



# AA2G™

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## Healthier, Brighter, Younger-Looking Skin

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Stabilized time-released Vitamin C

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Protects against UV-induced damage

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Brightens and evens skin tone

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 **NAGASE**  
Personal Care

# A stabilized and long-lasting Vitamin C, which features multiple daily and special skin care benefits, including skin brightening

AA2G™ is a stabilized Vitamin C derivative—L-Ascorbic Acid 2-Glucoside—synthesized from Vitamin C and starch\* through enzymatic technology developed by Hayashibara. L-Ascorbic Acid 2-Glucoside is the main component of AA2G™. It has the same bioactive functionality in the body as Vitamin C, because it is hydrolyzed into Vitamin C and glucose by  $\alpha$ -glucosidase—an enzyme naturally existing in cell membranes of the body and skin.

AA2G™ is metabolized more gradually in the skin than other Vitamin C derivatives, providing sustained physiological effects. In the commercialization process, AA2G™ has superior formulation stability as a raw material, whereas Vitamin C is known to have disadvantages in the storage and production of cosmetics, such as discoloration and degradation. Used worldwide as a cosmetic ingredient for many years, the distinctive characteristics of AA2G™ allow for the fullest use of Vitamin C's bioactive functionality in skin brightening, promotion of collagen synthesis, antioxidant effects and other skin care needs.

\*The starch used as a raw material is non-genetically modified.

- Supplies Vitamin C continuously
- Inhibits production of melanin
- Lightens eumelanin and improves pigmentation
- Protects from skin damage caused by UV lights
- Improves wrinkles and skin texture

## Formulation stability of AA2G™

AA2G™ is resistant to discoloration during production and storage of cosmetic products compared to other Vitamin C derivatives.

AA2G™



pH 5 pH 6 pH 7

SODIUM ASCORBYL PHOSPHATE (SAP)



pH 5 pH 6 pH 7

ETHYL ASCORBIC ACID (VC-Et)



pH 5 pH 6 pH 7

MAGNESIUM ASCORBYL PHOSPHATE (MAP)

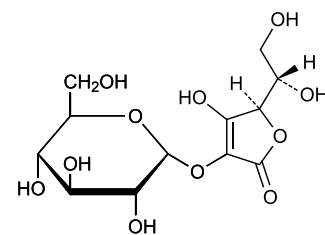


pH 5 pH 6 pH 7

2% solutions of various Vitamin C derivatives were stored at 40°C for 6 weeks.

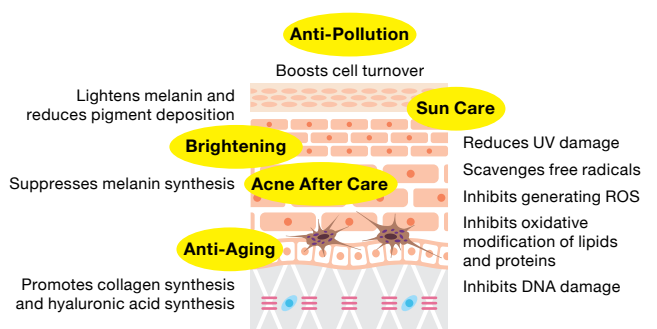
## Structural formula of L-Ascorbic Acid 2-Glucoside

One glucose molecule is bound to the reaction site, 2' hydroxyl group of Vitamin C, to improve stability.



## Multiple bioactive functions of AA2G™

In addition to the skin brightening effects, AA2G™ has been shown to have various positive effects on the skin.



### BENEFIT 1

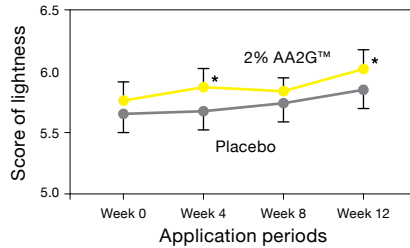
## Reduces age spots

Lotion containing AA2G™ reduced and lightened age spots.

### CHANGES IN AGE SPOTS AND LIGHTNESS SCORES OVER 12 WEEKS



Week 0                      Week 12



vs. 0w, \*:  $p < 0.05$

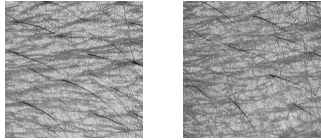
Lotion with 2% AA2G™ or placebo was applied on the face of 46 females with age spots twice a day for 12 weeks. Score of lightness was determined by a dermatologist using skin tone color chart made by Japan Color Research Institute.

### BENEFIT 2

## Reduces wrinkles and improves moisture content

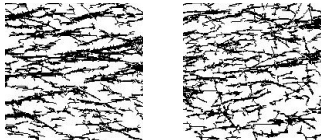
Cream containing AA2G™ reduced the wrinkle index and increased moisture content in eye area.

### MAGNIFIED PICTURES OF EYE AREA



Day 0

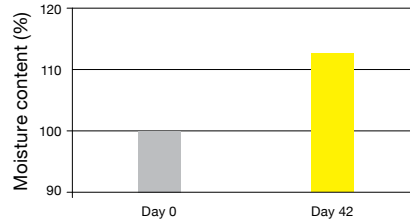
Day 42



Wrinkle Index  
5.28

Wrinkle Index  
4.28

### MOISTURE CONTENT BEFORE & AFTER APP.



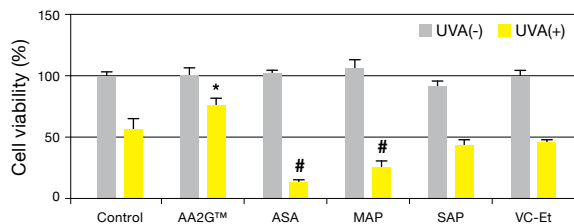
Cream with 2% AA2G™ was applied around the eyes of 10 females twice a day for 42 days. The moisture content of stratum corneum was measured in their eye area. A Wrinkle Index was calculated from binarized images of photos taken before and after the application.

### BENEFIT 3

## Reduces UV damage

AA2G™ suppressed cell damage on epidermal cells caused by UVA.

### COMPARISON OF UVA-INDUCED NHEK DAMAGE INHIBITION



High viability vs. UVA(+) control, \*:  $p < 0.01$

Low viability vs. UVA(+) control, #:  $p < 0.01$

Riboflavin and 0.25 mmol/L of Vitamin C derivatives were added to cultured NHEK cells. Cell viability was measured after 3 J/cm<sup>2</sup> UVA irradiation.

## APPLICATIONS

Skin Care

Sun Care

Anti-Aging

## PRODUCT FORMS

Lotions, Toners, Milk Lotions, Creams, Gels, Serums/Essences, Sunscreens

## SUGGESTED USAGE LEVEL

Skin Care 0.5–5.0%

Anti-Aging 0.5–5.0%

Brightening 1.0–2.0%

## INFORMATION

### INCI NAME

Ascorbyl Glucoside

### DESCRIPTION

White to yellowish-white powder or crystalline powder and odorless

### STORAGE

Store in a cool, dark and dry place.

### EXPIRATION

Twelve (12) months from the production date

### PACKAGE

Tin-free steel can in a carton box (net 10 kg) or zipper aluminum-laminated bag (net 1 kg)

### SAFETY

Data acquired

### FORMULATION DETAILS

After preparing an AA2G™ solution, neutralize it by using an alkaline agent before adding it to the formulation. Avoid heating for a long time at high temperature.

\* Quasi-drugs containing AA2G™ as an active ingredient are approved in Japan. The claims are listed as: "Preventing pigmentation from sunlight in age spots and freckles" or "Suppressing melanin synthesis and preventing pigmentation in age spots and freckles."



Raw material verified by  
ECOCERT GREENLIFE,  
conform to the  
COSMOS Standard

AA2G™ is certified as Halal

## Contact Us

For further information, please contact [dnpchb@nagase.co.jp](mailto:dnpchb@nagase.co.jp)

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Please visit our website for further information.



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