

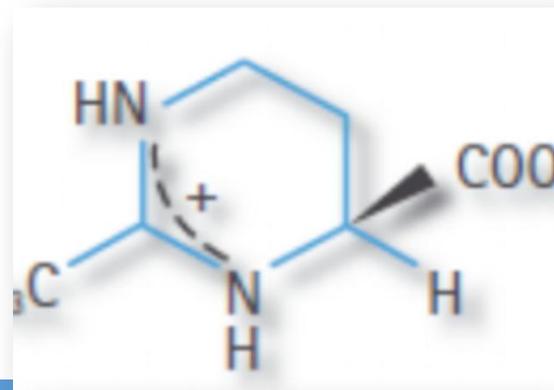
PROTECT

In 1985, Ectoin was found in the salt lake of natron Valley (desert of Egypt).
In the extreme conditions of high salt, high temperature and high ultraviolet radiation, Ectoin can protect halophilic bacteria from damage.

ECTOIN

Small ring amino acid derivatives
C A S: 96702-03-3

Ectoin



Physical and chemical properties

- **Appearance:** almost white ,granular crystal or crystalline powder
- **Assay (HPLC):** ≥98%
- **Molar mass:** 142.16 g/mol
- **pH:** 6.0 ~ 8.0
- **Level of use:** 0.2%—2%
- **Shelf life:** 2 years
- **Storage conditions:** Dry, room temperature, seal up



ECTOIN



Repairing assistant



Inflammation
resistance



Cell protection



Long-acting moisture
retention and anti-
ageing

ECTOIN

◁ Repairing assistant ▷

Repair efficacy test

Sample	Test	Concentration in Formula	Result	Efficacy assessment
Rehmanniae Radix Praeparata Extract	Repairable rate	-	15% ($p < 0.05$)	Significant
 ECTOIN		5%	16% ($p = 0.0046$)	Significant
		1%	16% ($p = 0.0024$)	Significant
		0.20%	16% ($p = 0.0073$)	Significant

Testing time: August 17, 2021

Testee: Zebrafish embryo with tail fin amputated.

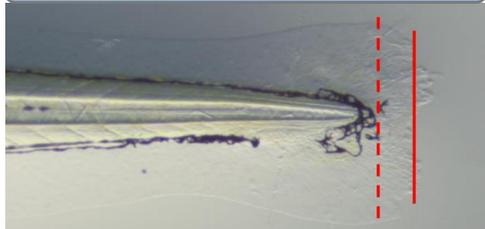
Test principle: The main steps and principles of zebrafish and human wound healing are exactly the same.

Test method: The repair efficiency of the sample was evaluated by measuring and calculating the promotion rate of the test sample on the regeneration of the zebrafish embryo's caudal fin.

The test results show that ECTOIN has a significant repairing effect at the three formulation concentrations.

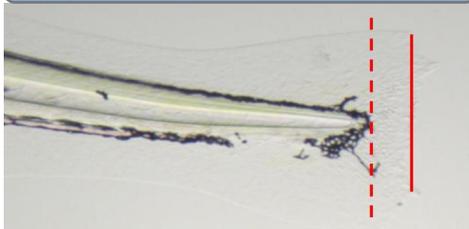


Blank control: Normal zebrafish embryo



0% Healing rate

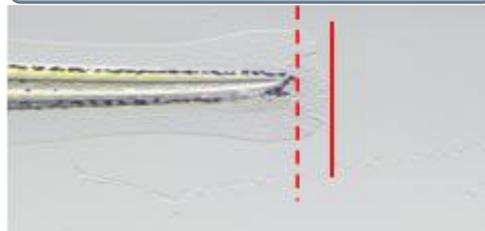
Positive control: Rehmanniae radix praeeparata extract



Significantly repaired
15% Healing rate

* The red dotted line to the solid line in the figure is the repair area

Test sample: Products containing 5%Ectoin



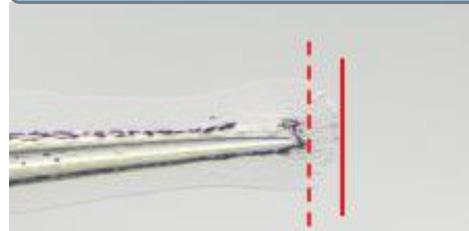
Significantly repaired
16% Healing rate

Test sample: Products containing 1%Ectoin



Significantly repaired
16% Healing rate

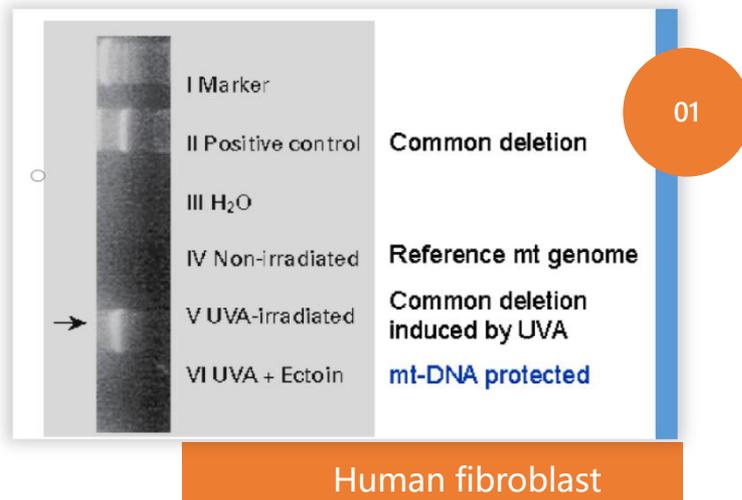
Test sample: Products containing 0.2%Ectoin



Significantly repaired
16% Healing rate



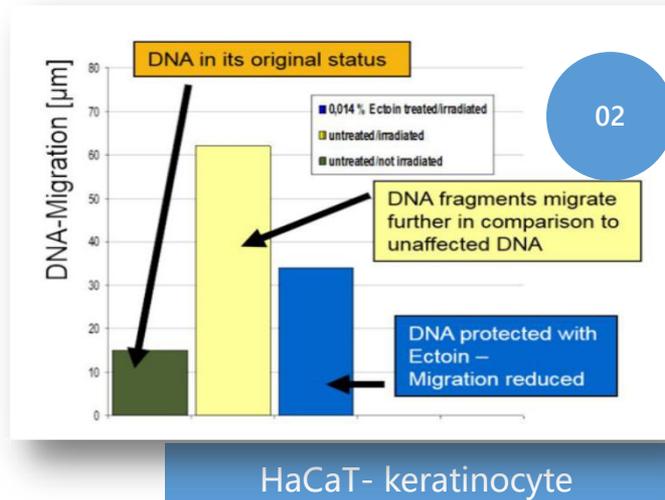
UVA repairing assistant



1mM of Ectoin is used to fulfill 24-hour pre-treatment of cells
The cells are exposed to UVA (8 J/cm²) for three times a day,
which lasts for 12 days in total.

- 01** > UVA can induce the emergence of "Common Deletion", a marker of mitochondrial DNA mutation; and, 1mM of Ectoin is enough to completely inhibit the UVA-induced mitochondrial DNA mutation.

As proven by experiments



1mM(0.014%)Ectoin

24h pretreatment of cells by Ectoin Cells exposed to UVA (5 J/cm²)



ECTOIN

◁ Inflammation resistance ▷

	IL-1 α	IL-6	IL-8	TNF- α	I κ B- α
Untreated	++	-	+	-	++
Pre-treated with Ectoin	++	-	+	-	++
Untreated, + LPS	+++	+++	+++	+	-
Pre-treated with Ectoin, + LPS	++	+	+	-	++

Keratinocyte

02

- 24-hour pre-treatment with 100 μ g/ml Ectoin
- 24-hour cell treatment with 10 μ g/ml LPS (from *Pseudomonas aeruginosa*)

By effectively inhibiting I κ B- α degradation and expressions of relevant inflammatory factors, it can suppress inflammatory responses induced by LPS.





Day 1



Day 7



Day 14

Relieve acne symptoms

1% Ectoin solution was sprayed three times a day (morning, noon and evening) to relieve the symptoms in two weeks.



Antihistamine test

1% Ectoin solution was applied on the right arm for pretreatment, and 5% histamine hydrochloride solution was sprayed on the left and right arms 1 min later. It was found that Ectoin can protect cell and prevent redness and itching induced by histamine.

Anti-inflammatory Test

Sample	Test	Concentration in Formula	Result	Efficacy assessment
 ECTOIN	Anti-inflammatory	1%	21% ($p = 0.036$)	Significant
Portulaca Oleracea Extract		-	30%	Significant

Testing time: August 17, 2021

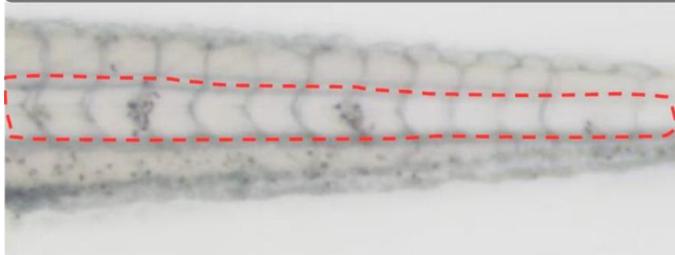
Testee: Zebrafish inflammatory embryo model

Test principle: The inflammatory response in humans and zebrafish occurs through the rapid accumulation of inflammatory cells. The anti-inflammatory effect can be achieved by effectively inhibiting the aggregation of inflammatory cells.

Test method: The anti-inflammatory effect of the sample was evaluated by measuring and calculating the inhibitory rate of the test sample on the inflammatory cells in the hematopoietic tissue of the zebrafish embryo caudal side.

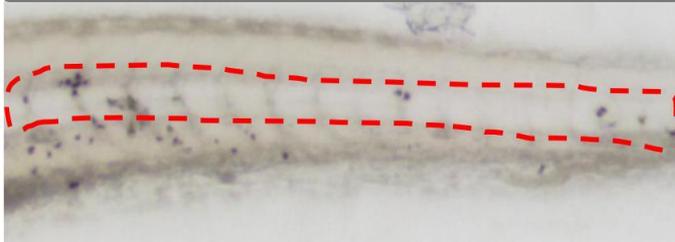


Blank control: Normal zebrafish embryo



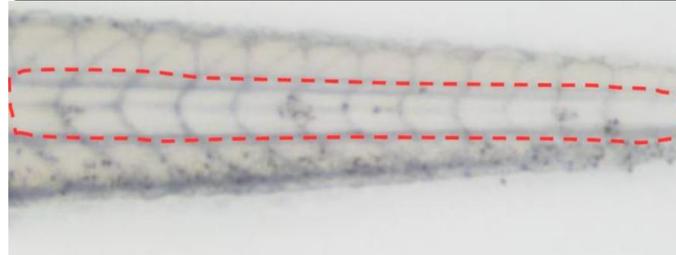
0% inflammatory cell suppression rate

Test sample: Products containing 1% Ectoin



Significant anti-inflammatory effect
(21% inflammatory cell suppression rate)

Positive contrast: Portulaca Oleracea Extract



Significant anti-inflammatory effect
(30% inflammatory cell suppression rate)

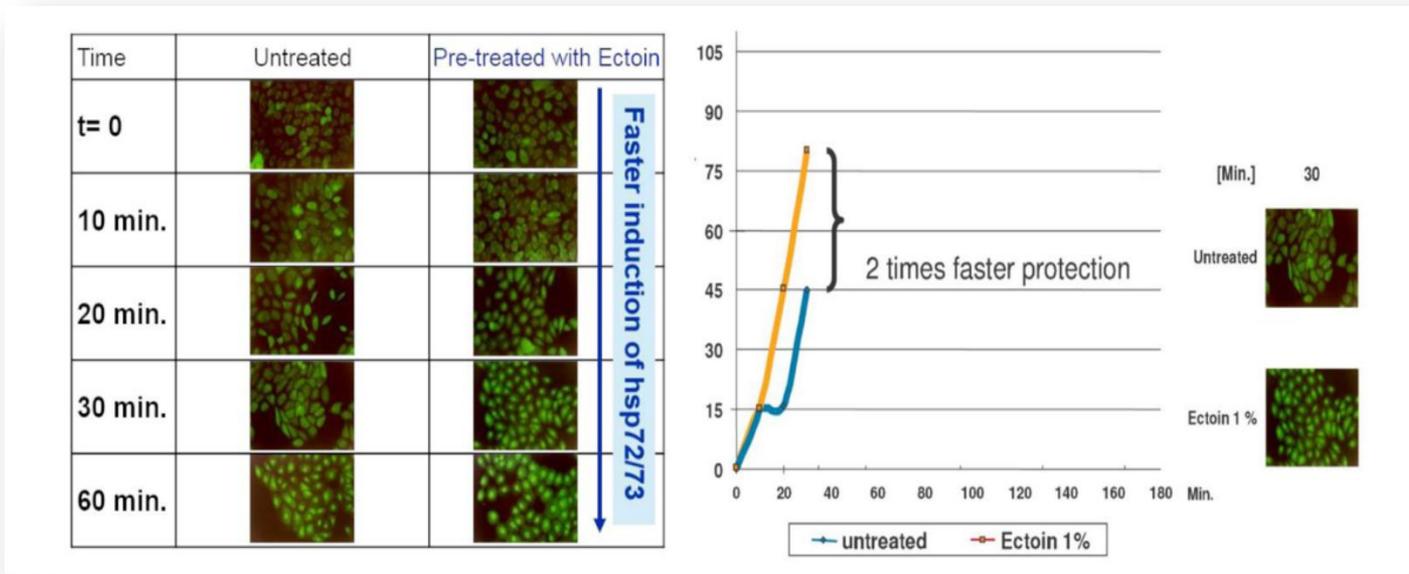
* Dark spots are stained inflammatory cells.



ECTOIN

◁ Cell Protection ▷

Ectoin' s thermal/environmental protection over cells

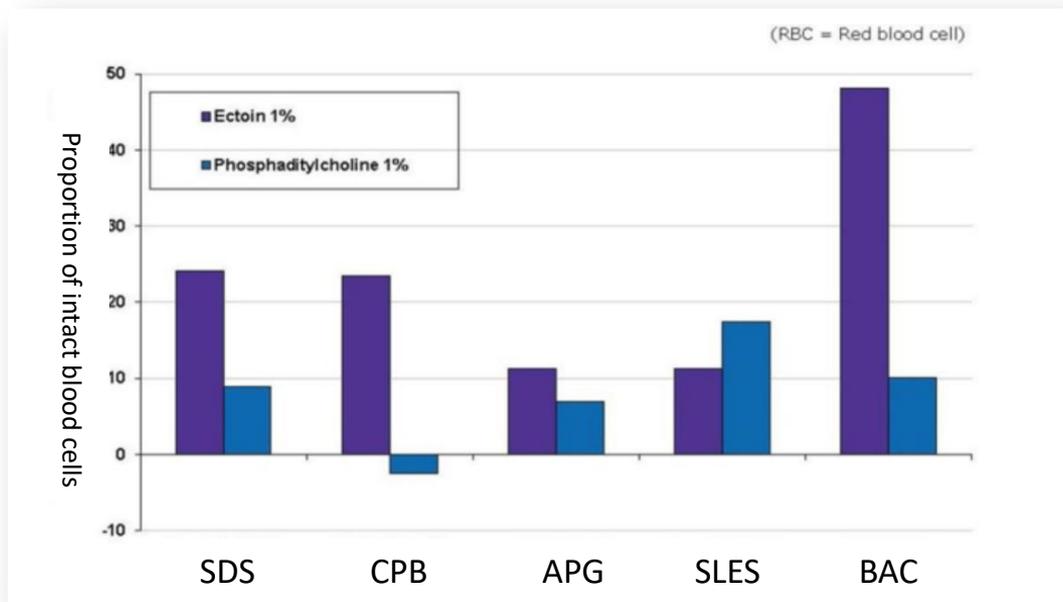


As proven by experiments

01 In comparison with untreated keratinocyte, those treated with 1% Ectoin undergo a heat shock at 44 °C; after that, their reaction velocity towards heat stress and expression rate of heat shock protein hsp72/73 are improved by 2-3 times.



Protect cells from damages caused by surface active agents



Sodium Dodecyl Sulfonate (SDS)
 Cocoyl Propyl Betaine (CPB)
 Alkyl polyglucoside (APG)
 Sodium Lauryl Ether Sulfonate (SLES)
 Benzalkonium chloride (BAC)

As proven by experiments

As demonstrated by experiments, ectoine performs better than lecithin as far as their protection over cytomembrane is concerned. In addition, ectoine can significantly improve cytomembrane stability under stress in a condition of different surface active agents, so as to prevent RBC pyrolysis.



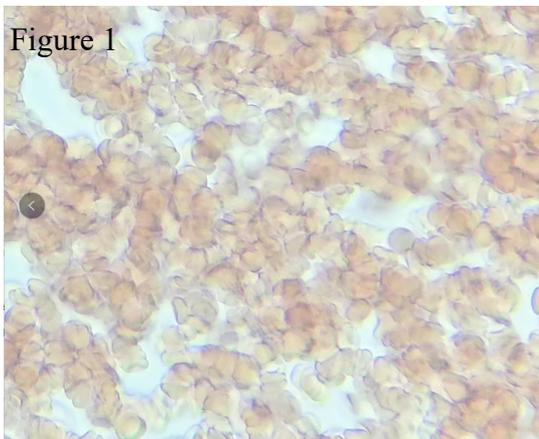


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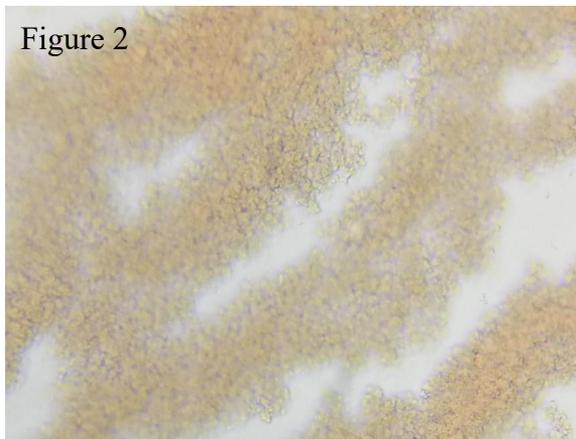
How to protect skin from alcohol

During the COVID-19. Busy in an isolation ward everyday, a 22-year-old nurse of the infectious disease department must bear rubber gloves and disinfect hands with 75% ethyl alcohol. In this case, repeated erosion of 75% ethyl alcohol sanitizer leads to serious skin injuries of hands.

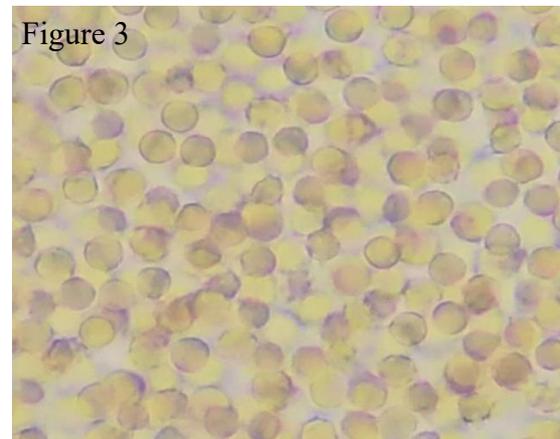
Experiment: How does Ectoin protect human erythrocyte under actions of 75% ethyl alcohol



Normal human erythrocyte



1-min treatment of human erythrocyte with 75% ethyl alcohol



1-minute pre-treatment of human erythrocyte with 75% ethyl alcohol +1% ect

As proven by experiments

- 75% ethyl alcohol does great harms to cells. In 1 minute after addition of it, cytomembrane lysis can be found in most erythrocytes (with normal saline added). Due to dehydration and coagulation effects of ethyl alcohol, as shown in Figure 2, nearly no morphologically intact cells are observed as far as relevant proteins are concerned.
- 1% Ectoin is selected to perform RBC pre-treatment; after addition of 75% ethyl alcohol and 1 minute of still standing, it can be observed that a few cells rupture and dissolve; in most cases, an intact cell membrane structure is shown. Thanks to barrier protection of Ectoin over cells, ethyl alcohol without exposure to cytomembranes also fails to dissolve them. In addition, extensive protein denaturation (see Figure 2) does not occur, because Ectoin plays an outstanding role on protecting proteins.

UVB protection

Participants: Six healthy volunteers aged 31-56, the skin color ITA°value of the test part is 20°~41°

Testing time: March 17, 2021

Experimental Materials:

Test sample: Products containing 4%Ectoin

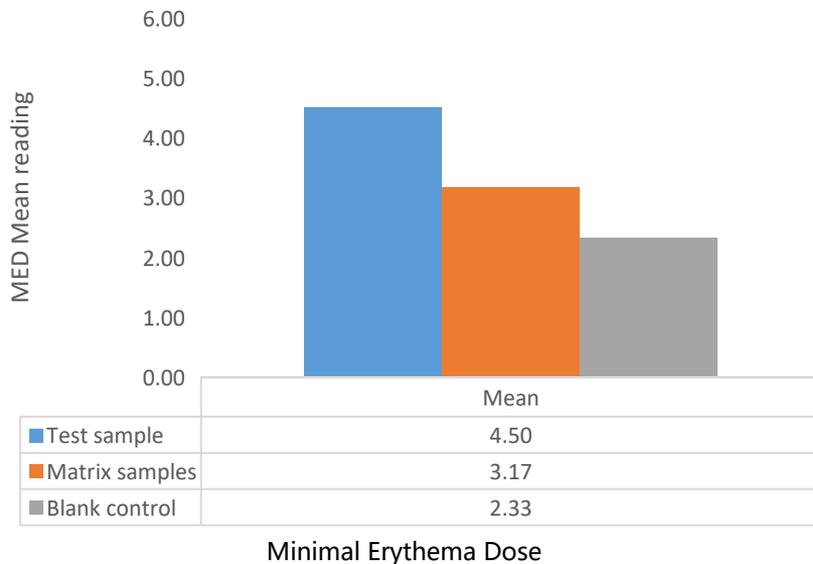
Matrix samples: Products without Ectoin

Blank control: Did not be disposed

MED: Refers to the UV exposure time required to produce the weakest erythema seen by the naked eye.

The larger the value of MED, the more ultraviolet energy or irradiation time required to cause the minimum amount of erythema on the skin, and the less susceptible the skin is to damage.

After applying ECTOIN, the exposure time required for the skin to appear the smallest amount of erythema is significantly increased compared to the matrix sample and the blank control.



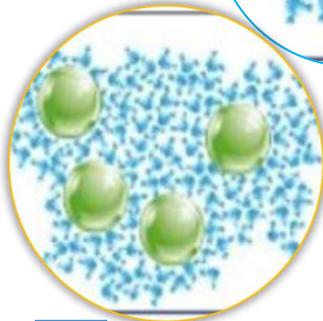
It shows that Ectoin protects the skin for the longest time under UV irradiation.



ECTOIN

◁ Long-acting moisture retention ▷
and anti-ageing

1

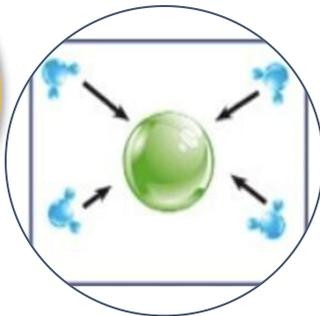


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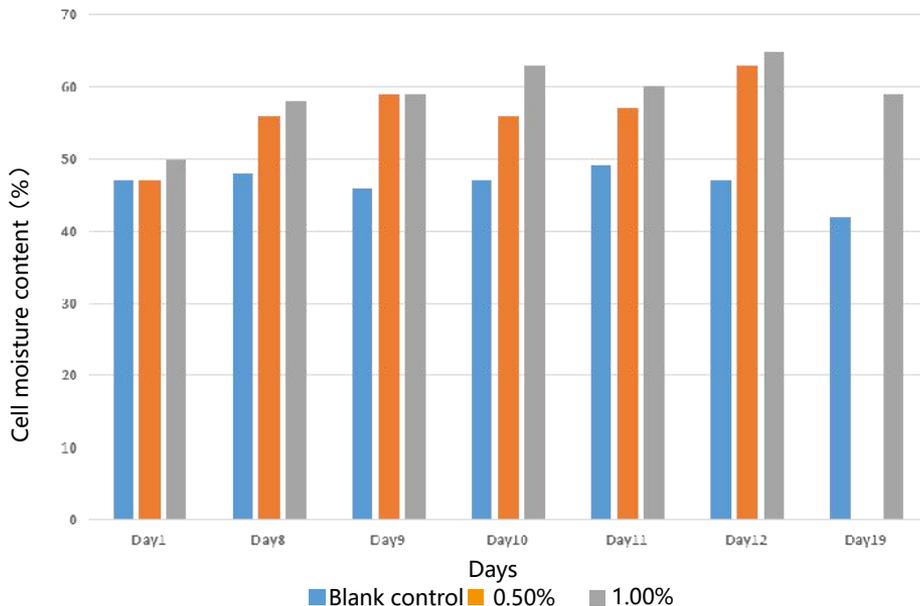
1 mol of Ectoin can bind 4 or 5 mol of water and protect DNA from damage. It has been used as a protective solution for organ transplantation in the medical field.

As a kind of amino acid derivative, Ectoin falls into the category of Extremolytes. Such extremolytes are small molecules with a protective function of anti-pressure. They can protect extremophiles and plants from fatal or extreme environments in their habitats, such as salt lakes, hot-springs, permanent ice and desert. It is proven by several clinical and in vivo studies that Ectoin is featured with definite anti-ageing and excellent cell protection characteristics.

2



Due to the existence of protective shell, stress factors can no longer damage cells, by building a strong protective layer composed of water molecules in the skin.



- Cosmetics that contains 0% (for control), 0.5% and 1% Ectoin (2mg/cm²) was utilized.
- It was applied on forearm skins at the volar side of 5 volunteers twice a day, which lasts for 12 days. From Day 8 to 12 (A), skin hydration was measured by Corneometry.
- Then, the application of cosmetics stopped for 7 days. This experiment was completed on Day 19. At last, the hydration (B) was measured.

Long-acting water retention

keeping the skin soft, well-moisturized and shining

Excellent effect of Ectoin is emphasized by relevant research findings. After 8 days of application, its hydration significantly increases to 200%, compared with that of the skin treated with placebo; moreover, such a situation remains unchanged until the end of the experiment. Although local application stops on Day 12, the actual hydration status lasts about 7 days. Clearly, Ectoin shows an apparent effect of long-acting moisture retention.

ECTOIN

◁ Reduce melanin, whiten ▷

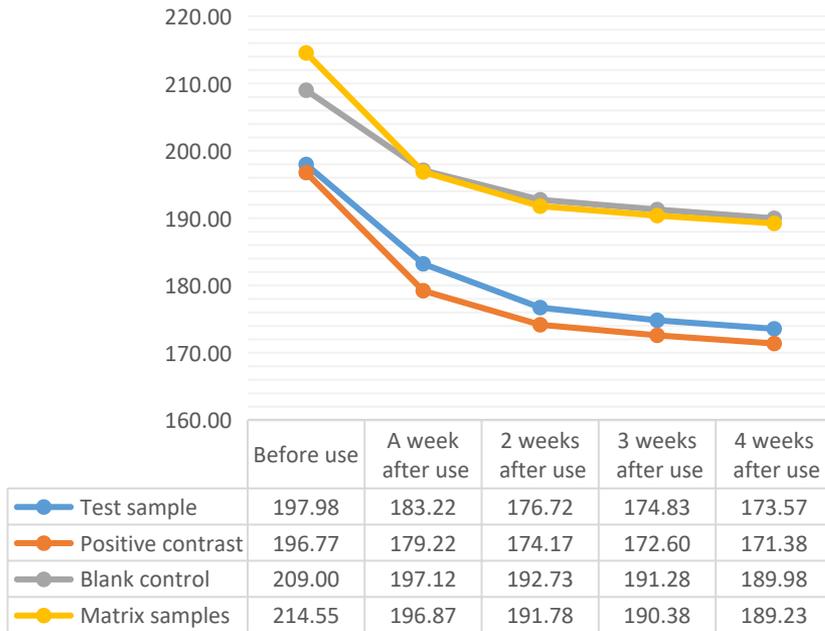
Whitening efficacy

Participants: Six healthy volunteers aged 31-56, the skin color ITA°value of the test part is 20°~41°
Testing time: March 17, 2021

Experimental Materials:

Test sample: Products containing 4%Ectoin
 Positive contrast: Products containing 7% vitamin C
 Blank control: Did not be disposed
 Matrix samples: Products without Ectoin

Skin melanin content



Skin Melanin Content

ECTOIN can effectively reduce melanin in skin, achieve whitening and brighten skin color.



Ectoin in daily protective lotion

Brand: DAISY SKY

- Efficacy planning: Improve dull yellow, improve dull and heavy make-up before dressing skin tone
- Ectoin addition: 1.6%





Ectoin Moisturizing Cream



Brand: Saville&Quinn

Efficacy planning: Repairing, rejuvenating, improving wrinkles and yellowing

Brand: Haa

Ect high moisturizing cream

Efficacy planning: Repair, improve dull yellow, anti sensitive, improve relaxation, moisturize skin



Water cream essence

Brand: Saville&Quinn

Efficacy: Hydrating and moisturizing



Ectoin Eye cream

Brand: JUNPING

Efficacy: Hydrating and moisturizing 、 Remove dark circles

Ectoin addition: 1.6%





Ectoin Repair moisturizing essence



Ectoin Essence

Cazador

- Improve fine lines, improve dullness, moisturize

Ectoin Essence

- Repair and soothe skin, balance water and oil

Ectoin Essence of repair

- Moisturizing and repairing



01. Quality

Strict quality system, high purity and good quality



02. Technology

From the patent technology of Chinese Academy of Sciences; microbial synthesis, environment-friendly



03. Cost

Competitive cost performance



04. Support

Quick response, technical endorsement, formula optimization, solution

Advantage

SiYOMiCRO
中科欣扬