

# Eco-friendliness, secureness, and safety

## Eco-Friendly Raw Material

- Chemical-free cultivation
- Clearly indicates the place of origin (Japan)
- Traceability
- Allows for reuse of non-standard products
- Unaffected by weather and allows for consistent supply
- Partnership with a food company contributes to the achievement of a recycling-oriented society



Commitment to material procurement	Domestically produced raw materials	Effective use of resources (sustainability)	Ethical consumption
	Based on Nameko produced without agricultural chemicals in Yamagata. Traceability has been established for the raw material to ensure secureness and safety.	The eco-friendly raw material is effectively used: Small Nameko that are usually discarded because of their non-standard size. The raw material can be stably supplied because it is farmed indoors in a well-controlled environment that is not affected by weather.	Nameko has been consumed in Japan for many years. In cooperation with local food product companies, we will support the creation of a recycling-based society and the future-oriented production of cosmetics.

Recommended formulation ratio: 0.2-3%  
Safety evaluation: Human repeat insult patch test (HRIPT): Negative

Product number	Product name	INCI name/中文名称	Other ingredients	Package
PME-131	Pholitect BG	PHOLIOTA MICROSPORA POLYSACCHARIDES /*	Water, BG (botanical-derived)	1kg
PME-121	Pholitect PE		Water, phenoxyethanol	

\*PHOLIOTA MICROSPORA POLYSACCHARIDES can be replaced with POLYAMINO SUGAR CONDENSATE.  
INCI name: POLYAMINO SUGAR CONDENSATE; 中文名称: 多氨基酸多糖縮合物

The Country of origin: Japan The place of Origin: Yamagata Pref.

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<https://koken-cosme.com/>



The first anti-inflammatory botanical shield polymer in the world !

# Pholitect®

(PHOLIOTA MICROSPORA POLYSACCHARIDES)

Protects the skin from drying and external stress with its botanical power.

An eco-friendly functional basematerial

Moisturizing

Anti-inflammatory

Barrier function

Irritation reduction

Makeup

Protection from UV rays/blue light

Improved feel/lathering



# Phytochemical ingredients protect the skin from drying and external stress

Pholitect is a new, plant-based cosmetic raw material from mucus, a botanical shield component secreted from mushrooms (nameko), that protects from dryness and external stress. It is extracted using a proprietary method. Although it is a water-soluble molecule, it is characterized by its thick, rich texture that is oily but neither slippery nor sticky. Suitable for natural cosmetic formulas since it gives a springiness and denseness to cleansing agents.

- ✓ Air pollutants, pollen, and temperature difference
- ✓ Cleansing face wash
- ✓ Stimuli contained in cosmetics
- ✓ UV rays, blue light

Botanical shield polymer, a 100% natural eco-friendly functional base material

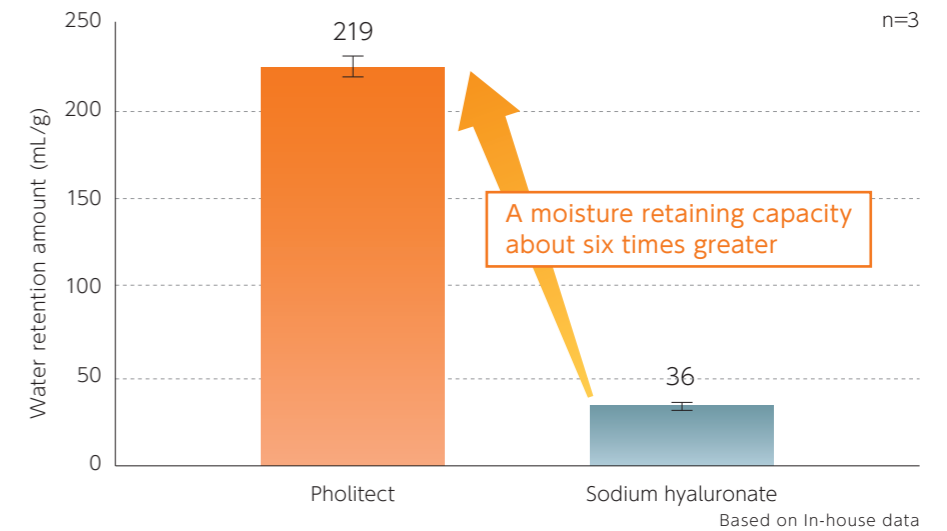
<div style="background-color: #f4a460; border-radius: 50%; width: 60px; height: 60px; margin: 0 auto; display: flex; align-items: center; justify-content: center; color: white; font-weight: bold; font-size: 12px;">Functionality</div>	<div style="background-color: #f4a460; border-radius: 50%; width: 60px; height: 60px; margin: 0 auto; display: flex; align-items: center; justify-content: center; color: white; font-weight: bold; font-size: 12px;">Characteristics of basematerial</div>	<div style="background-color: #f4a460; border-radius: 50%; width: 60px; height: 60px; margin: 0 auto; display: flex; align-items: center; justify-content: center; color: white; font-weight: bold; font-size: 12px;">Environmental considerations</div>
Shield function	Thickening/coloring	Produced domestically/chemical-free
Drying/inflammation Irritant substance UV rays/blue light	Improved feel	Efficient use of resources
	Lather quality improvement	Traceability
	Makeup effects	

## Domestically produced plant-derived polysaccharide focusing on the living body's defense system

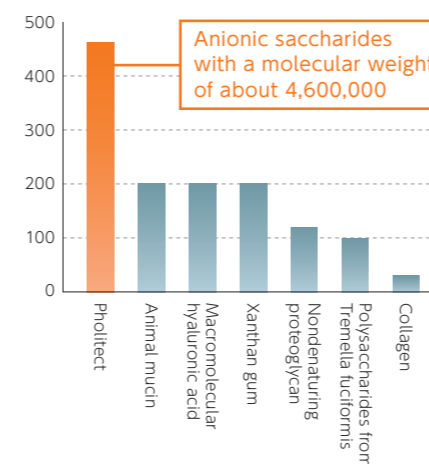
It has been reported that natural polysaccharides have anti-inflammatory and anti-allergy effects and help regulate immunity. Phytochemicals, which plants create to protect themselves, are considered to be important not only for the body's internal environment, but also for nutritional support for the skin, and to improve the skin's condition. Mushrooms have been used for ages as a phytochemical raw material that includes functions such as an anti-inflammatory effect, immune cell activation, and an anti-allergic effect.

### Structural features of Pholitect

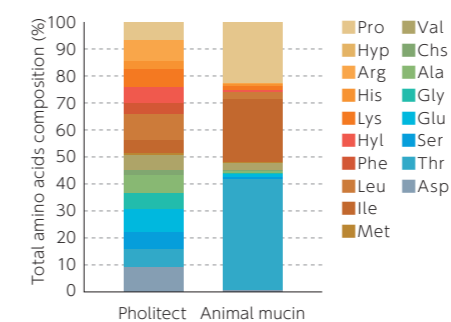
Pholitect is the anionic saccharides that consists of sugar and protein. It is unique saccharides with a structure similar to mucin, an animal mucosal protective ingredient. Its amino-acid composition is better balanced than animal mucin. Pholitect is a macromolecule with a molecular weight of approximately 4,600,000 with a moisture retaining capacity about six times greater than hyaluronic acids.



### Molecular weight



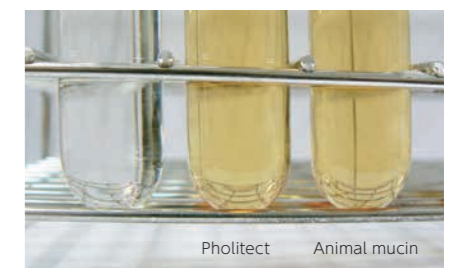
### Analysis of amino acids



Pholitect has a better amino acid composition balance than animal mucin.

### Analysis of sugars

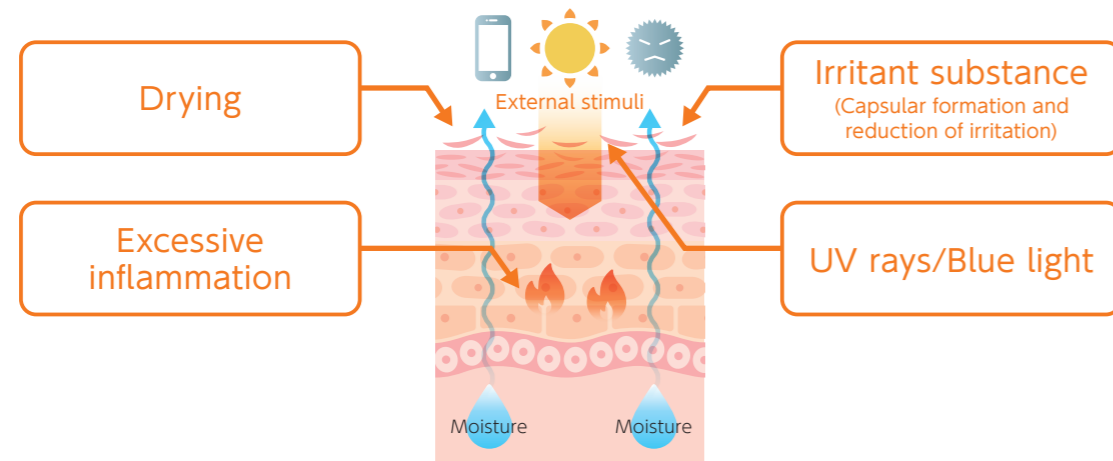
(color reaction of neutral sugar using orcinol and sulfuric acid)



Contains neutral sugar just as animal mucin

Pholitect is a unique polysaccharides similar to mucin, a living body's mucosal protection component.

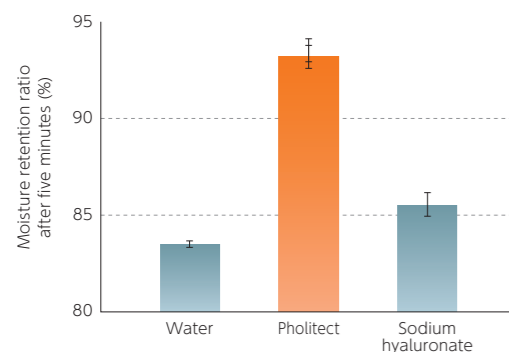
Based on In-house data



### Prevents Drying

#### The ability to reduce water evaporation and retain moisture

Sample solutions with a concentration of 0.1% solid content were dropped on filter paper. Five minutes later, their weight was measured. The moisture retaining rate was calculated based on changes in weight. (n=3)



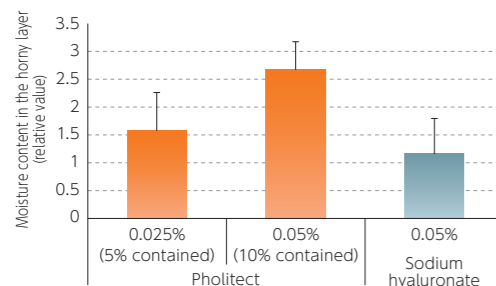
Pholitect showed a moisturizing effect about 2.5 times greater than hyaluronic acid.

Based on In-house data

#### The skin moisturizing effect

##### Toner

Sample aqueous solutions were applied to subjects' forearms. After five minutes, the moisture content in the horny layer was determined using a Corneometer. The relative values were calculated with the moisture content in the horny layer before application as 1 (n=3).

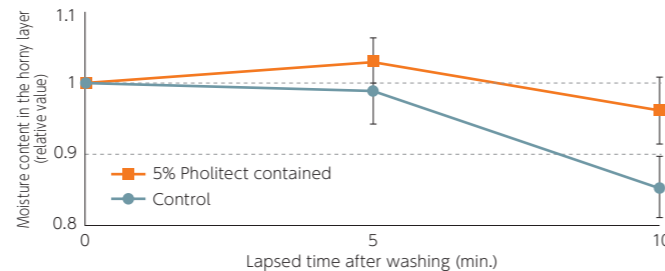


Pholitect showed greater suppression of water evaporation and moisture retention than sodium hyaluronate.

Based on In-house data

#### The moisturizing effect following washing

- The moisture content in the horny layer of the back of the hand was determined using a Corneometer.
- The back of the hand was washed for 20 seconds using lather from one push of the amino-acid face wash.
- Rinse with lukewarm water for ten seconds and wipe gently.
- The moisture content in the horny layer of the back of the hand was determined using a Corneometer (n=4).

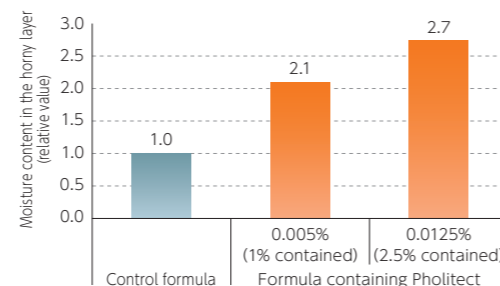


Pholitect suppressed drying after washing. Pholitect is expected to increase moisturizing ability after washing and keep skin smooth and moisturized.

\*With cooperation of: General Cosmetics Course, Tokyo College of Medico-pharmaco Technology  
Based on In-house data

##### Cream

Pholitect was mixed in O/W cream. It was applied to the inside of subjects' forearms. After two hours, the moisture content in the horny layer was measured.



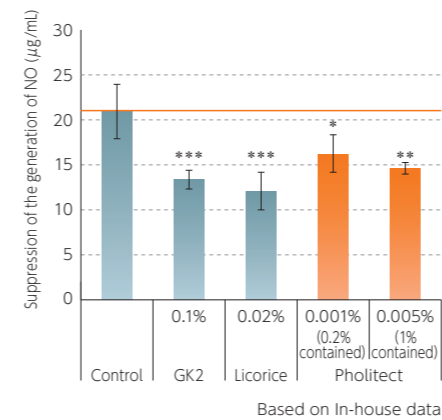
The formula containing Pholitect presented a moisturizing effect that two times or more greater than the control formula.

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Based on In-house data

### Anti-inflammatory effect

Macrophage-like cells (RAW264.7 cells) were treated with lipopolysaccharide (LPS) to induce an inflammatory reaction. The suppression of the generation of nitrogen monoxide (NO) and inflammatory cytokines (IL-6, COX-2, TNF- $\alpha$ , and NF- $\kappa$ B) was examined in samples.

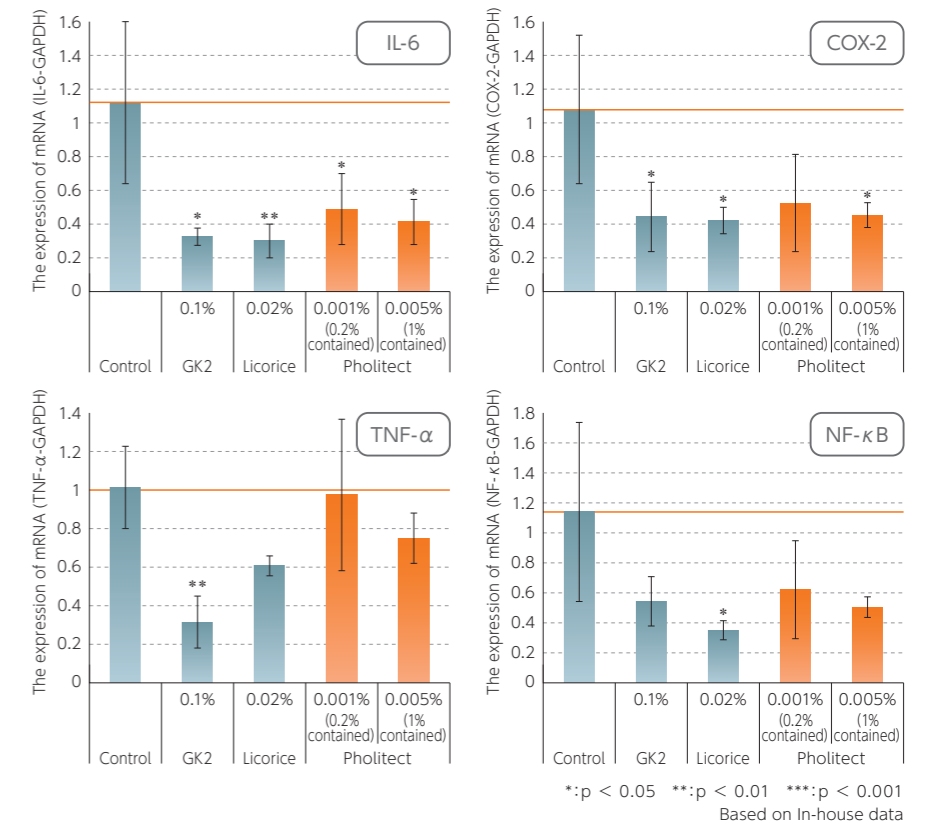
#### The effect of suppressing the generation of NO



Based on In-house data

Pholitect showed an anti-inflammatory effect equal to dipotassium glycyrrhizinate (GK2) and Chinese licorice extract even when the amount contained was 1/100 and 1/2 respectively.

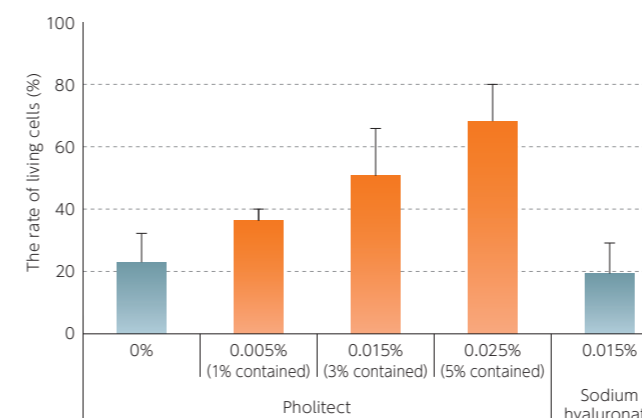
#### The effect suppressing the generation of inflammatory cytokine



\*\*p < 0.05 \*\*\*p < 0.01 \*\*\*\*p < 0.001  
Based on In-house data

### Protection from external stimuli (alleviation of the stimulation of activators)

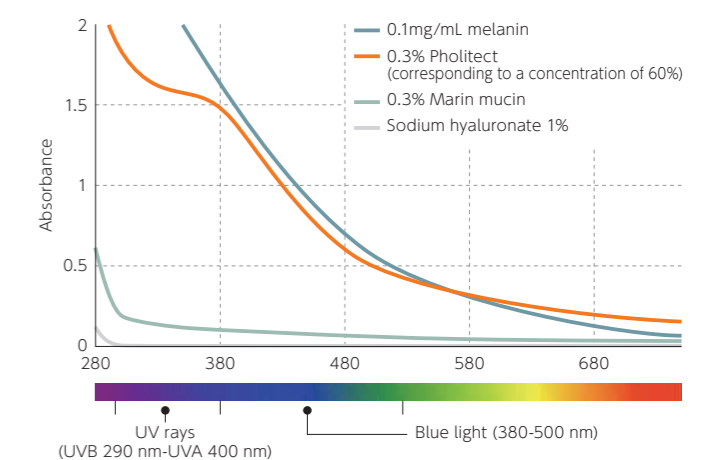
- Samples were applied to artificial skin after being mixed with SDS for cultivation.
- Cells were incubated after samples were washed away.
- The rate of living cells was measured using MTT assay. (n=3)



Pholitect showed an effect lessening stimuli in a concentration-dependent manner. Pholitect is expected to protect the skin from external stimuli when used at a concentration of 1% or greater.

Based on In-house data

### UV rays/blue light (anti-photoaging measures)



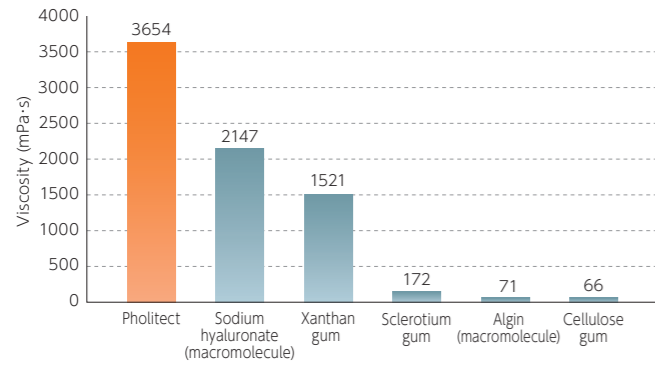
Uniquely, Pholitect has the ability to absorb a broad range of spectra (UV rays, blue light, and near-infrared light). It is expected to protect the skin from light like melanin (a pseudo-melanin shield effect). Pholitect will moisturize the skin, protect it from external stimuli, and protect it from the sun at the same time.

Based on In-house data

# Characteristics of base material

## Viscosity and thickening action

The viscosity of aqueous solutions containing 0.5% solid content was determined.



	Serum		Cream		Cleanser	
	Control	containing Pholitect	Control	containing Pholitect	Control	containing Pholitect
Viscosity	5.1 mpa·s	8.3 mpa·s	59.0 mpa·s	101.8 mpa·s	22.0 mpa·s	28.0 mpa·s

Pholitect has higher viscosity than sodium hyaluronate and other macromolecules. It has a unique spinnability that cannot be found in other macromolecules. Pholitect is expected to provide a thickening action when used in serum, cream, or face wash. Based on In-house data

## The effect of improving feel

Characteristics from feeling in use	Non-sticky	Thick
	Seems to form a film like an oil. Easy to penetrate the skin	

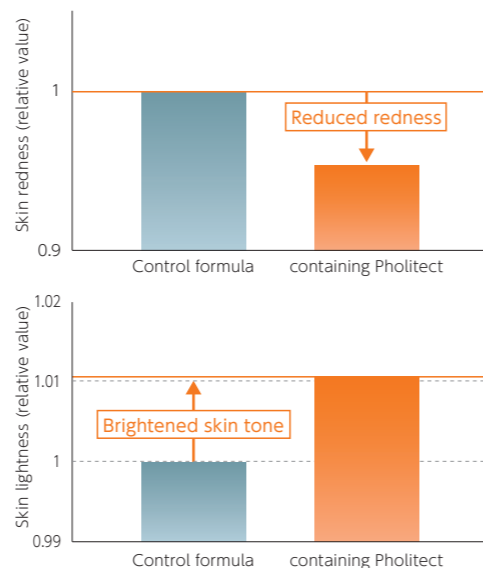


If a product contains 1% Pholitect, it is expected to facilitate the cream's spreading, penetration, and transparency and its smooth, bouncy and moist texture.

\*With cooperation of: General Cosmetics Course, Tokyo College of Medico-pharmaco Technology Based on In-house data

## Makeup effects

A BB cream containing 7% Pholitect was prepared and applied to pieces of polyurethane with artificially produced dark spots. Then, redness and brightness were determined (n=3).



When Pholitect was used in a BB cream, skin redness was concealed better, and skin tone was brightened. Pholitect enables a natural color control.

\*With cooperation of: Cosmetics Development Course, Tokyo College of Biotechnology Based on In-house data

## Coloring and temperature stability

Concentration of solid content	0%	0.0025%	0.005%	0.015%	0.025%	0.05%	0.5%
Amount of Pholitect contained	Distilled water	0.5%	1%	3%	5%	10%	100%

The concentration for observable coloring was 1% or more for clear solutions and 3% for white cream base materials. Based on In-house data

## Compatibility

Aqueous solutions containing Pholitect and each cosmetic raw material were mixed at the ratio of 1 to 1. Observed appearance immediately after mixing, 2 weeks and 4 weeks after storage at room temperature.

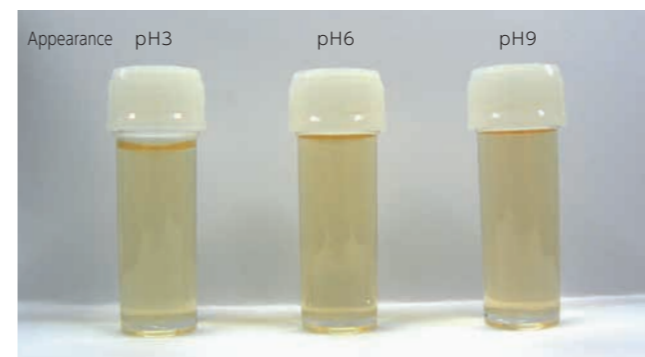
(The final concentration of Pholitect: 0.05%; equivalent to a concentration of 10%)

Raw material (final concentration)	Immediately after mixing	2 weeks later	4 weeks later
0.2% sodium hyaluronate	○	○	○
10% glycerin	○	○	○
0.1% algin	○	○	○
0.1% xanthan gum	○	○	○
5% ethanol	○	○	○
30% butylene glycol	○	○	○
5% pentylene glycol	○	○	○
30% propanediol	○	○	○

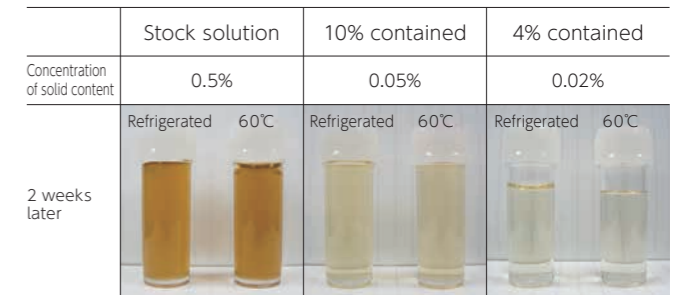
Based on In-house data

## Hydrogen ion concentration and physical properties

**Color tone** An aqueous solution of Pholitect (an aqueous solution containing 10% Pholitect) was prepared in a way to make the hydrogen ion concentration a pH of 3, 6, or 9, and color tone was measured.



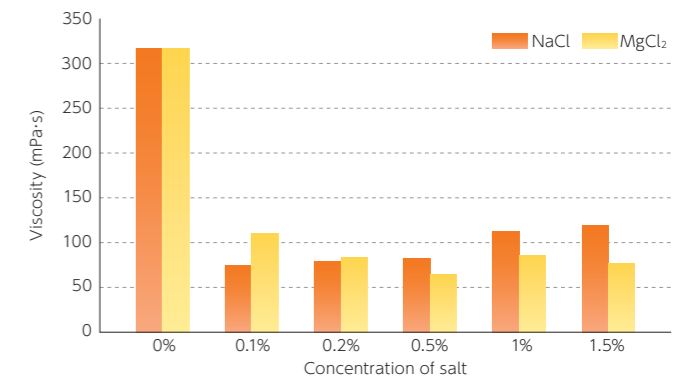
With a pH of 9, redness tended to become slightly more intense. If the concentration was 10% or less, there was no great difference in the appearance regardless of the hydrogen ion concentration. Based on In-house data



Thermal stability is high. The color tone and viscosity will not be changed by heating. Based on In-house data

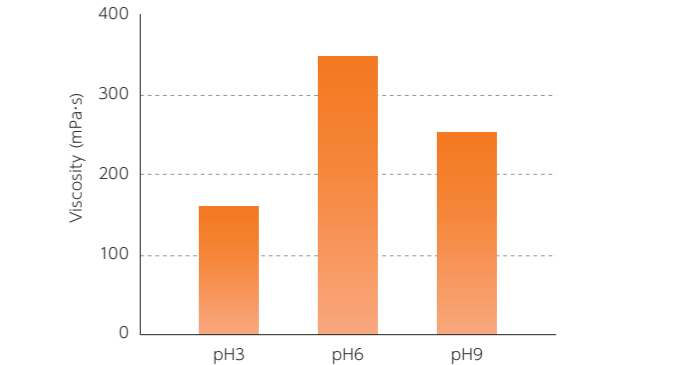
## Salt and physical properties

Salt was added to an aqueous solution of Pholitect (an aqueous solution containing 20% Pholitect), and viscosity was measured.



Viscosity tended to decrease when salt was added. Based on In-house data

**Viscosity** An aqueous solution of Pholitect (an aqueous solution containing 20% Pholitect) was prepared in a way to make the hydrogen ion concentration a pH of 3, 6, or 9, and viscosity was measured.



Viscosity reached its peak around a neutral pH. Temperature did not affect viscosity. (Viscosity will rise when refrigerated if the product contains butylene glycol, a preservative agent.) Based on In-house data