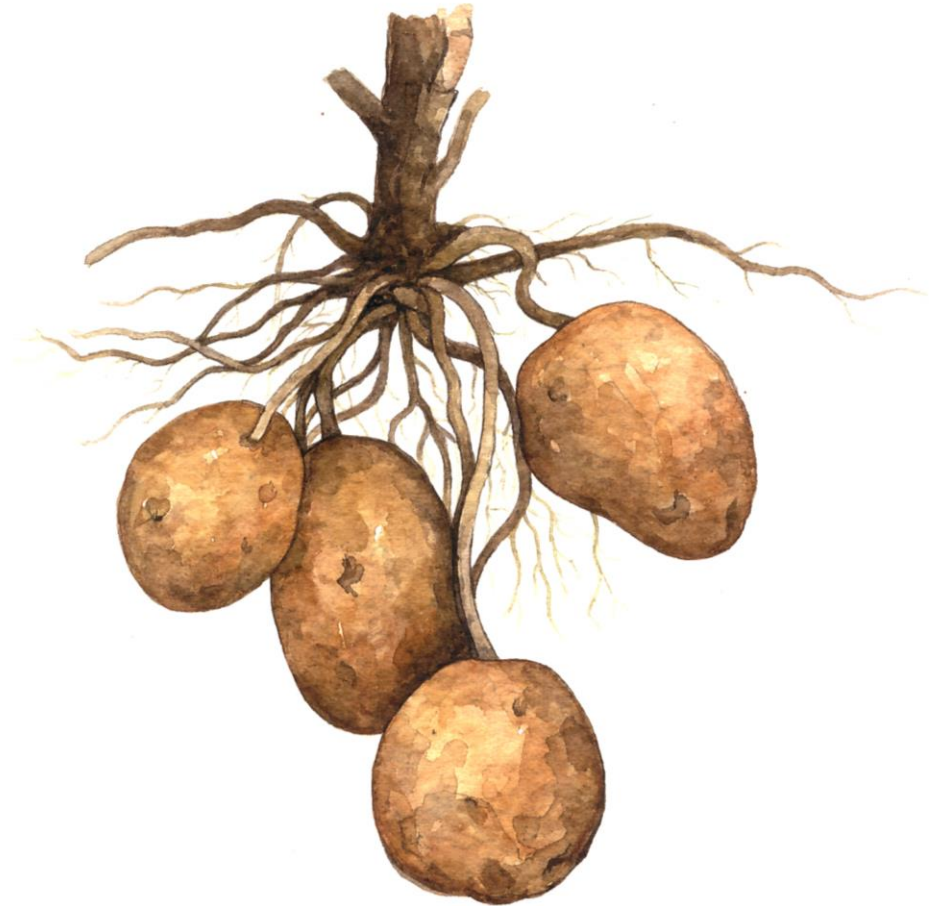


Product for anti-oxidant, skin hydration effects

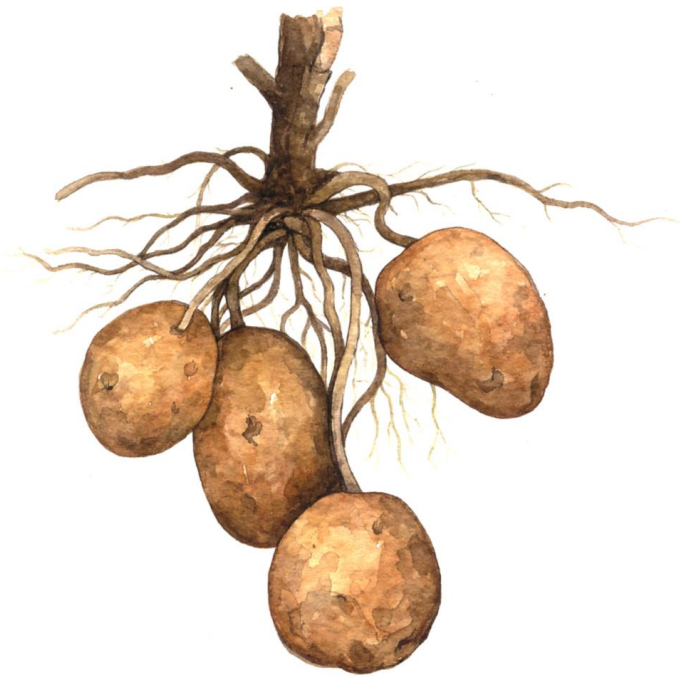
PotatoFerm

the garden of
naturalsolution
www.naturalsolution.co.kr



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Plant Story



Solanum tuberosum, commonly called potato, is a tuberous perennial crop, a member of the nightshade family. The potato was a staple food for the Inca Empire in the Andes, and was introduced to Europe by the Spanish in the second half of the 16th century. The spread into Europe, and the lower altitudes, lead to other species of potatoes being developed. Today potatoes are cultivated throughout the world.

Plant Story

The potato contains abundant starch, vitamin B6 and C. It is popular not only as a food, but also as skin care ingredient. Mashed potato mixed with flour and honey is traditionally used as a face mask. It is used on sunburn skin for the soothing effect and the high levels of vitamin C provides skin brightening and anti-oxidant effect.

There have not been many scientific studies on the relationship between skin care and the potato, however the many examples of using potato on skin suggest it may have potential as a cosmetic ingredient.

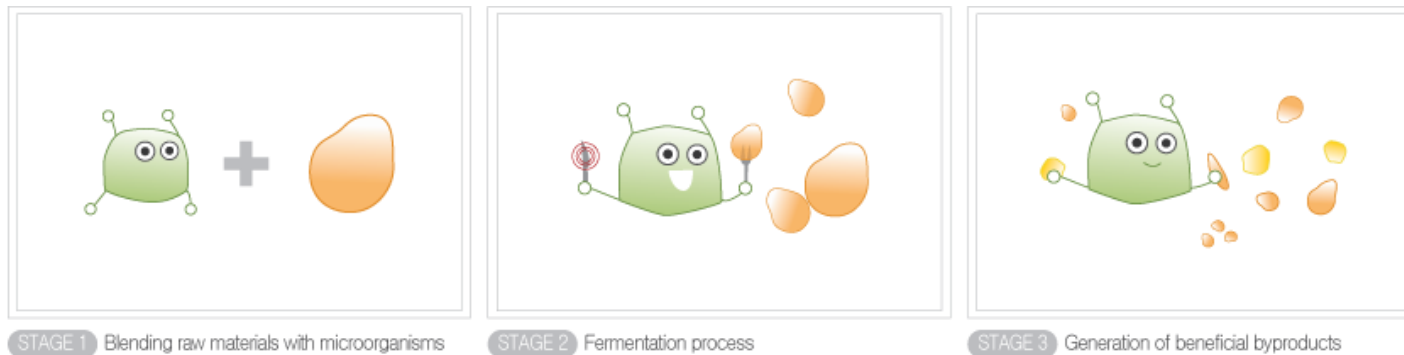


Home remedy: soothe burns

Potato has been known to work well to treat sunburns. It is excellent for drawing out the heat with very high content of water (over 80%). There are some home care remedies. Slice cold potato and place it on the affected areas. Leave them on for about 20 minutes and remove. You can also dab potato juice on the spot. Doing so gives you a cooling sensation and even diminishes your suntan.



Fermentation Process



Fermentation is a conversional process of organic compounds such as carbohydrates using various microorganisms. Solid fermentation using microorganisms is generally used and well-accepted process for food and for herbal medicine in Korea since the ferment exhibits better bioavailability. The properties and the components of raw materials are changed during the fermentation process.

in vitro Efficacy Evaluation

❖ Anti-oxidant Effect

ROS (Reactive Oxygen Species) Scavenging Ability

❖ Skin Hydration Effect

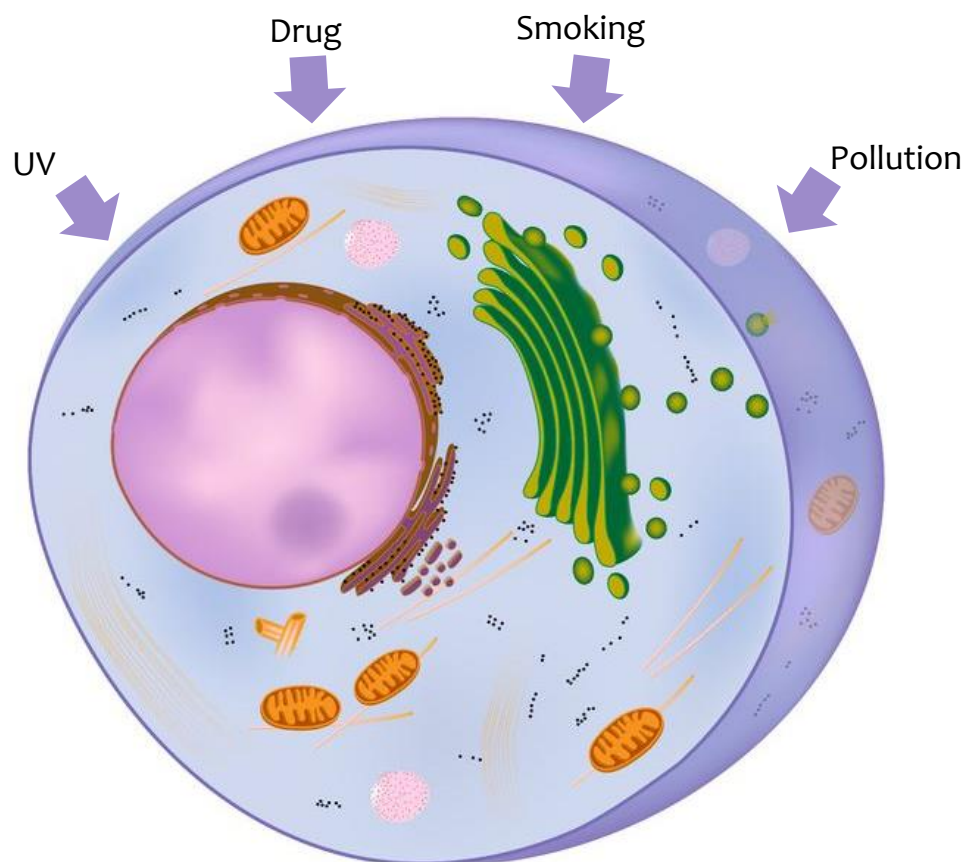
Real Time-PCR(HAS-2, AQP-3 and COL1A1)

Clinical Study



Oxidative Stress

Reactive Oxygen Species (ROS) can be increased by



Intracellular ROS may induce

- DNA damage
- Lipid peroxidation
- Amino acid oxidation: protein damage
- Oxidation of co-factors: enzyme inactivation
- Chronic inflammation

ROS

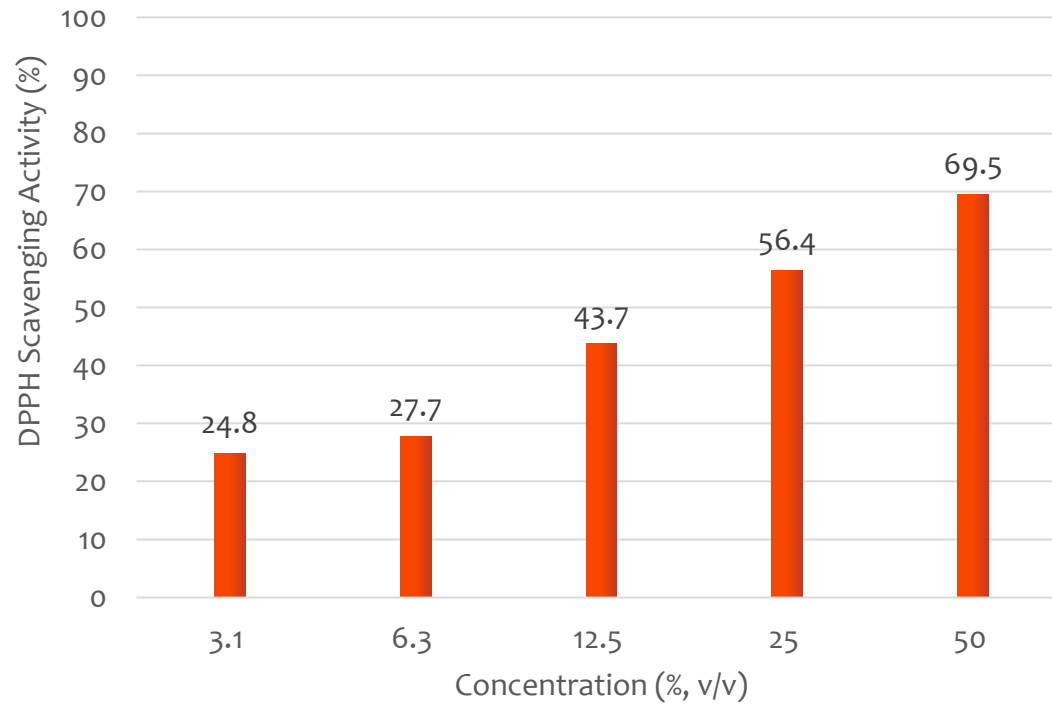


Skin Aging

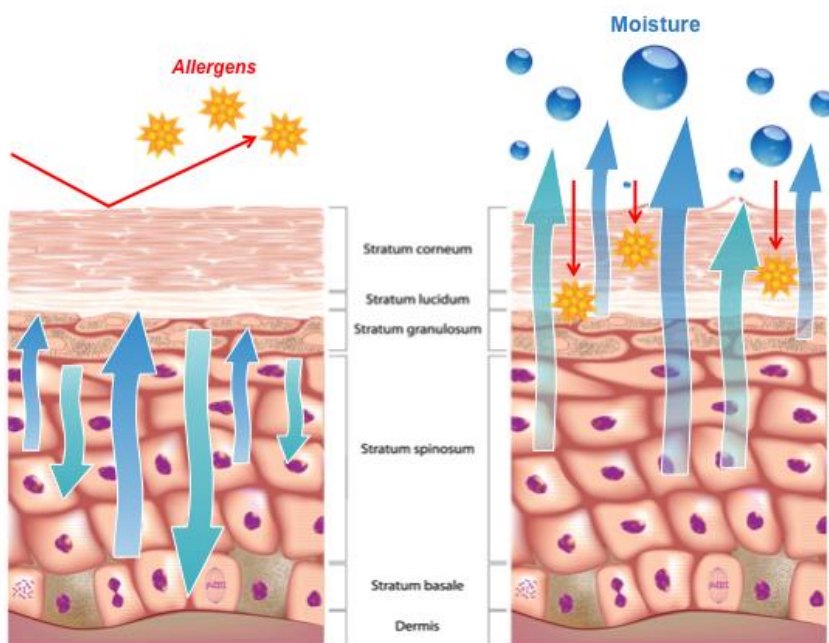
Inflammation

in vitro Efficacy Evaluation: Anti-oxidant Activity

•• DPPH Scavenging Activity



Water and Skin



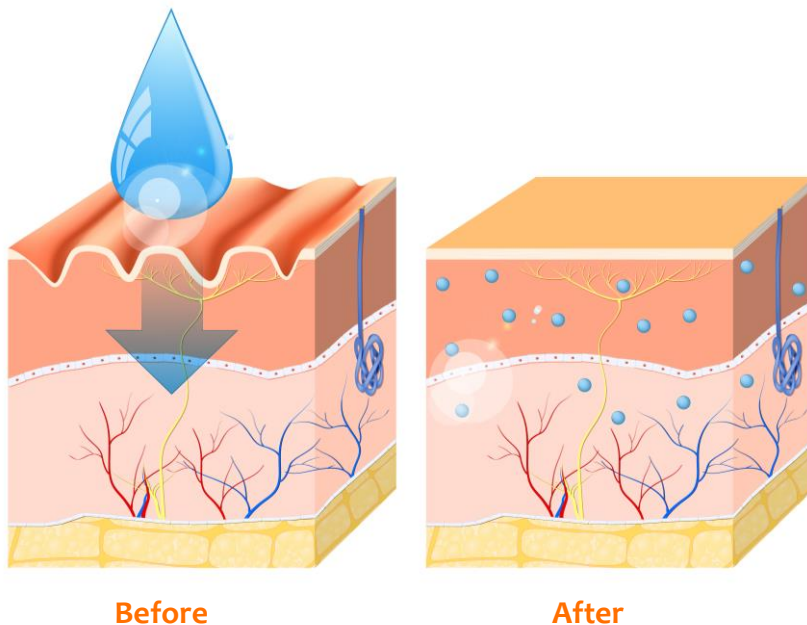
Normal Skin

Dry & Damaged Skin

Water is absolutely essential for the normal functioning of the skin and especially its outer layer, the stratum corneum. Adequate skin hydration is critical for maintaining healthy skin, and moisturizers are an important component of basic skin care. The ability of the skin to hold water is primarily related to the stratum corneum which plays the role of barrier to water loss.

Hyaluronic Acid Synthase-2

🍷 Hyaluronic Acid in skin

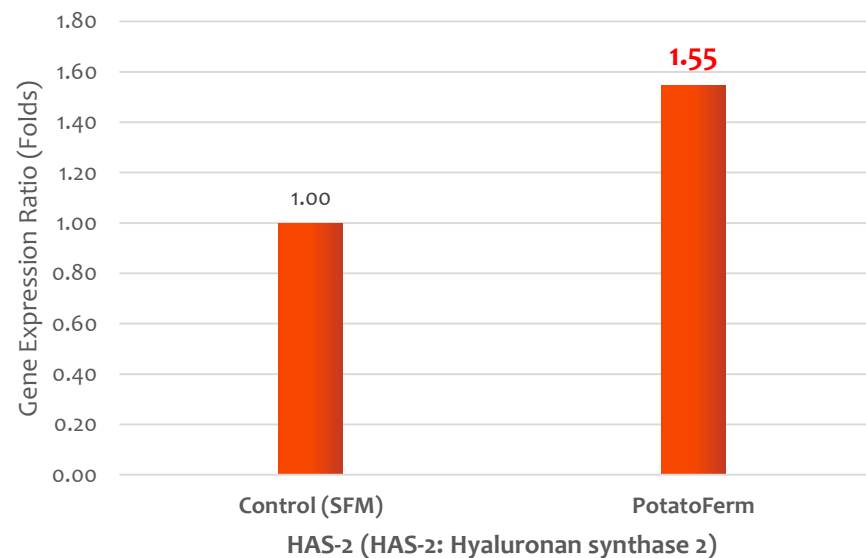


Hyaluronic acid holds water molecules more than any other natural substance—up to 1,000 times of its weight. Topically applied Hyaluronic acid transforms the dermis layer of your skin into a super-sponge holding moisture within the extracellular matrix. It does not only hydrate the skin, but also increases skin density.

Hyaluronic acid is synthesized by a class of integral membrane proteins called hyaluronan synthases. **Hyaluronan Synthase-2** is an enzyme that is encoded by the HAS2 gene in humans.

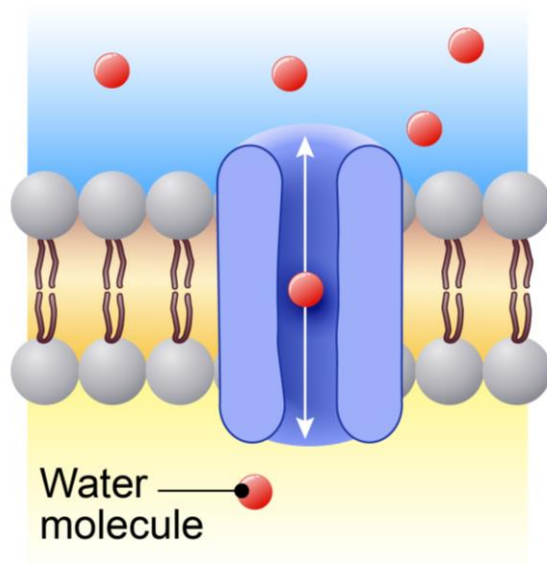
Real Time-PCR: Skin Hydration Related Gene Expressions

•• HAS-2(Hyaluronan Synthase-2)



Aquaporin-3

⦿ Water Molecule Transporter

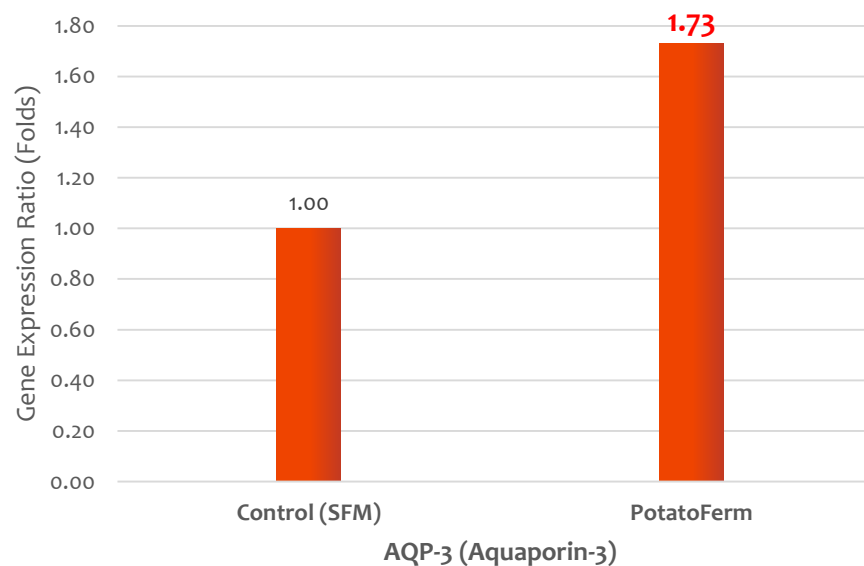


Aquaporins (AQPs) are a family of water channels that transport water and small molecules for the maintenance of fluid homeostasis. Thirteen AQP family members have been identified in humans (AQP0-12).

Aquaporin 3 (AQP3) is an aquaglyceroporin that transports water and glycerol and is expressed in the epidermis, among other epithelial tissues. It is thought that AQP3 plays a key role in skin hydration. AQP3 levels have been found to be altered in human skin diseases.

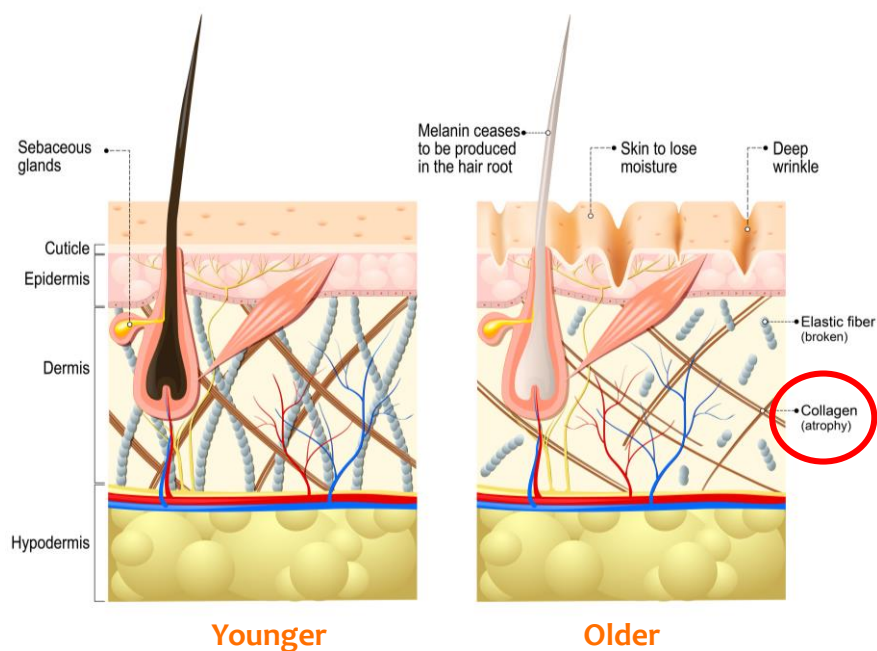
Real Time-PCR: Skin Hydration Related Gene Expressions

🍌 AQP-3(Aquaporin-3)



Collagen type I, alpha 1

🔗 Younger and older skin

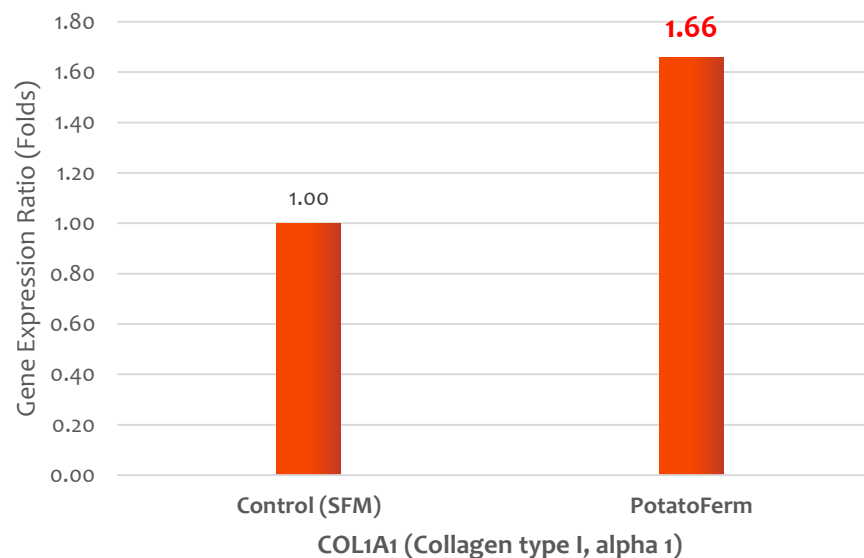


Collagens are a family of proteins that strengthen and support many tissues in the body, including cartilage, bone, tendon, skin, and the white part of the eye (the sclera). Collagen is used to increase skin hydration and skin elasticity.

Type I collagen is the most abundant form of collagen in the human body. **COL1A1** gene provides instructions for making part of a large molecule called type I collagen.

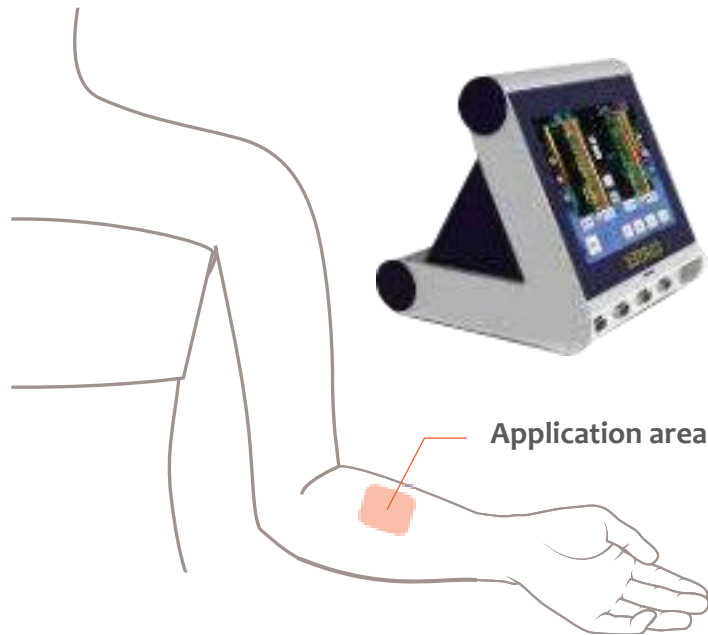
Real Time-PCR: Skin Hydration Related Gene Expressions

COL1A1(Collagen Type 1, Alpha 1)



in vivo Evaluation: Skin Hydration

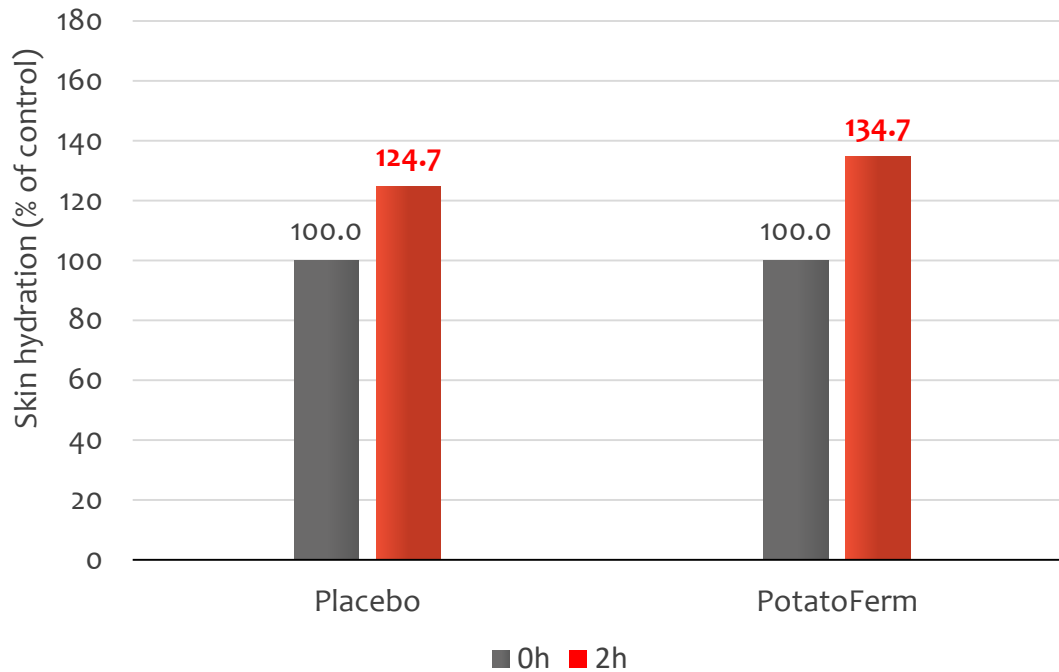
🔬 Clinical Study



- **Target Site:** Forearm
- **Subjects:** 6 volunteers, aged between 25 to 50 years old
- **Test Item:** 5% PotatoFerm containing cream, Placebo cream
- **Application:** 100µl of 5% PotatoFerm cream and placebo cream
- **Application Area:** 4 cm²/site (2 cm * 2 cm)
- **Measurements:** 0, 2 hours after application
- **Test Instrument:** Skin-O-mat (Cosmomed, Germany)

in vivo Evaluation: Skin Hydration

🍌 Clinical Study



As a result, topical application of **PotatoFerm** has effect on skin hydration of **10.0%** compared to placebo.

Product Information

- ⦿ **Product Name:** PotatoFerm-HP
- ⦿ **INCI Name:** Saccharomyces/Potato Extract Ferment Filtrate
- ⦿ **Dosage:** 1 – 100% (can be used as the replacement of water)
- ⦿ **Formulation:** Add to the formulation when the temperature is lower than 55°C.
Recommended to add after the cooling process.
- ⦿ **Storage:** Avoid direct light or UV.
Keep it in a dry area at room temperature.

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