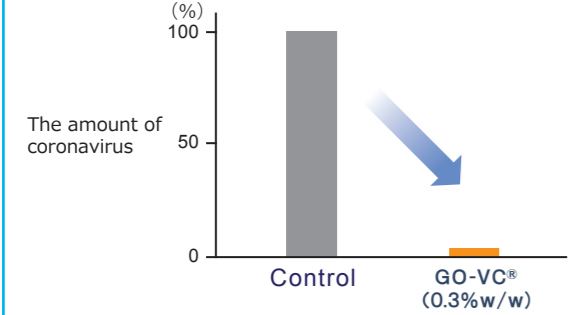


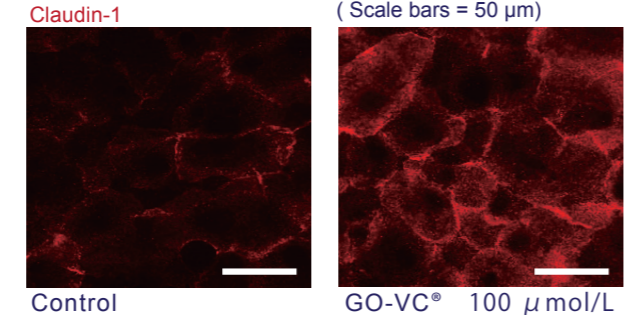
RESULTS (in vitro-data)

Antiviral effect of GO-VC



GO-VC could have an inactivating effect against coronavirus after 15 min of contact.

Epidermal barrier function-reinforcing effect of GO-VC



GO-VC could reinforce the epidermal barrier function by enhancing the biosynthesis of tight junction-member proteins such as claudin-1.

Data Sheet	
Trade name	GO-VC 10W GO-VC 10W (with phenoxyethanol)
INCI	WATER, CAPRYLYL 2-GLYCERYL ASCORBATE WATER, CAPRYLYL 2-GLYCERYL ASCORBATE,PHENOXYETHANOL
Property	Colorless to light yellow liquid, Characteristic odor
Dosage purpose	Anti-oxidant, brightening, Anti-wrinkle, Anti-acne, Moisturizer, Antibacterial, Antivirus
Recommendable level	0.5 ~ 1.0%
Usage	Cosmetics
Caution	-
Storage condition	Keep it away from heat and direct sunlight. Recommended storage temperature :Below 4°C centigrade.
Toxicity	Non-sensitizer. (RIPT, active 20% water solution) Non-mutagenic. (AMES, active 100%) Non-irritant. (Human Patch, active 20% water solution)

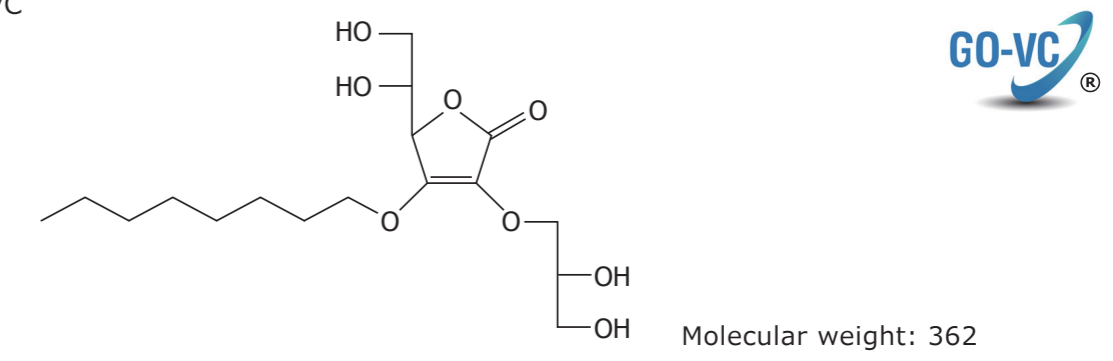
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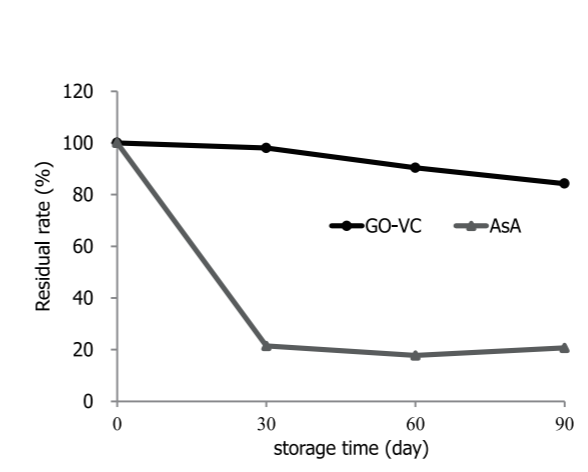
Trade name **Amphiphilic and nonionic ascorbic acid derivative**
GO-VC 10W Cosmetic Ingredient

GO-VC has a unique structure where a glyceryl and octyl groups are introduced to hydroxyl groups at the C-2 and C-3 positions of ascorbic acid (AsA), and becomes an amphiphilic AsA derivative. Although AsA is highly instable, GO-VC has higher stability than the conventional AsA derivatives. With respect to the skin-physiological effects of GO-VC, by having glyceryl group in its structure, the derivative is expected to show a higher humectant ability and reduce strong skin-dryness, which is caused by conventional Vitamin C cosmetics. Having an octyl group showing an anti-bacterial activity in its structure, GO-VC is expected to show an antibacterial ability. Moreover, GO-VC was found to have a fibroblast proliferating ability, a type I collagen production-enhancing effect, and a melanogenesis-suppressing ability appeared at lower concentration than that of arbutin. In the clinical trial, GO-VC at concentration of 0.1% was confirmed to reduce acne. Furthermore, GO-VC can be formulated with various cosmetic products such as lotion, serum, cream and gel. The conventional water-soluble AsA derivatives, such as APS and APM, is known to change the viscosity of the product or cause crystallization because of alkali metal salt. Also conventional fat-soluble AsA derivatives such as VCIP hardly dissolve in water. On the other hand, because two strong ionic hydroxyl groups in AsA moiety of GO-VC are substituted with glyceryl and octyl groups, GO-VC can be formulated with water-soluble polymers in products without the reduction of the viscosity. Furthermore, GO-VC is nonionic material, slightly charged with negative, so it can be used for iontophoresis.

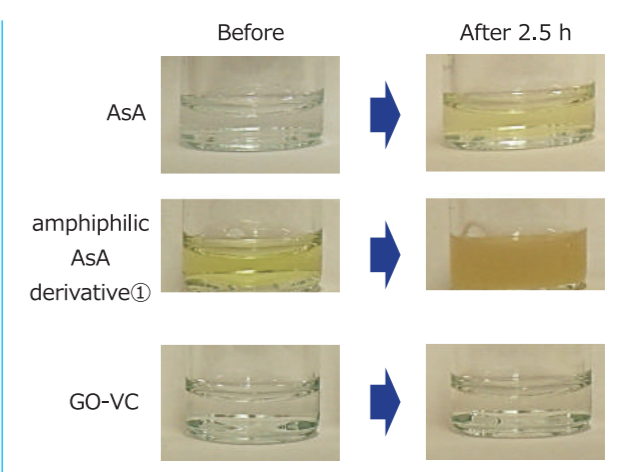
Structure GO-VC



RESULTS (stability-data)

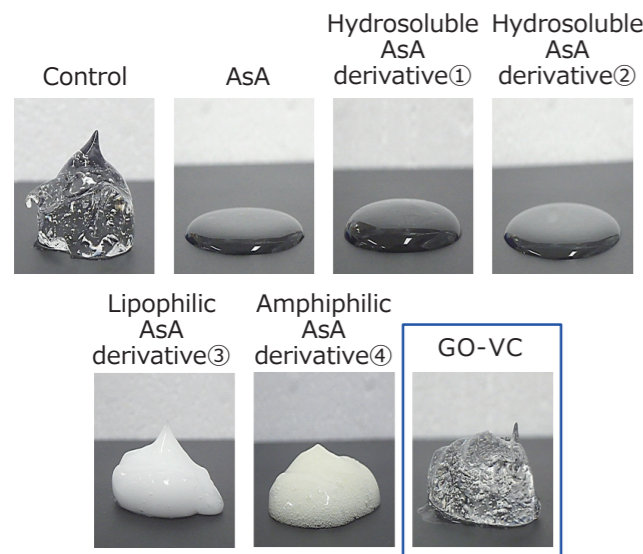


GO-VC shows higher stability than ascorbic acid.
 2% ascorbic acid (AsA) and GO-VC solutions (pH 5) were stored at 50 °C for 90 days. As a result, GO-VC was found to have a higher stability than AsA.



GO-VC does not turn brownish even stored at 100°C for 2.5h.
 5% ascorbic acid (AsA), amphiphilic AsA derivative①, and GO-VC solutions were stored at 100°C for 2.5 hours. As a result, GO-VC was found to have a higher stability than AsA and conventional amphiphilic AsA derivative①.

RESULTS (viscosity-data)



GO-VC has the viscosity stable

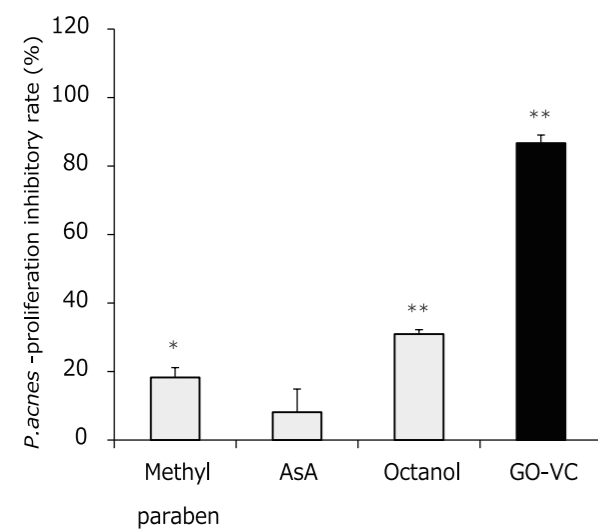
Ascorbic acid (AsA), hydrosoluble AsA derivative①・②, lipophilic AsA derivative③, amphiphilic AsA derivative④, and GO-VC were added in 5% each to gel formulation. The viscosity of gel were decreased with AsA and hydrosoluble AsA derivative①・②, respectively. Lipophilic AsA derivative③, led to change the gel color to creamy white, though the viscosity did not change. Amphiphilic AsA derivative④ led to slightly decrease the viscosity of gel, and changed color to creamy white as lipophilic AsA derivative③. On the other hand, GO-VC completely contained in gel formulation without any negative points such as the color change and the low viscosity.

RESULTS (in vitro-data)

	the number of living bacteria (cfu/mL)	
	Before	After 7 days
<i>Escherichia coli (E.coli)</i>	2.4×10^6	<10
<i>Pseudomonas aeruginosa (P. aeruginosa)</i>	2.7×10^6	<10
<i>Staphylococcus aureus (S. aureus)</i>	1.5×10^6	<10
<i>Candida albicans (C. albicans)</i>	1.9×10^5	<10

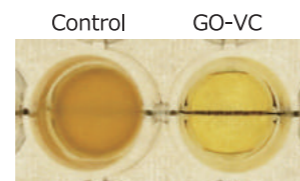
The antibacterial activity of GO-VC

The antibacterial activity to escherichia coli, pseudomonas aeruginosa, staphylococcus aureus, and candida albicans of GO-VC were evaluated by using the way of japanese pharmacopoeia. As a result, GO-VC was found to have the antibacterial activity to above 4 kinds of bacteria.



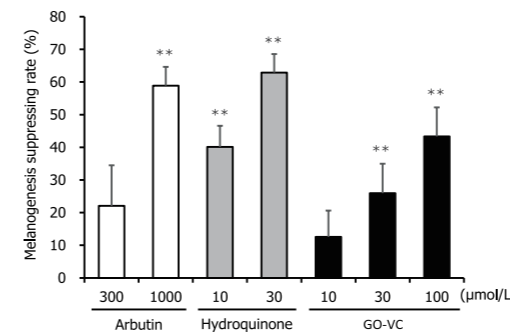
The p.acnes-proliferation suppressing effect of GO-VC

P.acnes were cultured at 37 °C under an anaerobic condition, and mixed with 0.1% GO-VC, methyl paraben, ascorbic acid (AsA), and octanol. After being cultured at 37 °C under an anaerobic condition for 48 h, the absorbance of 620 nm was measured. As a result, GO-VC was found to suppress the proliferation of p.acnes significantly, and the suppressing effect was found to be higher than those of methyl paraben, AsA, and octanol. (n = 3, Mean±SD, **p < 0.01 *p < 0.05 significant from the Ctl group)



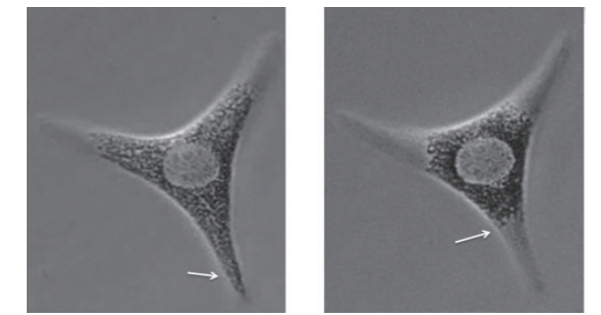
While control was clouded by p.acnes, GO-VC was not clouded decreasing the amounts of p.acnes.

RESULTS (in vitro-data)



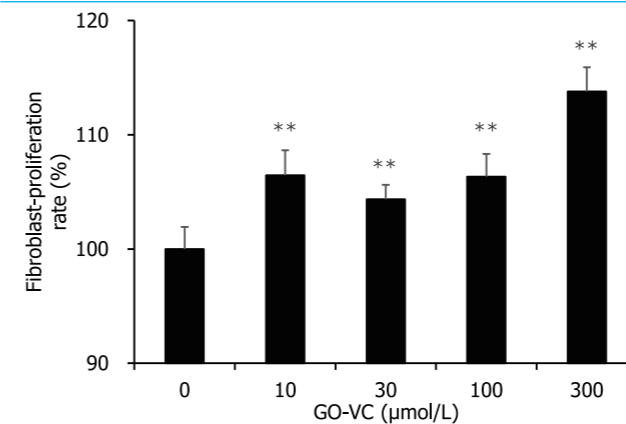
The melanogenesis-suppressing ability of GO-VC

After mouse melanoma B16-4A5 cells were cultured with DMEM containing 10,30, and 100 μmol/L GO-VC, 300 and 1,000 μmol/L arbutin, 10 and 30 μmol/L hydroquinone. After 72h, intracellular melanin contents were evaluated. As a result, GO-VC was found to suppress the melanin production dose dependently, and the suppressing effect appeared at lower concentration than that of arbutin, which is a famous skin whitening agent. (n = 4, Mean±SD, **p < 0.01 significant from the Ctl group)



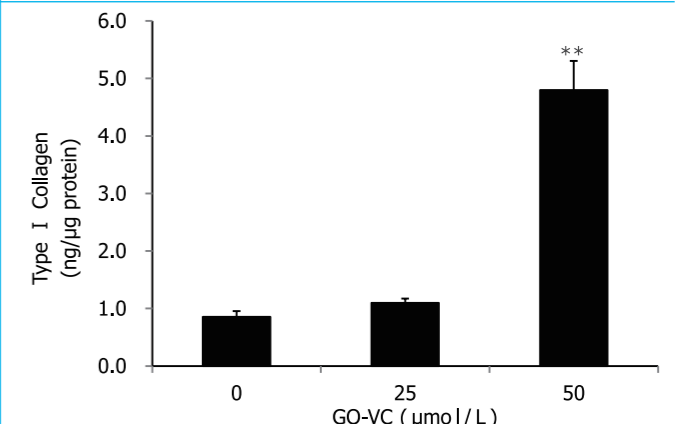
The suppressing effect of GO-VC on intracellular melanosome-transfer in melanocytes

After melanocytes were cultured with GO-VC, GO-VC was found to suppress the transfer of melanosomes to the dendrite tips of melanocytes. Therefore, GO-VC has a potential of disrupting the intracellular melanosome-transfer in melanocytes.



The fibroblast proliferating ability of GO-VC

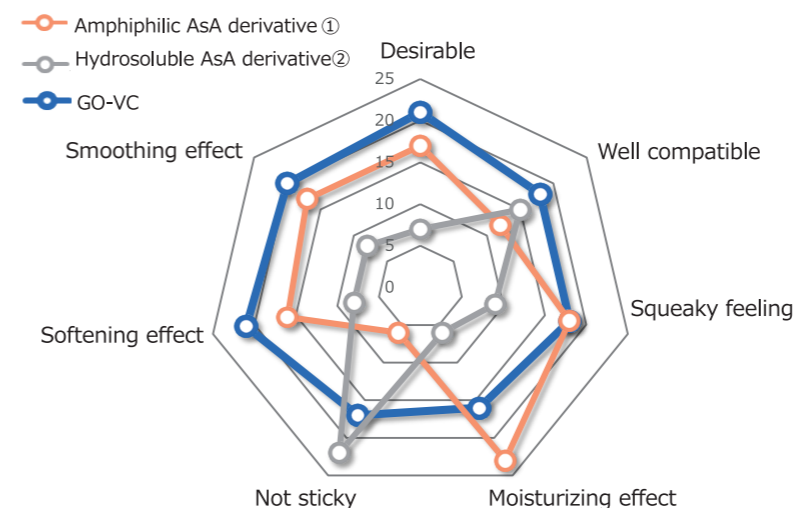
After Normal human dermal fibroblasts (NHDF) were cultured with DMEM containing 10,30,100, and 300 μmol/L GO-VC for 48 h, NHDF proliferating rates were evaluated. As a result, at all concentrations of 10,30,100, and 300 μmol/L, GO-VC was found to enhance the proliferation of fibroblasts more significantly than the control. (n = 4, Mean±SD, **p < 0.01 significant from 0 μmol/L GO-VC)



Type I collagen production-enhancing effect of GO-VC

After Normal human dermal fibroblasts (NHDF) cultured with DMEM containing 25, 50 μmol/L GO-VC for 24 h, the contents of collagen production were evaluated. As a result, GO-VC was found to enhance the type I collagen production significantly. (n = 3, Mean±SD, **p < 0.01 significant from 0 μmol/L GO-VC)

RESULTS (in vivo-data)



Sensory evaluation test of GO-VC

GO-VC, amphiphilic ascorbic acid (AsA) derivative①, and hydrosoluble AsA derivative② were added in 1% each to water. 15 subjects apply these solutions on their skin of forearm, and they answered the questionnaire about "Desirable", "Well compatible", "Squeaky feeling", "Moisturizing effect", "Not sticky", "Softening effect", and "Smoothing effect". The results were measured based on the perception of each person with scores ranging from 0 to 2 to each samples and calculating the total scores. As the result, GO-VC had moisturizing effect without sticky and squeaky feeling.