skin barrier condition, sebum secretion, and stratum corneum thickness according to skin type, there may be variations in the brightening effect.

### ✓ Necessity for Lifestyle Changes

Even with management, if lifestyle habits such as UV protection, adequate hydration, and regular exercise are not maintained, it becomes difficult to achieve maximum effectiveness.

# CareCella



## 3. Key Ingredient : Vitamin C

Pure Vitamin C is the active form of Vitamin C found in nature. Also known as L-ascorbic acid, it possesses powerful antioxidant properties, making it highly effective in brightening, wrinkle improvement, and enhancing skin elasticity. However, pure Vitamin C is unstable and highly acidic. When exposed to light and air, it easily oxidizes, leading to a decrease in effectiveness.

Vitamin C derivatives are compounds that address the drawbacks of pure Vitamin C. They are more stable than pure Vitamin C and cause less irritation to the skin leading to their use in various types of cosmetics. However, their effectiveness may be slightly lower than that of pure Vitamin C.



## 3. Type of Vitamin C in Cosmetics

### Pure Vitamin C

- L-ascorbic acid

### Vitamin C Derivatives

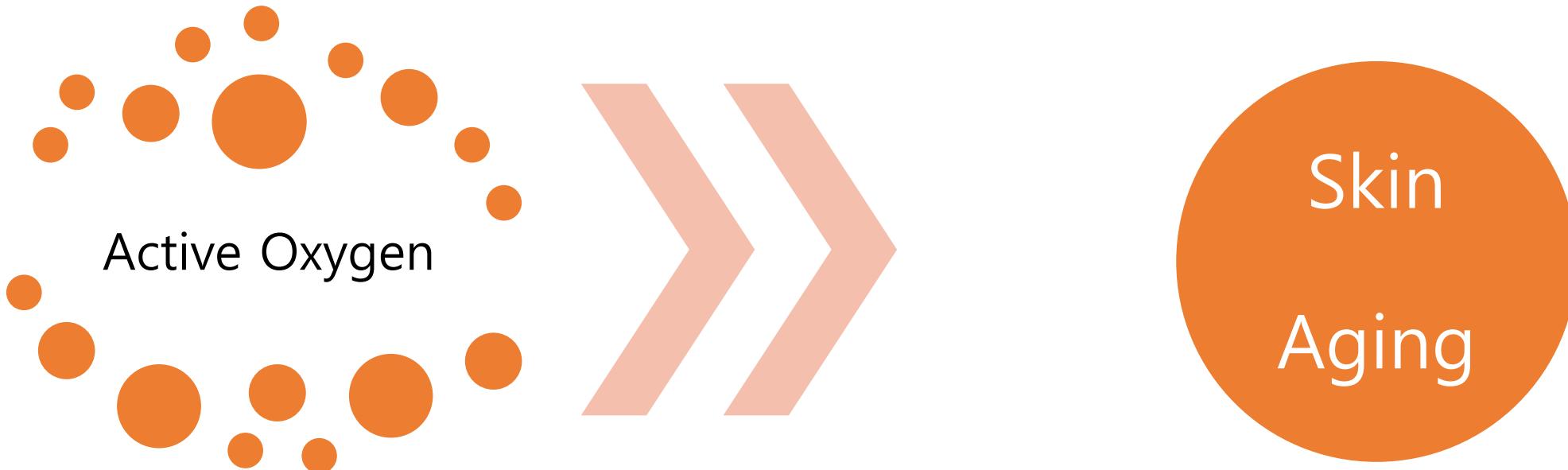
- Ascorbyl glucoside (helps brighten skin complexion)
- Ascorbyl palmitate
- Tetrahexyldecyl ascorbate
- Ascorbyl 2-glucoside
- Ascorbyl 6-palmitate
- Ascorbyl phosphate
- Magnesium ascorbyl phosphate
- Sodium ascorbyl phosphate
- Ethyl ascorbate

**At-home Professional-Grade Skincare**

CareCella Bio K AppleTamin C Serum



# Active Oxygen



2~3% of oxygen we breathe  
=> Causes cell damage, aging,  
and various conditions

Active oxygen damages collagen and elastin,  
promotes melanin production  
=> Decrease in skin elasticity  
Cause wrinkles, freckles, blemishes, melasma

# Antioxidation

Decreased antioxidant system activity

Age

Environment

Diet

## Supplements

Vitamin C  
Vitamin E  
Beta Carotene

## Vitamin C

Cleansing  
Brightening  
Skin Elasticity

# Product Features

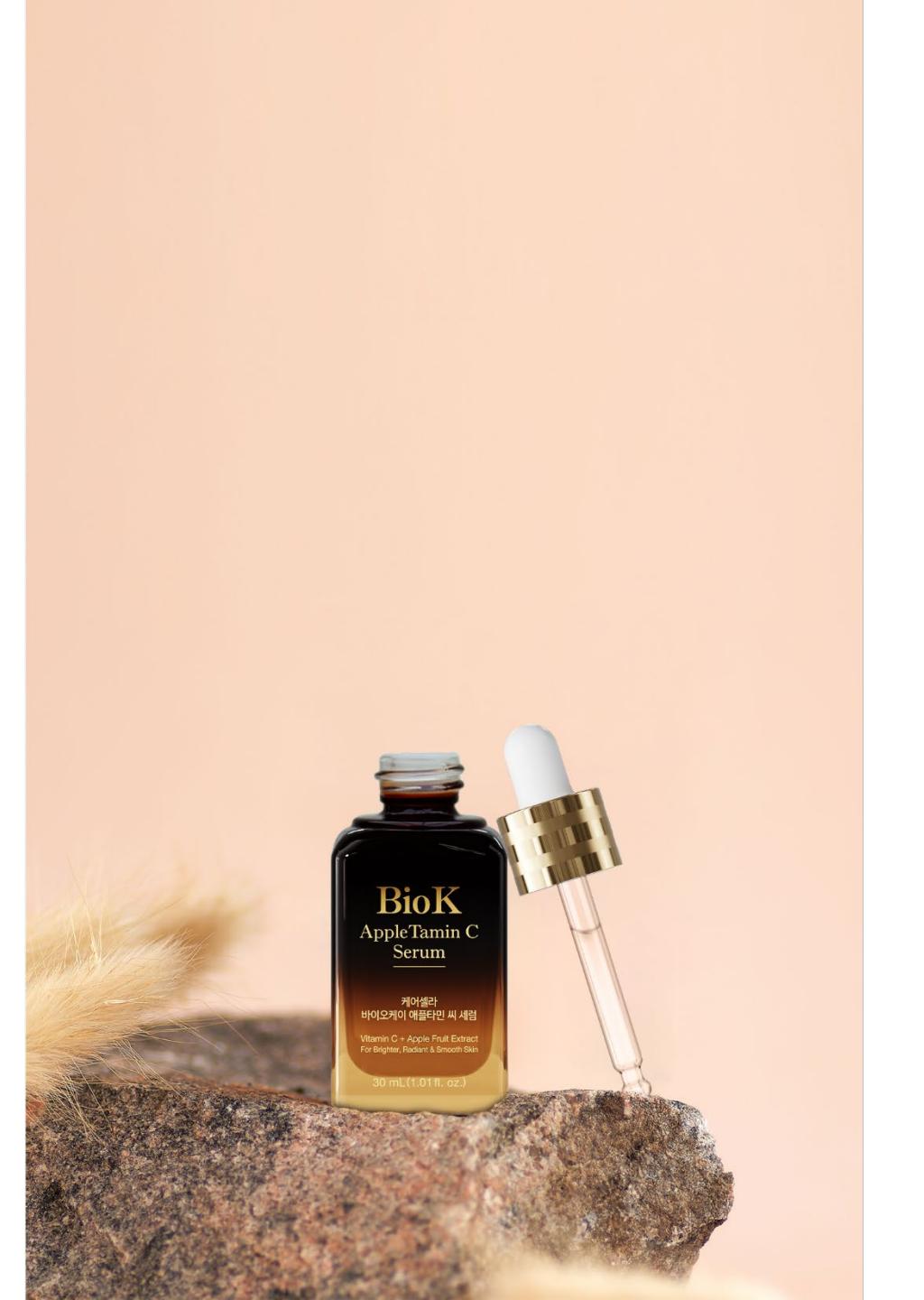
Active Oxygen is Ever-Present

Bio K's solution: **Vitamin C**



A properly formulated vitamin C serum is different.

It can combat the reactive oxygen species that age our skin and create other blemishes.  
Our vitamin C serum is formulated to help with your brightening.



## Product Features (3-hour test)



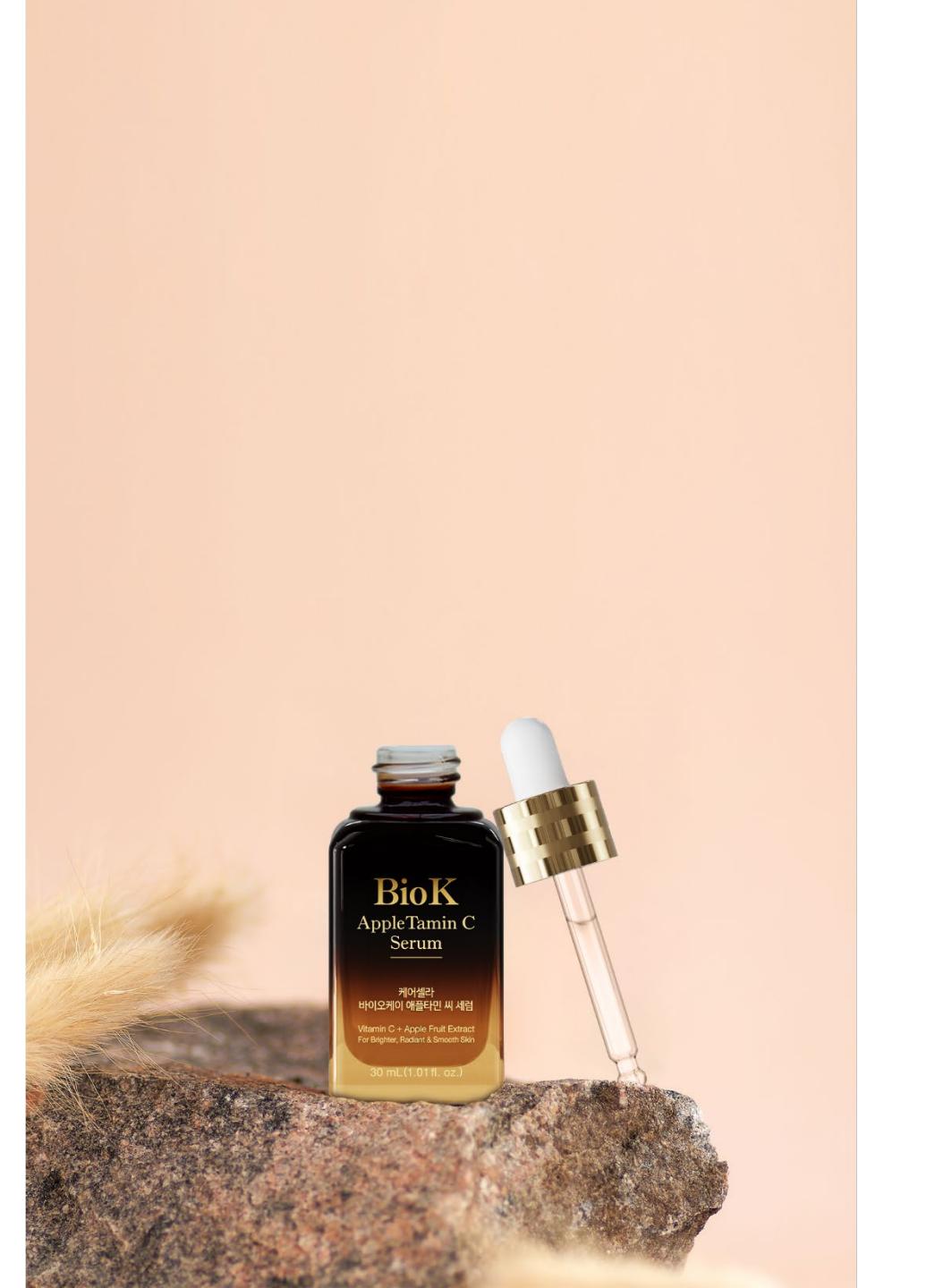
# How to Use Pure Vitamin C

## Pure Vitamin C with Purified Water

A hydrophilic formula is best for maximizing the effects of vitamin C



Pure vitamin C oxidizes rapidly due to light, air, and heat. The contents should be transparent and hydrophilic, allowing you to confirm the degree of change each time you use it. This ensures safety during use and increases absorption rate compared to emulsified products, making it more effective.



# Ingredients that Synergize with Pure Vitamin C

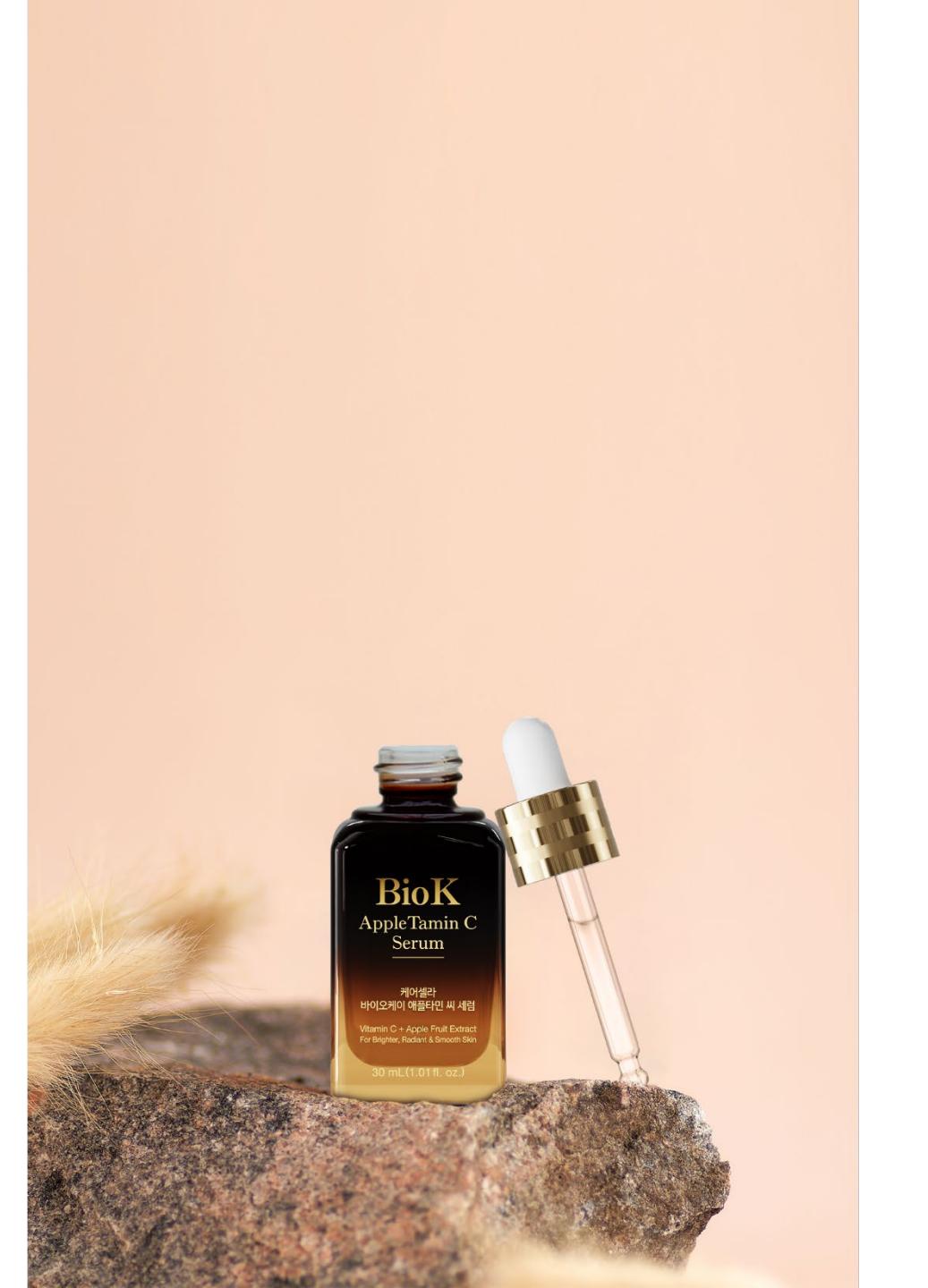


## Cheongsong Gold Apple Extract

Bio K's gold apple extract is sourced from the Shinano Gold variety that have passed stringent quality tests in the Cheongsong region.

The high-quality extract delivers a moisturizing and vibrant glow to the skin.

[Based on the characteristics of raw materials]



# Ingredients that Synergize with Pure Vitamin C: Cheongsong Gold Apple Extract

## Synergistic Ingredient: Carotenoid

Carotenoids are precursors to vitamin A that play fundamental roles in vision, immune function, and the health of skin and bones within the body.

### Characteristics

1. A vitamin C derivative that helps improve skin.
2. Inhibits reactive oxygen species.
3. Malic acid and tartaric acid in apples have exfoliating effects.
4. Abundant in polyphenols and pectin that can help improve skin tone and maintain moisture.

Ingredient : Gold apple extract

INCI Name : Malus Domestica Fruit Extract

EWG Grade :

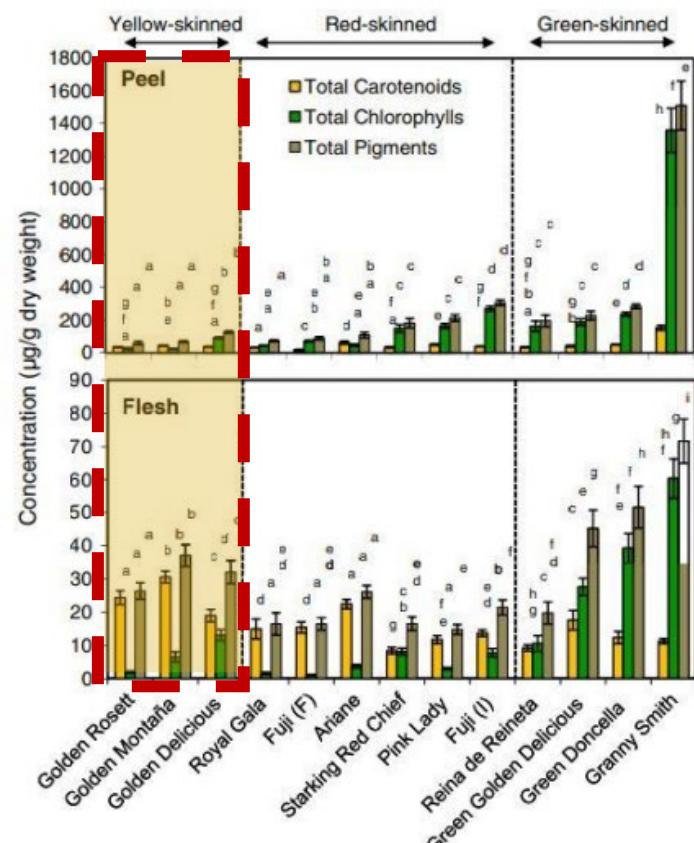
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# Ingredients that Synergize with Pure Vitamin C: Cheongsong Gold Apple Extract

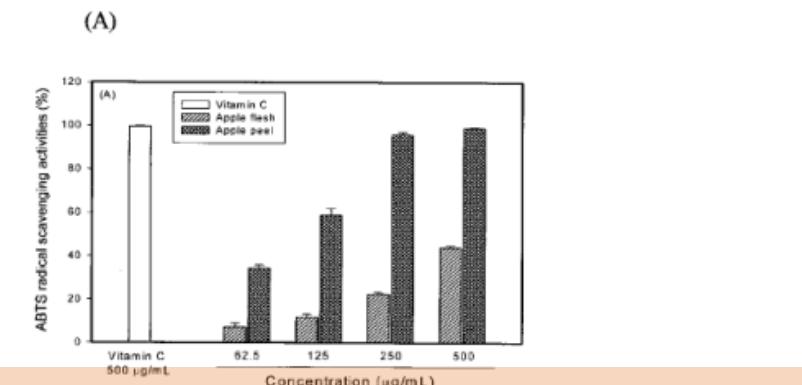
## Carotenoid Conc.

When comparing the concentration of carotenoids, chlorophylls, pigments in apples with different colors, gold apples had **comparatively higher concentrations of carotenoids.**



## Antioxidant Effects

Gold apple flesh and peel showed antioxidative properties. The peel showed antioxidative properties similar to vitamin C.



Gold apple extract has antioxidative properties

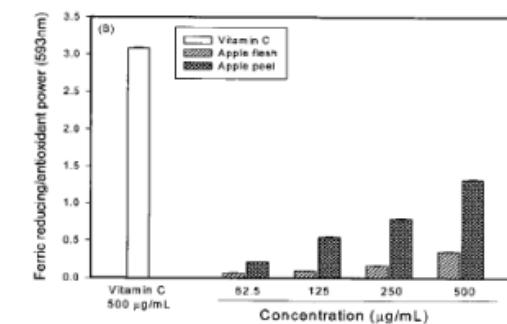


Fig. 1. ABTS(A) radical scavenging activities and FRAP assay(B) of EtOAc fractions from apple flesh and peel.  
Results are mean±SD (n=3).

# Ingredients that Synergize with Pure Vitamin C: Cheongsong Gold Apple Extract

## Brightening

Results showed that apple flesh and peel inhibits melanogenesis. The peel showed an inhibitory effect **40% higher than that of albumin**.

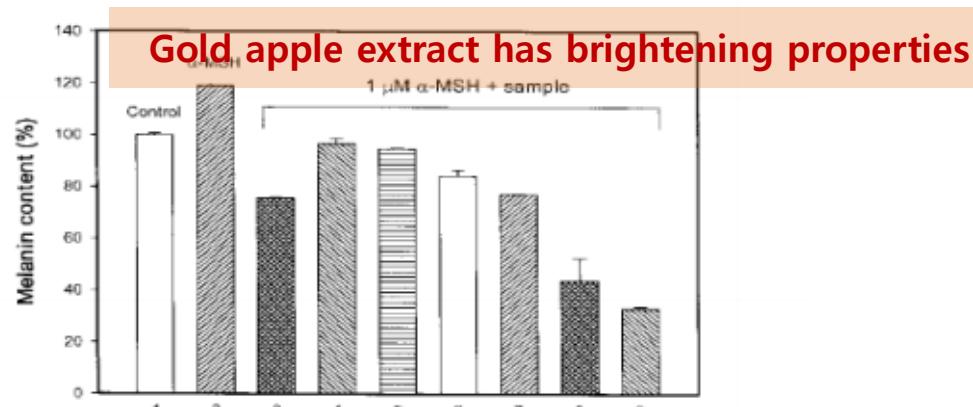


Fig. 3. Melanogenesis inhibition of EtOAc fractions from apple flesh and peel on melanin synthesis in B16/F10 melanoma cells.

1 : Control, 2 : 1 mM  $\alpha$ -MSH, 3 : Arbutin 500  $\mu$ g/mL, 4 : Apple flesh 125  $\mu$ g/mL, 5 : Apple flesh 250  $\mu$ g/mL, 6 : Apple flesh 500  $\mu$ g/mL, 7 : Apple peel 125  $\mu$ g/mL, 8 : Apple peel 250  $\mu$ g/mL, 9 : Apple peel 500  $\mu$ g/mL.  
Results are mean $\pm$ SD (n=3).

## Skin Elasticity

Elastin is necessary to maintain skin elasticity. Results showed that the peel inhibits the activity of elastase, an enzyme that breaks down elastin.

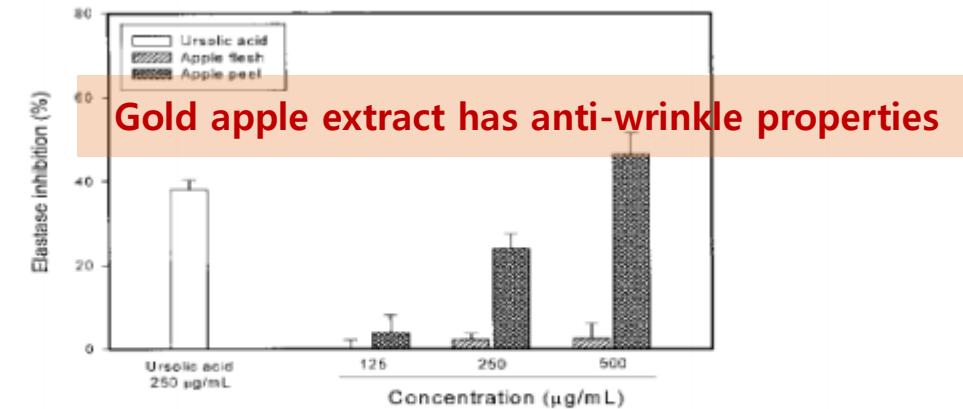


Fig. 4. Elastase inhibition of EtOAc fractions from apple flesh and peel.

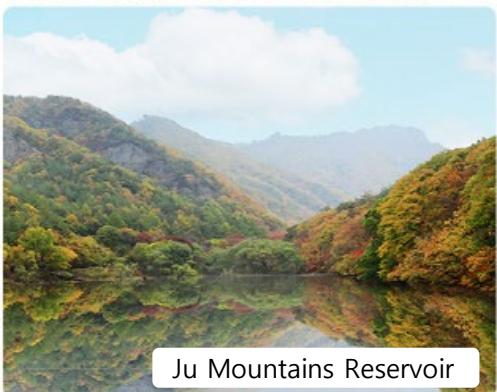
Results are mean $\pm$ SD (n=3).

# Ingredients that Synergize with Pure Vitamin C: Cheongsong Gold Apple Extract

## Why Cheongsong Gold Apples?



Mt. Juwang Granite Cliff

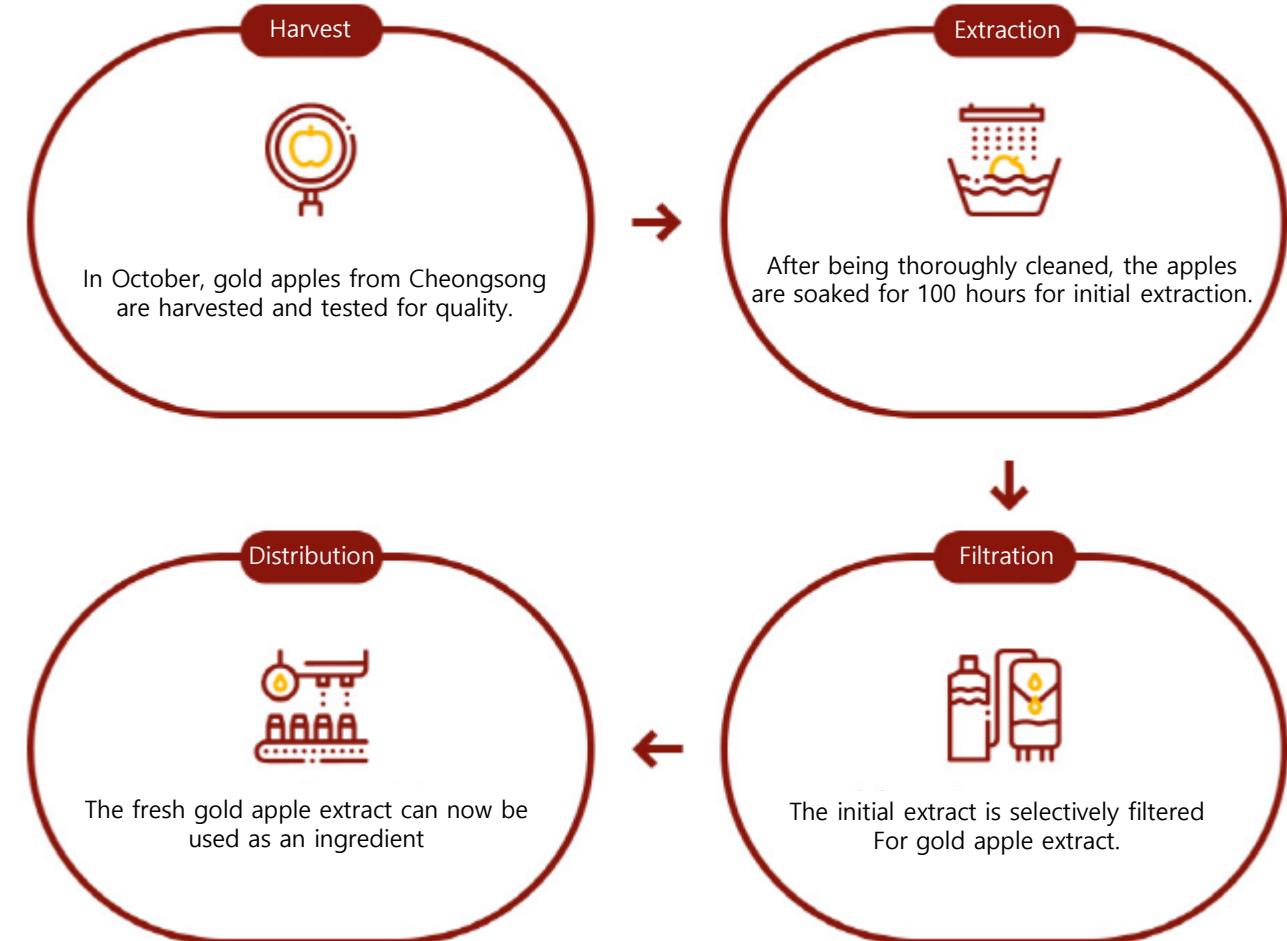


Ju Mountains Reservoir



Shinano Gold Apple Tree

The Shinano Gold apples from Cheongsong, which are only available for four weeks out of the year, undergo 100 hours of cold soaking to be processed into raw material.



# Cold Soak Extraction



Extraction of Active Ingredients without Loss

## Cold Soaking / Cold Maceration

- The raw materials are soaked in an extractant at room temperature (15-20°C).
- Minimization of denaturation/loss of components that are easily decomposed by heat, such as polyphenols.
- Soaking over an extended period ensures that the active ingredients reach equilibrium with the solvent.

# Product Features

## 01 Gold Apple Extract

Purified extract processed over 100 hours  
for fresh moisturization

## 02 17% Vitamin C

15% Pure vitamin C (ascorbic acid)  
+ 2% Ascorbyl glucoside for clear and  
clean skin

## 03 10x Antioxidative Strength

Test-proven antioxidant effects

\*Antioxidant tests conducted by General Bio

## 04 The New Standard for Home Care

Professional-grade care at home with one  
product. Vitamin C for bright, radiant, and  
smooth skin

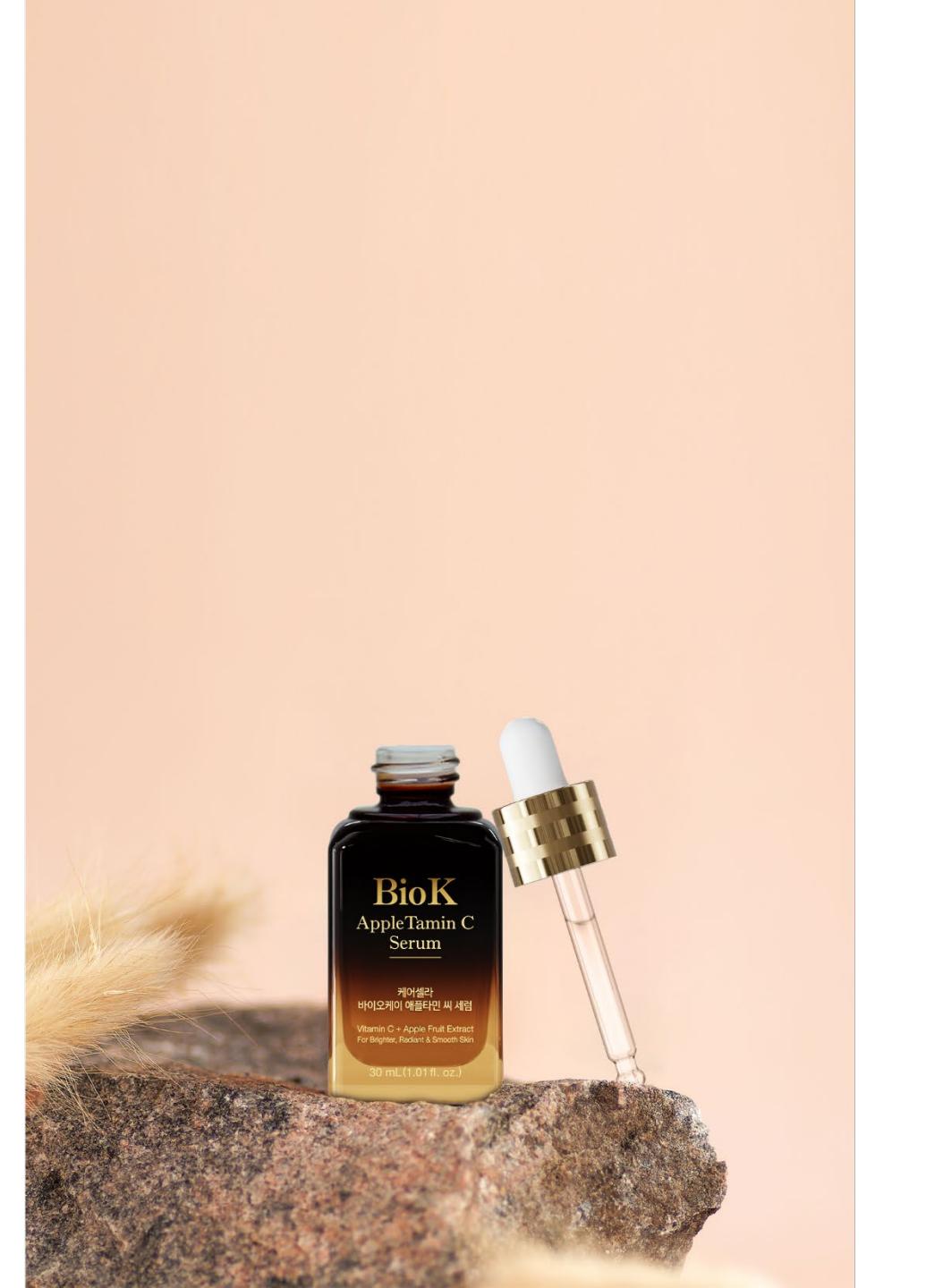


# Key Ingredients

A Combination of the Potent Vitamin C and Gold Apple Extract

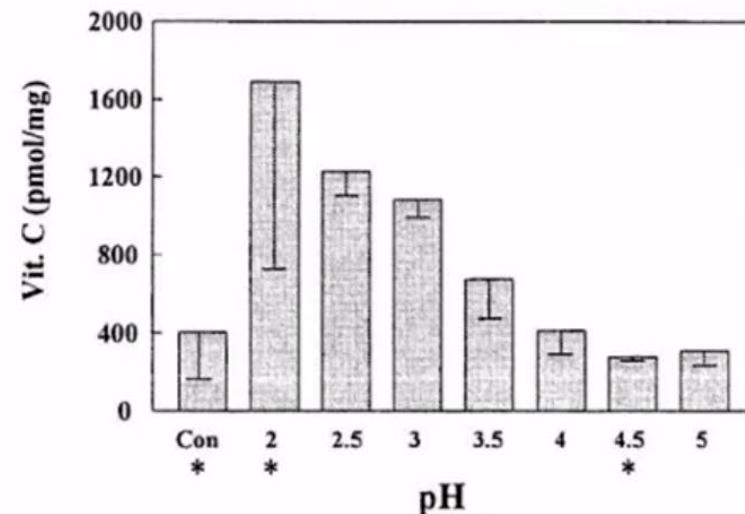
## A clear, antioxidant brightening serum

Gold apple extract	▶	Polyphenol, carotenoid (antioxidant)
Pure vitamin C 15%	▶	L-ascorbic acid
Vitamin C derivatives 2%	▶	Ascorbyl glucoside (brightening)
pH 3.2-3.5	▶	Facilitates vitamin C absorption
Tocopherol (Pure vitamin E)	▶	Synergizes with pure vitamin C
Tocotrienol (Pure vitamin E)	▶	Synergizes with pure vitamin C
Ferulic acid 5,000ppm	▶	Antioxidant
Resveratrol 1,000ppm	▶	Antioxidant
Glutathione 1,000ppm	▶	Synergizes with brighteners
Phloretin 100ppm	▶	Antioxidant within apples
Hydrophilic water base	▶	Synergizes with pure vitamin C
No grade 9 aromatics, pigments		
All ingredients EWG Green grade		

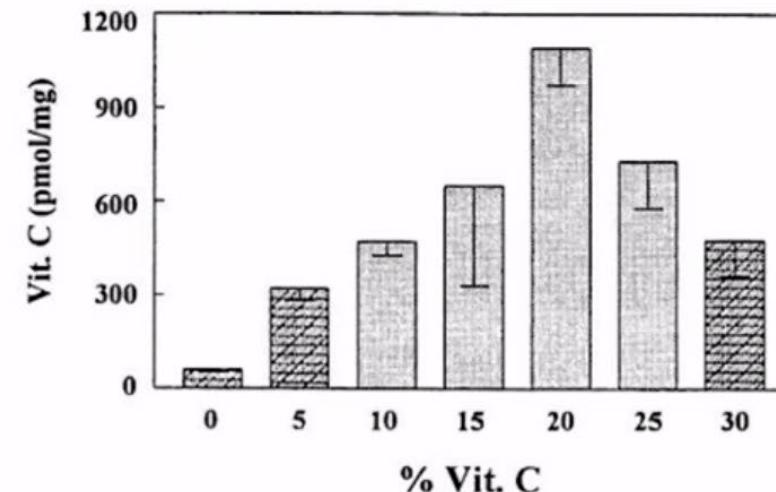


## Pure Vitamin C (Approximating the absorption rate of L- ascorbic acid by the skin)

### Topical L-Ascorbic Acid: Percutaneous Absorption Studies



**Figure 1.** Effect of pH on percutaneous absorption. 15% L-ascorbic acid at different pHs were applied to pig skin for 24 hours. Skin levels of L-ascorbic acid are expressed as mean  $\pm$  SD ( $n = 3$ ). \*Average ( $n = 2$ ).



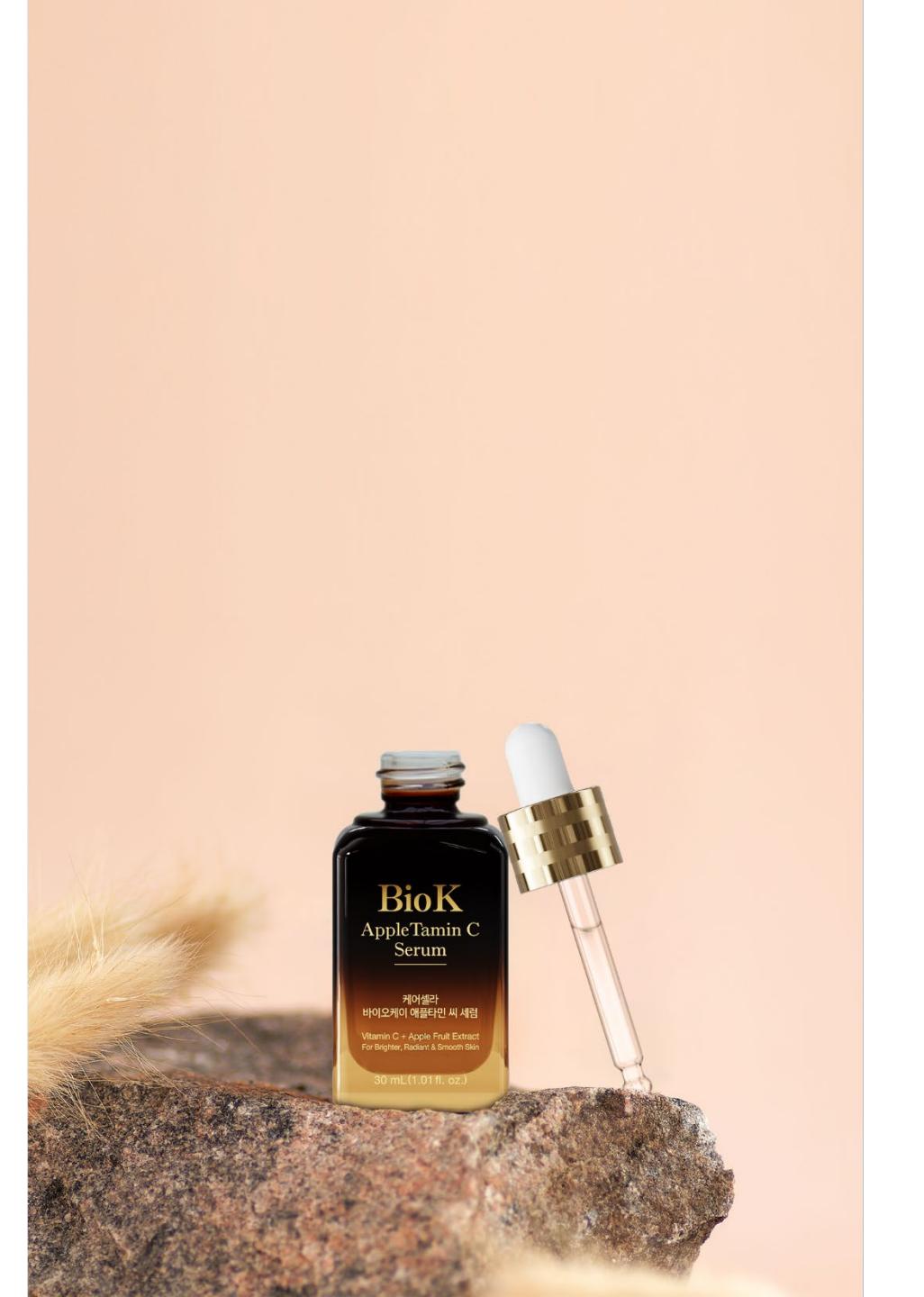
**Figure 2.** Effect of concentration on percutaneous absorption. Varying concentrations of L-ascorbic acid pH 3.2 were applied to pig skin for 24 hours. Skin levels of L-ascorbic acid are expressed as mean  $\pm$  SD ( $n = 3$ ).

**Lower pH increases absorption rate**

**Optimal absorbed by the skin at 20% concentration**

## Vitamin C Derivatives

Pure Vitamin C	Vitamin C Derivatives
L – ascorbic acid	Ascorbyl glucoside
Highly effective	Less effective
Reacts to heat and light	Stable (less likely to oxidize)
Can cause skin irritation	Causes much less skin irritation
High-end	Accessible
<b>Recommended for best result</b>	<b>Recommended for sensitive skin</b>



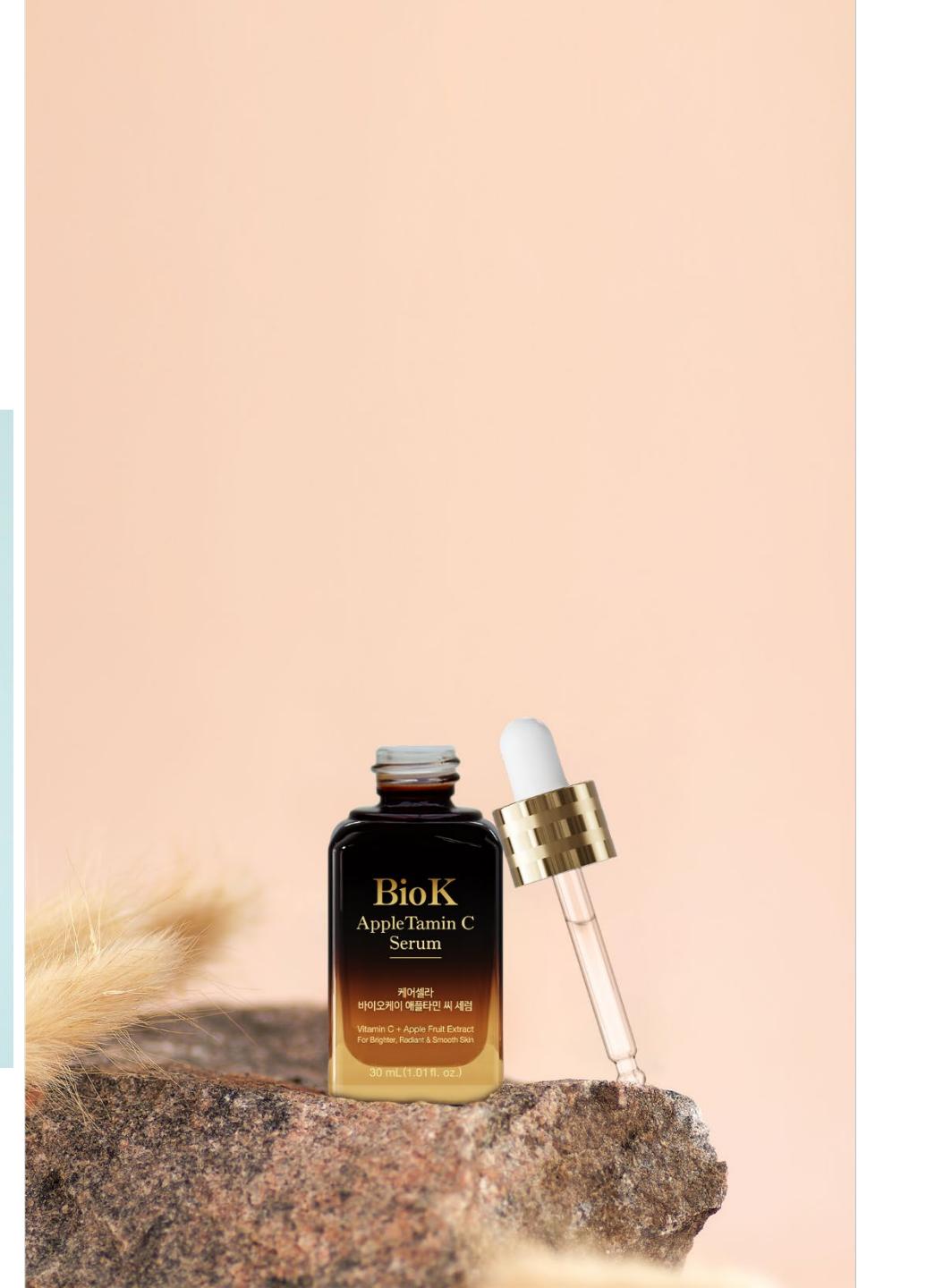
# Product Details 1 – Oxidation

## Antioxidants are the Solution

CareCella Bio-K AppleTamin C Serum protects the skin against active oxygen



The DPPH analysis test measures the ability of cosmetics to remove DPPH radicals. Because DPPH are stable free radicals, there is a color change when removed from their surrounding by antioxidants.



## Product Details 1 – Oxidation



# Product Details 1 – Oxidation (Product Comparison)

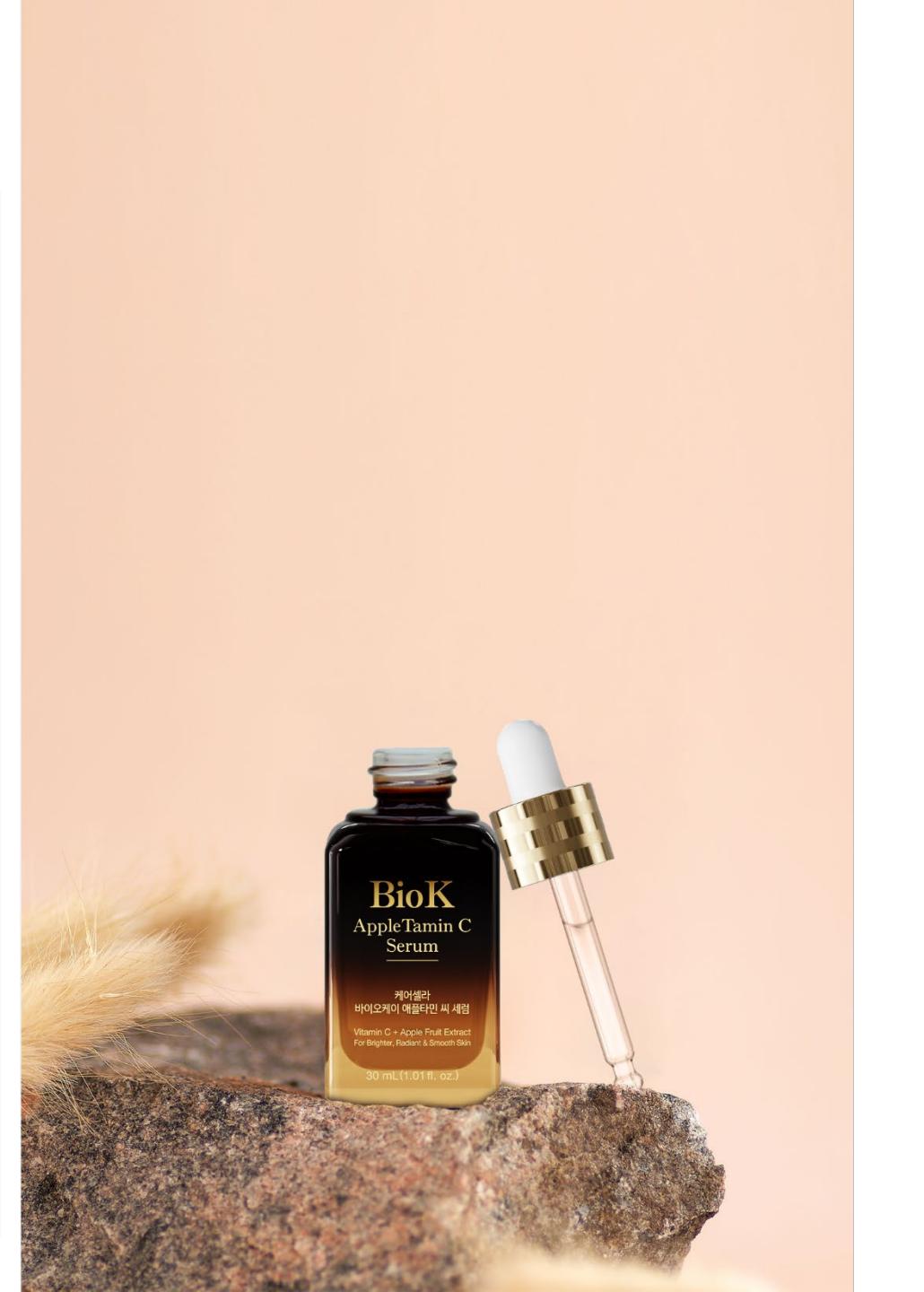
## Comparison of Effects Based on Vitamin C and Antioxidant Content

\*1: Existing Company Product

\*2: CareCella Bio-K AppleTamin C Serum

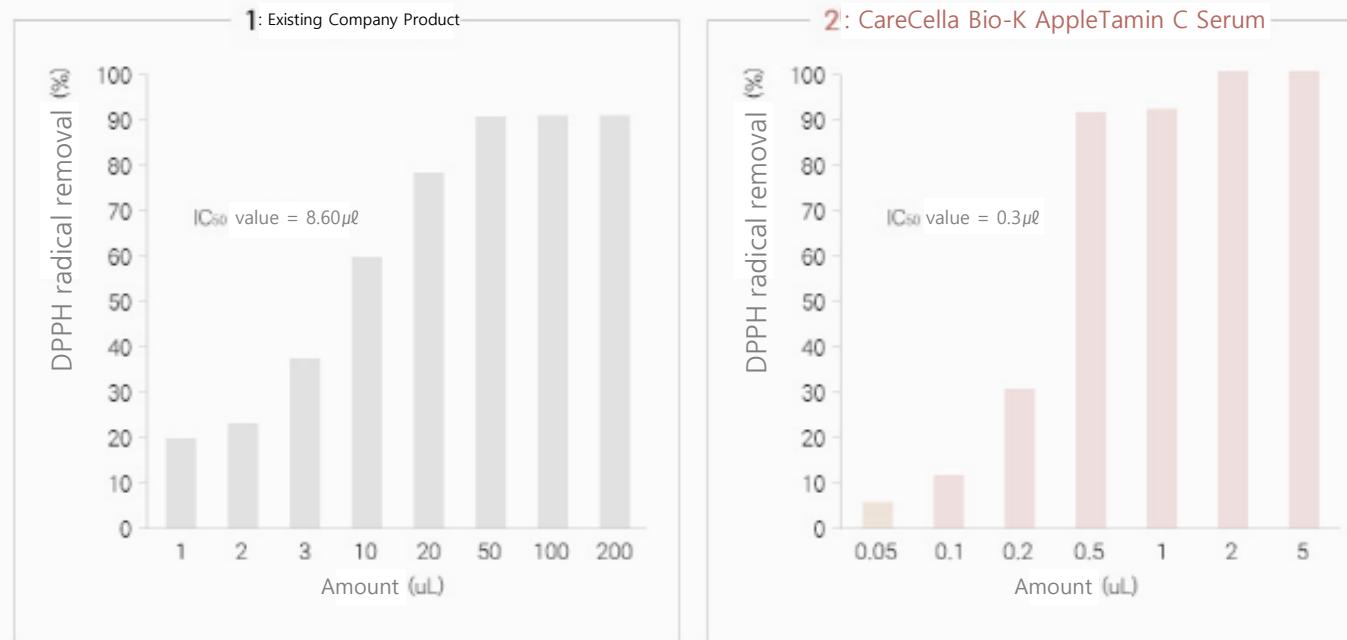
Ingredients	Compound Name	1	2	Content Difference
Pure Vitamin C	Ascorbic acid	0.001%	15%	15%
Vitamin C Derivatives	3-O-Ethyl ascorbic acid	0.001%	0.1%	0.10%
	Ascorbyl glucoside	0.001%	2%	2.00%
Antioxidants	Phloretin	0.01%	0.01%	-
	Ferulic acid	0.5%	0.5%	-
	Glutathione	0.02%	0.1%	0.08%
	Tocopherol	0.07%	0.004%	-0.07%
	Tocotrienol	-	0.01%	100%
	Resveratrol	-	0.1%	100%

\*Source: General Bio R&D Center

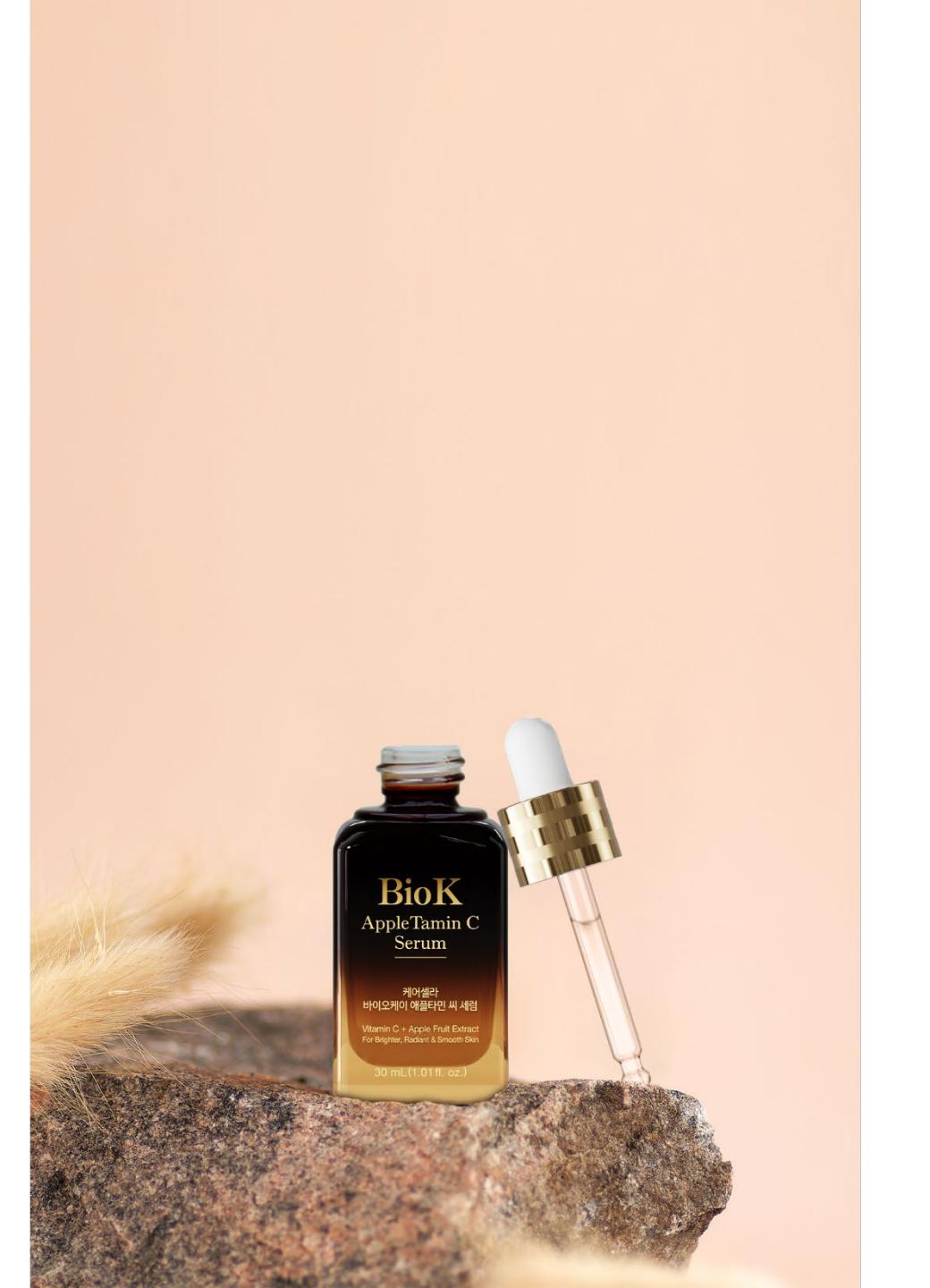


# Product Details 1 – Oxidation (Product Comparison)

Antioxidative effect increases as the content of pure vitamin C and its derivatives increases



DPPH removal x29 more effective

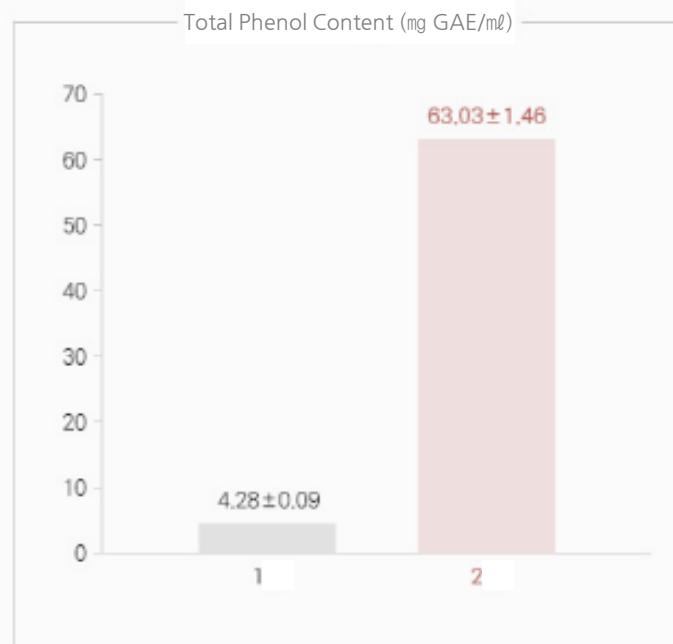


# Product Details 1 – Oxidation (Product Comparison)

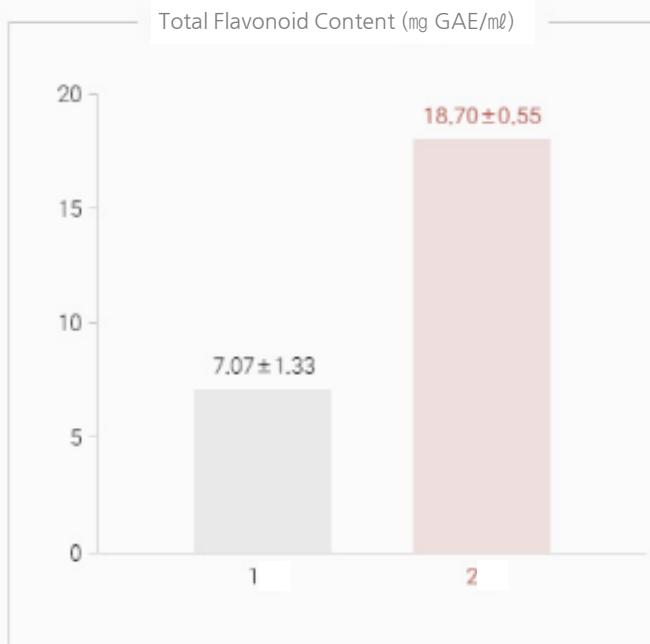
## Comparison of Phenol / Flavonoid Content

\*1: Existing Company Product

\*2: CareCella Bio-K AppleTamin C Serum

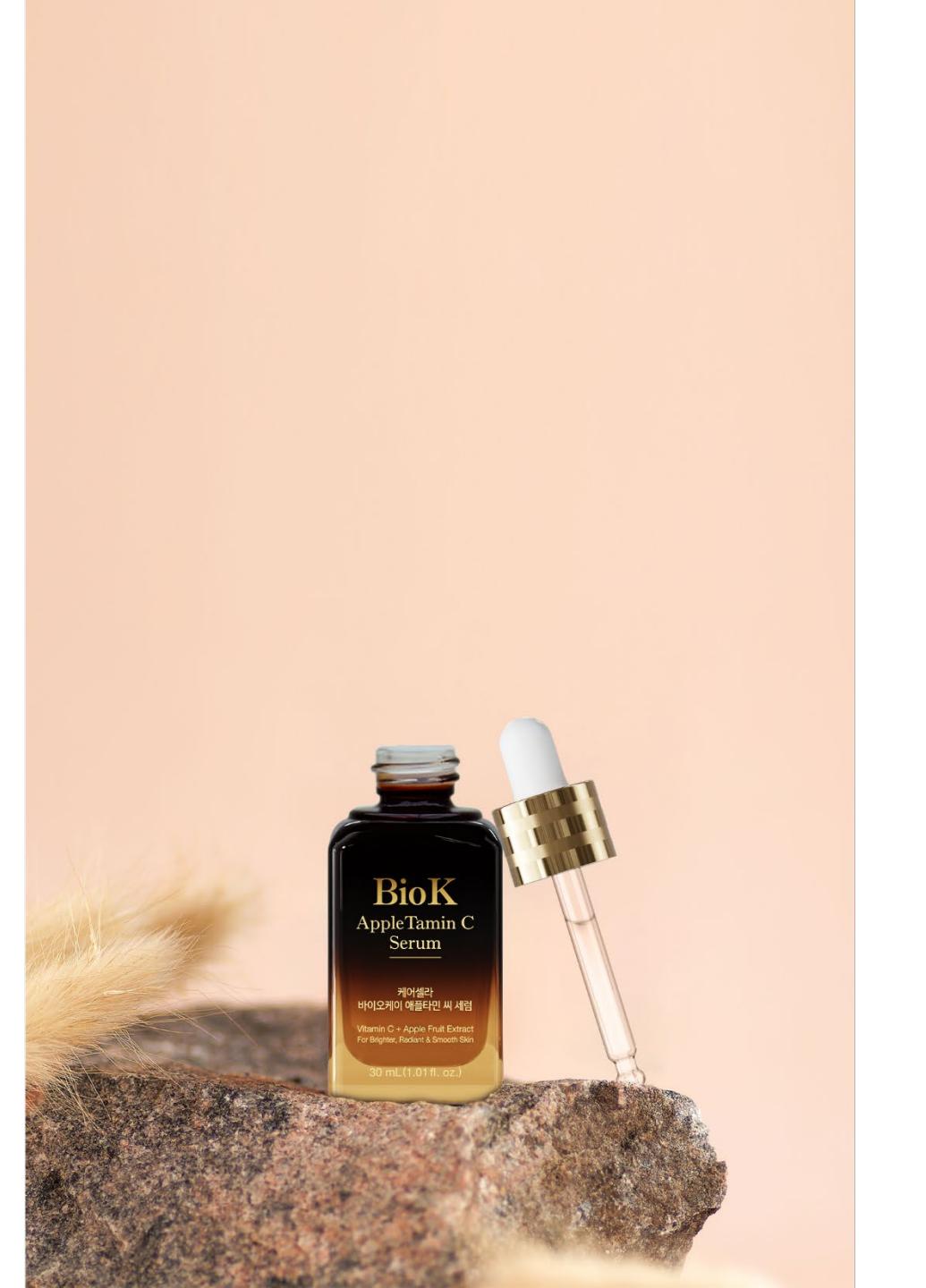


GAE : Gallic Acid Equivalent



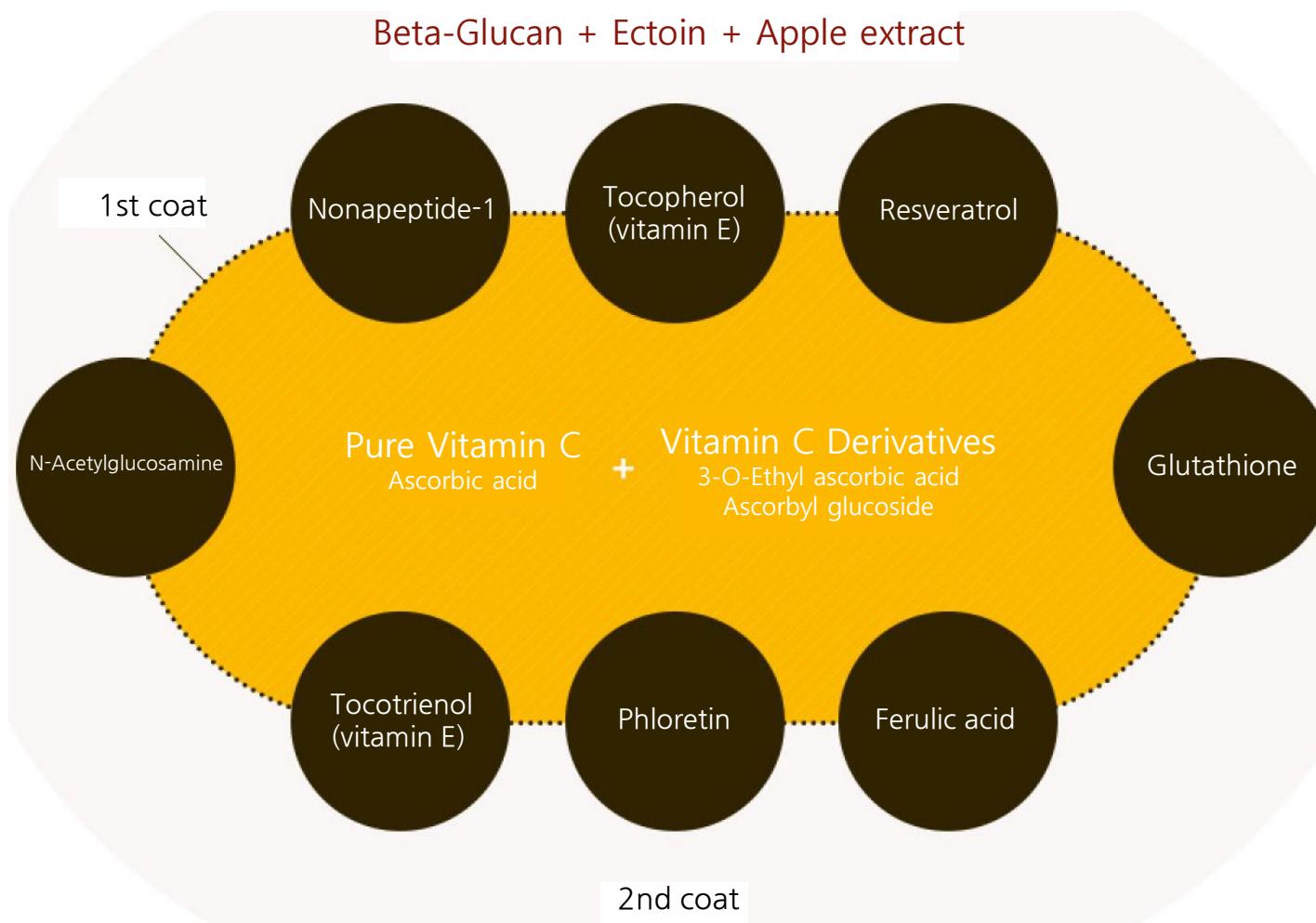
QE : Quercetin Equivalent

Total phenol content x15  
Total flavonoid content x2.6



## Product Details 2 – Formula Preservation

### Preventing the Oxidation of Pure Vitamin C: GB Double-Layering



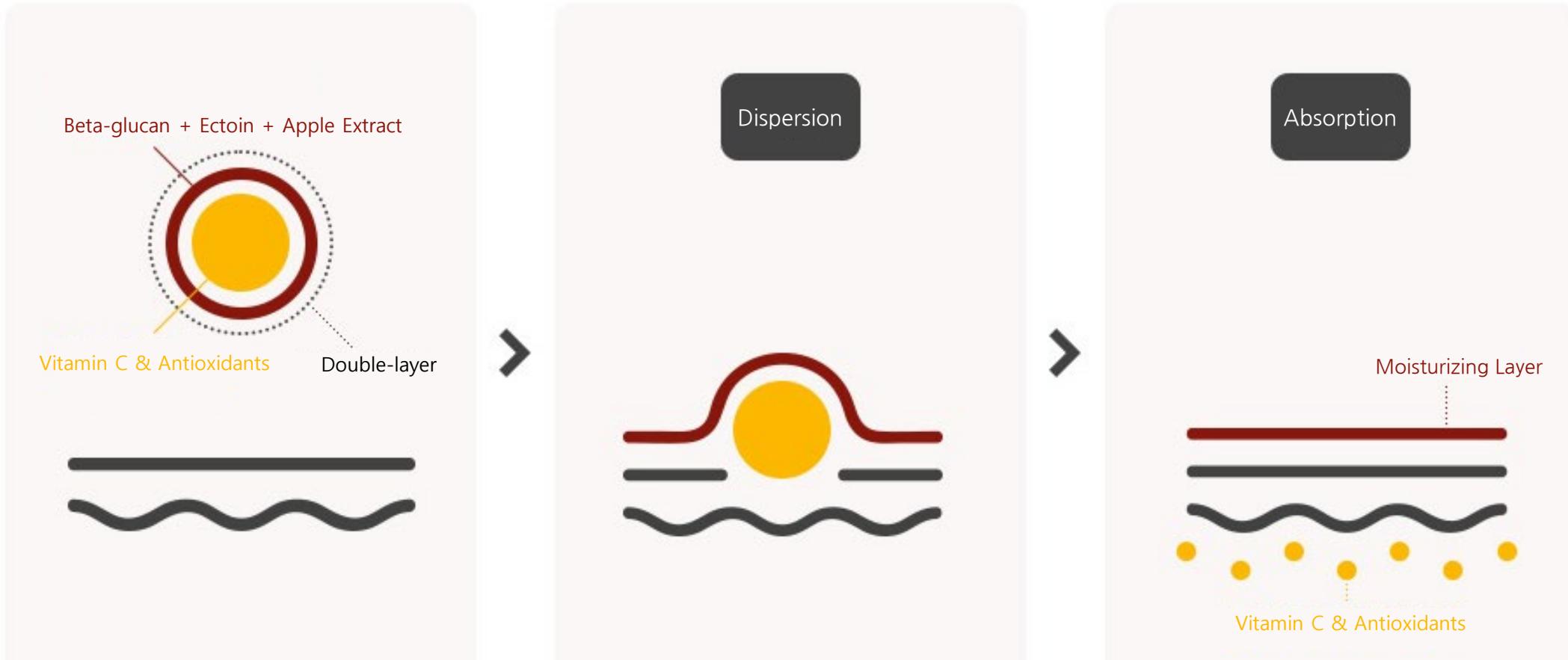
Step 1 : Introduce an eight-fold antioxidant substances into pure vitamin C + vitamin C derivative and proceed to 1st stage coating.

Step 2 : Stabilize by applying a secondary coating film onto the primary coating film using beta-glucan + ectoin + apple extract.

It's possible to maintain fresher ingredients by using ingredient combinations and manufacturing methods that help prevent vitamin oxidation.

## Product Detail 3 – Moisturizing Effect

### Double-Layering for Maximum Absorption and Moisturization



When the coating film is rolled onto the skin, it bursts, allowing the active ingredients to permeate the skin and create a moisturizing film on the epidermis.

## TIP

# CareCella Bio K AppleTamin C Serum

## Tips

Using an acidic toner to balance the skin texture and slightly adjust the skin's pH level can facilitate better absorption of vitamin C.

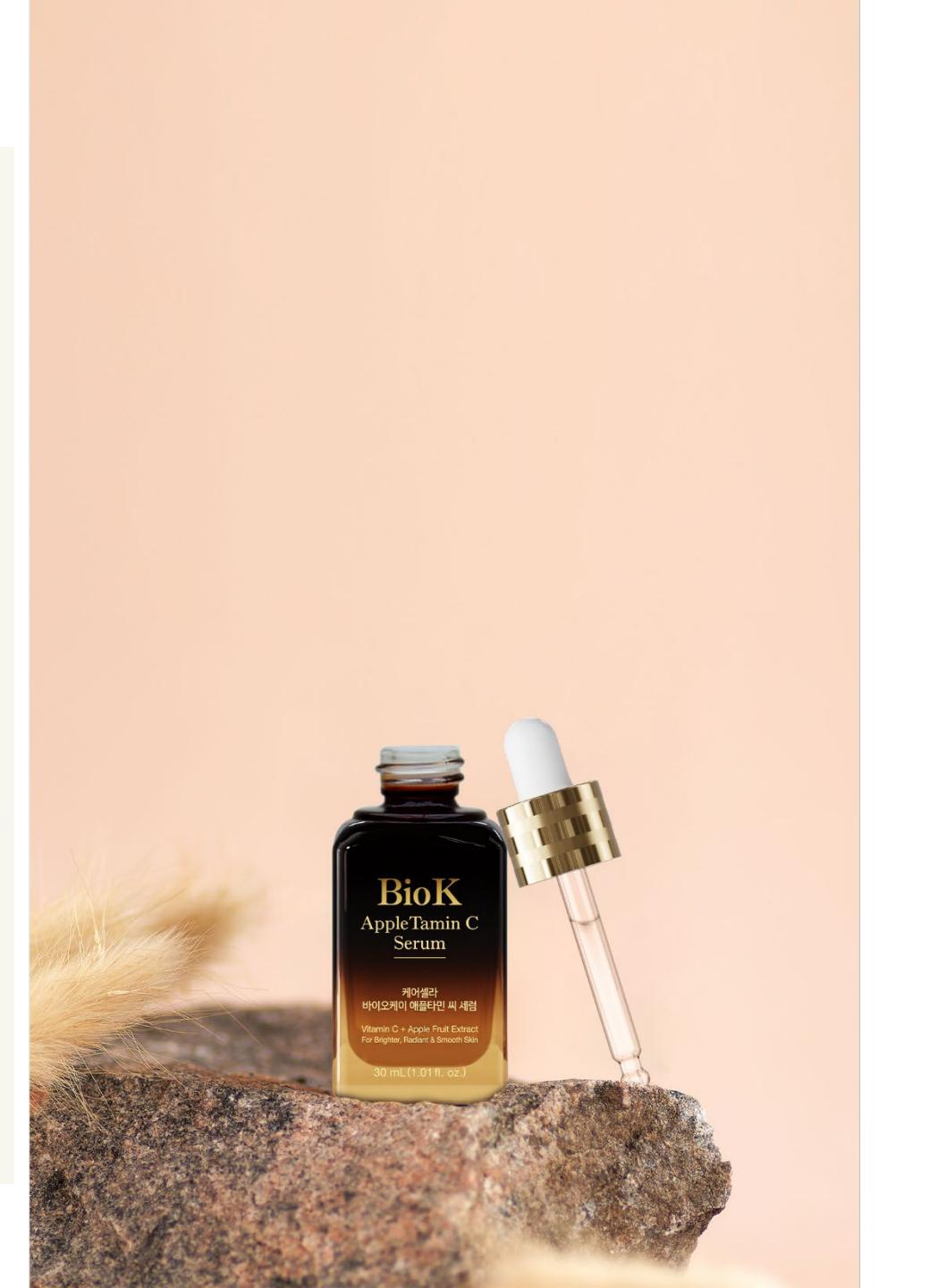
Additionally, it's not recommended to apply a moisturizer immediately after applying vitamin C skincare products.

CareCella Bio K AppleTamin C Serum has a pH value of 3.2-3.5 applying a moisturizer with pH similar to the skin (pH 5.5-7) can potentially reduce vitamin C absorption.

### For dry and sensitive skin, please try the following:

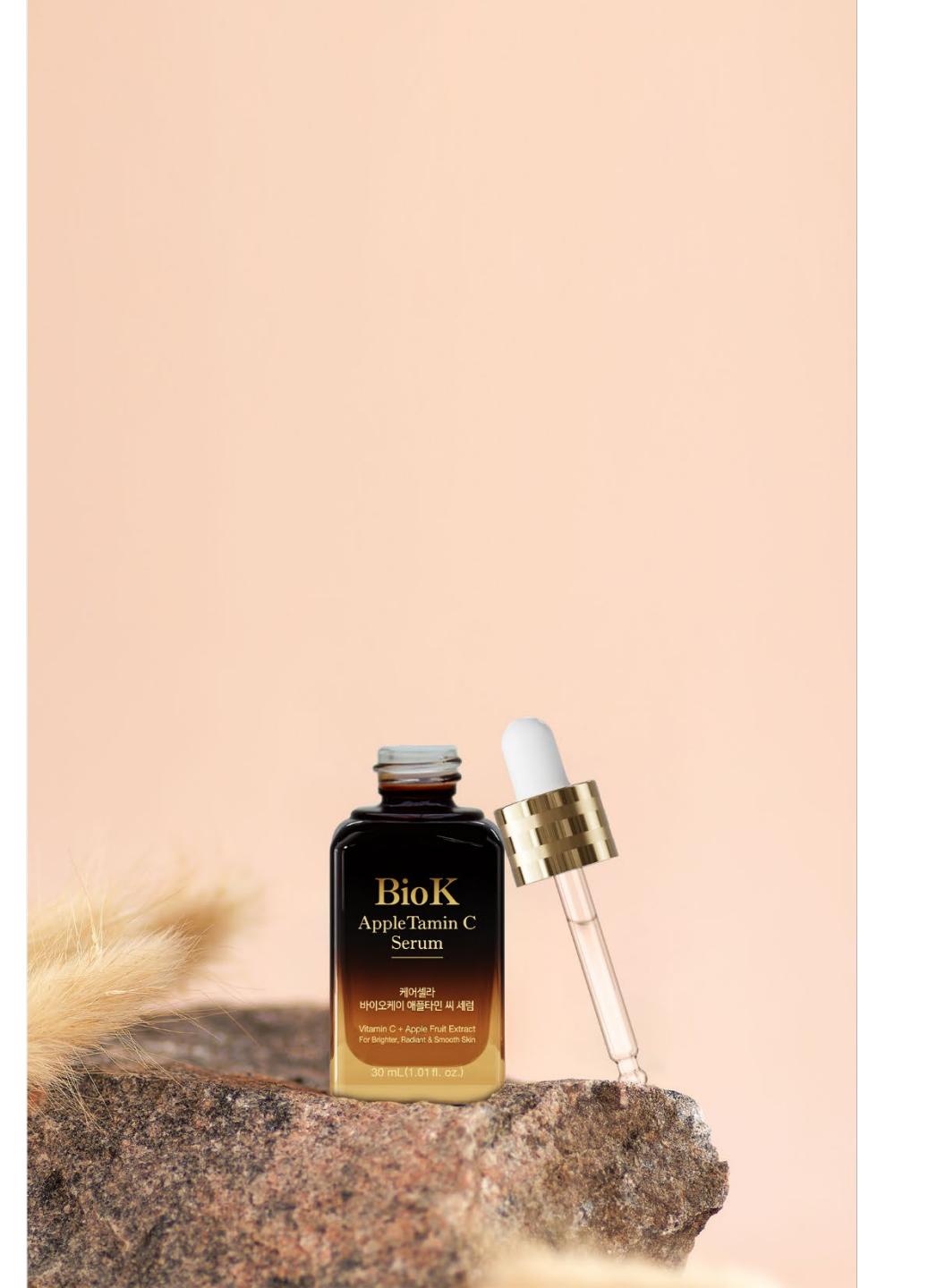
1. Start use with small amounts then gradually increase the amount over time.
2. Apply moisturizers (at least 5 min) afterwards to make sure that vitamin C is absorbed.

As the skin adapts, gradually increase application interval



# RECOMMENDED FOR

- Those who want a at-home maintenance product
- Those who want a brighter complexion
- Those who want a smoother skin tone
- Those who are worried about pigmentation and blemishes
- Those worried about melasma
- Those who want to treat UV-induced blemishes



# Q&A

## Q. How long will one bottle last?

A. The serum is intended for use at night. One bottle (30ml) will last approximately 14-30 days.

## Q. When can I expect to see results?

A. Individual differences may occur depending on skin type and condition, but results can usually be seen after 14 days with daily use.

\*Subject to individual variation based on product integrity / external environment

## Q. My skin is sensitive, can I still use it?

A. The high concentration of vitamin C may cause irritation. We highly recommend conducting a patch test before use.

## Q. Why is the pH (3.0~3.5) so low?

A. With a pH of 3.0-3.5, the serum can penetrate through the thick stratum corneum of the skin, facilitating better absorption.

## Q. Can pregnant women use it?

A. Please consult a healthcare professional before use.



# Q&A

## Q. I feel heat and a slight tingling after use.

A. This means that the vitamin c has been successfully applied. The low pH serum applied the skin (slightly alkaline to neutral pH 5.5-7) may cause such sensations.

## Q. The product smells metallic.

A. Due to the nature of high-concentration vitamin products, it may smell very similar to metal. Because additional fragrances have not been added, the unique smell of vitamin C may develop over time.

## Q. Can I use the product on acne-prone and eczemic skin?

A. We do not recommend using the product on acne-prone and eczemic skin as the high concentration of vitamin C may cause an irritation. However, the product can help reduce pigmentation on the skin, such as acne scars.



## PRECAUTIONS

- 1 Due to the high concentration of vitamin, there may be a reaction when exposed to UV rays. It is recommended to use the product at night.
- 2 If there is damage to the epidermis due to physical or chemical treatments, it is recommended to wait 1-2 weeks before use.
- 3 If you have undergone dermatological procedures (lasers, injections), it is recommended to wait at least 3 days before use.
- 4 Due to the high concentration of vitamin C, product discoloration may occur due to oxidation. It is recommended to use within 2-3 months after opening.
- 5 When using products with a high concentration of vitamin C, sensations of heat and itching may occur.  
(If such reactions persist, discontinue use. Consult a healthcare professional before continuing use.)
- 6 Store in a cool area away from sunlight
- 7 Refrigeration can help maintain the freshness of the vitamin C content.
- 8 After use, please close the container for storage.



# CareCella Bio-K AppleTamin C Serum

## HOW TO USE

01



Open the cap and fill the dropper with product.

02



Place small droplets on the face

03



Gently spread across the face  
(start at the center and spread outwards)

\*For an evening skincare routine, use after toner application

\* Use within 2-3 months after opening



**BioK**  
AppleTamin C  
Serum

케어셀라  
바이오케이 애플타민 씨 세럼