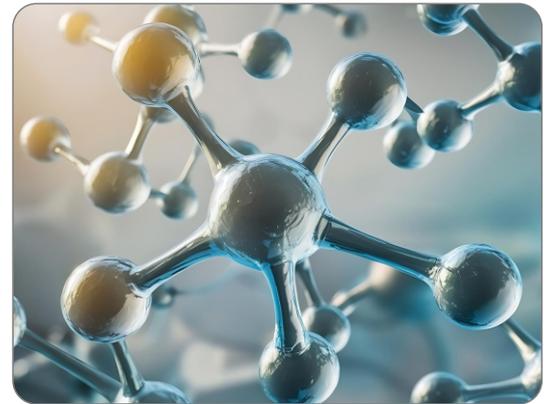


ECTOIN

BIOTECH EDGE

Ectoin is **crafted through advanced probiotic fermentation** inspired by nature's stress-protection systems. Developed via **extremophile biotechnology**, it transforms the resilience of extremophile microorganisms into powerful skin protection. This bioengineered osmolyte stabilizes cell structures, maintains hydration, and defends skin against environmental and oxidative stress. With its pure, eco-conscious origin and proven soothing efficacy, Ectoin represents the next generation of smart biotechnology for skin comfort and resilience.



Ectoin is an amino acid derivative originally derived from extremophilic bacteria, is now commercially produced via fermentation driven processes using probiotics. Since its discovery, Ectoin is extensively studied for its ability to **protect cells and their internal structures against stress induced by adverse environmental conditions** where Ectoin is found to be an excellent molecule for cellular defence.

PRODUCT DETAILS

INCI name: Ectoin	Content: 99%	Recommended Dosage: 0.3 – 2%	Appearance: White Powder
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APPLICATIONS :



Age-defying serum



Hydrating mist



Post produce treatment



Spot-cleaning gel



Replenishing lotion



Anti-wrinkle & firming
formulation

KEY FEATURES :

- Cellular stress-protection molecule with anti-inflammatory activity
- Preserves barrier integrity by limiting transepidermal water loss (TWEL)
- Shields cells, DNA, and proteins from oxidative damage
- Enhances skin resilience against environmental aggressors

WHAT IT BRINGS TO YOUR FORMULATION :

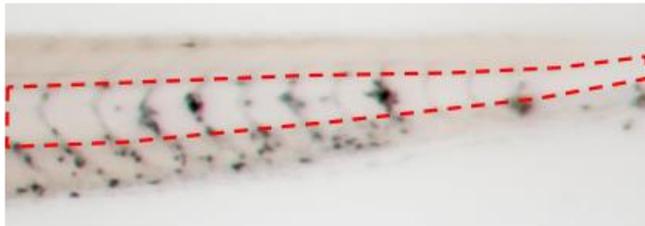
- Enables calm-focused, barrier-supportive skincare concepts
- Supports hydration performance without occlusion or heaviness
- Offers excellent stability across a broad pH spectrum
- Integrates seamlessly with humectants, emulsifiers, and active systems
- Aligns with clean-beauty expectations through a biodegradable, non-irritating profile

EFFICACY STUDIES :

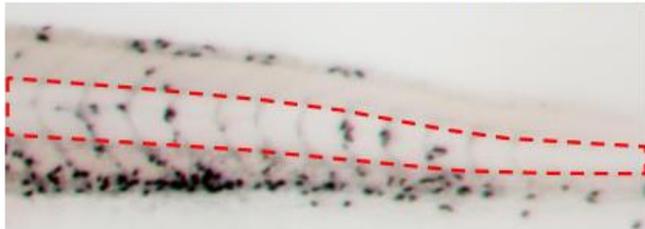
Cosmetic Soothing Efficacy Study on Zebrafish (Embryo Neutrophil Test)

Test	Formula addition concentration	Result	Evaluation of soothing effects
Zebrafish embryonic neutrophil aggregation inhibition rate	2%	24% (p=0.0000025)	Significantly
	0.78%	10% (p=0.038)	Significantly

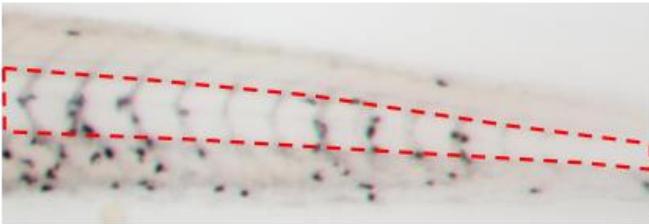
Representative chart of soothing efficacy test results:



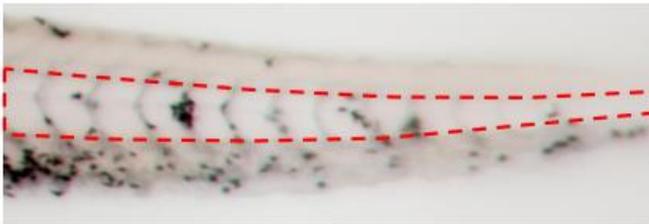
Model control group: No significant soothing effect (0% neutrophil aggregation inhibition rate)
*Dark dots represent stained neutrophils.



Significant soothing effect:
(30% inhibition rate of neutrophil aggregation)

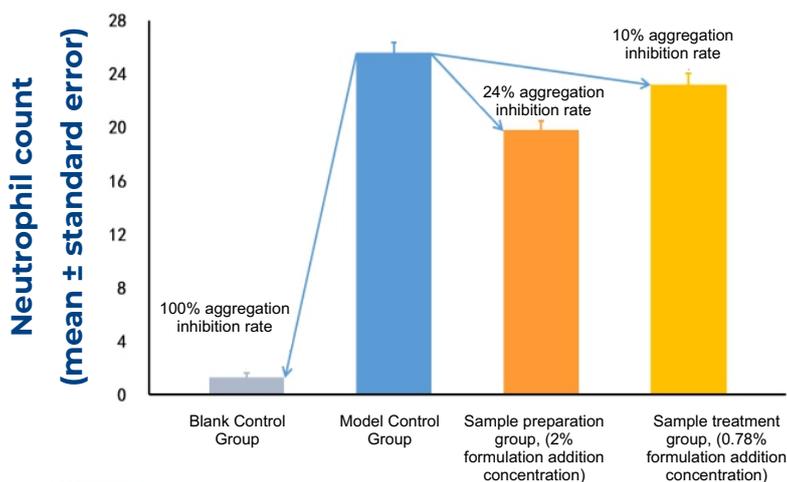


Significant soothing effect:
2% formulation concentration
(24% neutrophil aggregation inhibition rate)



Significant soothing effect:
0.78% formulation concentration
(10% neutrophil aggregation inhibition rate)

Bar chart of soothing efficacy test results

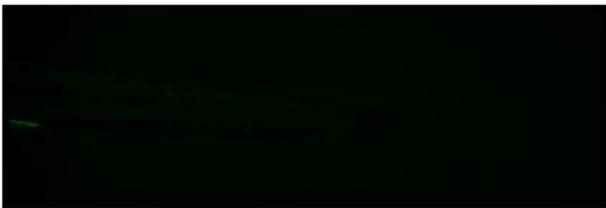


Repair Efficacy Screening on Zebrafish Embryo (Skin Barrier Permeability Test)

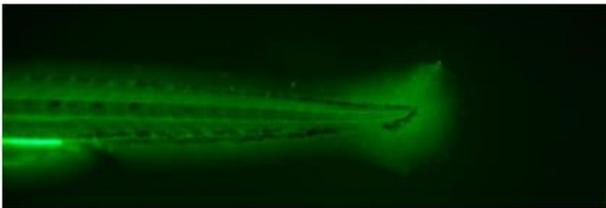
Test	Formula addition concentration	Result	Evaluation of soothing effects
Zebrafish embryo skin barrier permeability Inhibition rate	3%	59% (P=0.000000000000019)	Significantly
	0.5%	63% (P=0.000000000000027)	Significantly

Representative chart of repair efficacy test results

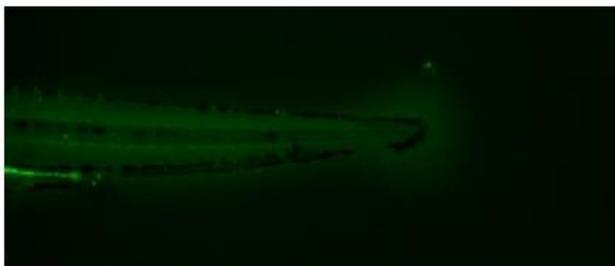
Blank control group



No significant repair effect (0% skin barrier permeability inhibition rate),

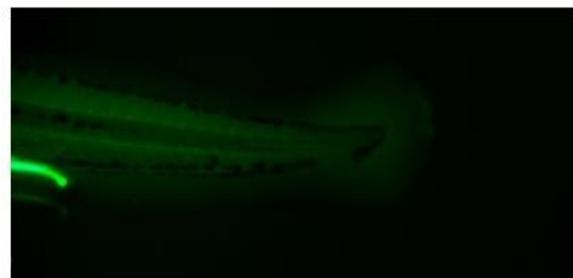


Model control group



Ectoin Significant repair effect:

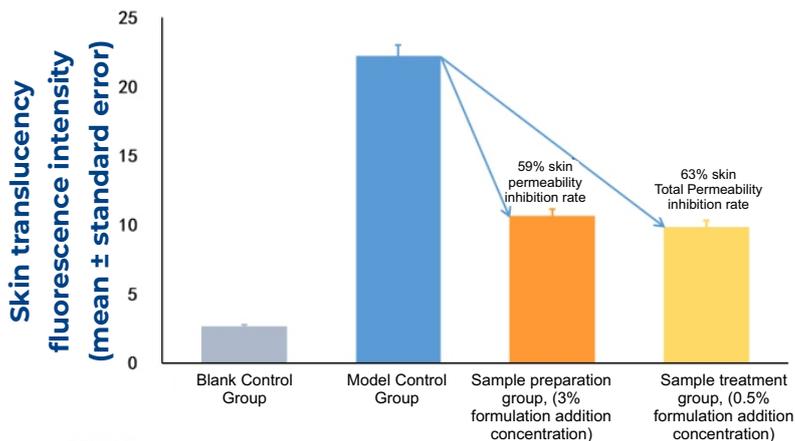
3% formula concentration
(59% skin barrier permeability inhibition rate)



Ectoin Significant repair effect:

0.5% formulation concentration (63% skin barrier permeability inhibition rate)

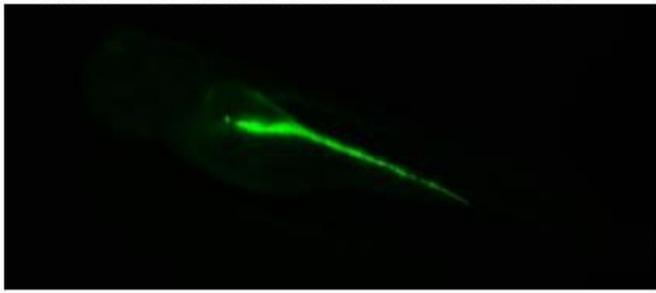
Repair test results bar chart



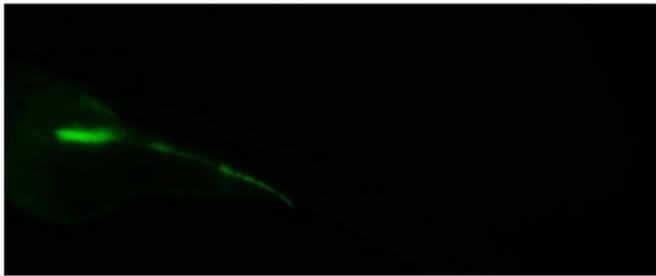
Anti-wrinkle and Firming Efficacy on Zebrafish Embryo by Reactive Oxygen Species (ROS) Scavenging Test Method

Test	Formula addition concentration	Result	Evaluation of soothing effects
Zebrafish embryo reactive oxygen species (ROS) Clearance rate	0.5%	14% (p=0.00000084)	Significantly Significantly

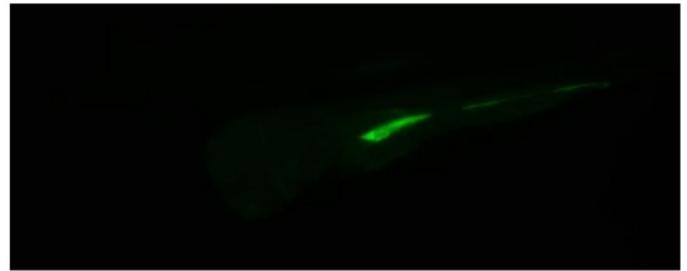
Representative chart of repair efficacy test results



Blank control group:
no significant anti-wrinkle
and firming effects (0% ROS clearance rate)

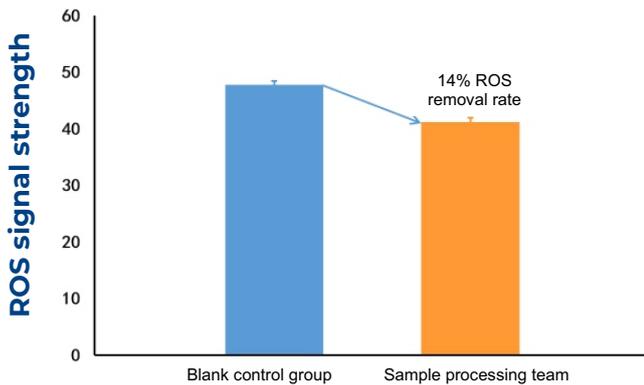


ROS in zebrafish embryos are labeled with green fluorescence. Significant anti-wrinkle and firming effects (15% ROS clearance rate).



Test sample group: Ectoin - Significant anti-wrinkle and firming effects (14% ROS clearance rate)

Bar chart of anti-wrinkle and firming efficacy test results



*p<0.05.

CLINICALLY PROVEN BENEFITS :

- Maintains skin hydration and resilience under stress conditions
- Reduces irritation and inflammatory response
- Reinforces and supports skin barrier repair
- Contributes to antioxidant and anti-aging protection