
BioAuthentic Exosomes
Active Concepts

Evolving Modern Incarnations

Of Cosmetic Delivery

Delivery systems offer a vesicle for active delivery, allow formulators to customize their products, and ensure an increased uptake of benefits.

While Active Concepts already capitalizes on the benefits of delivery systems, is there a way to *revolutionize* traditional methods?

If there was a way to do so, **why do we care**?

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From Pharma to Cosmetics

In our pursuit of innovation, Active Concepts set our sights on the pharmaceutical industry, drawing inspiration from **precision and efficacy-driven results**.

Recognizing the sophisticated methods employed in pharmaceuticals to **enhance the absorption and targeted delivery** of active ingredients, we sought to adapt similar principles into our ingredients.

We aimed to adopt exosomes into our skincare portfolio, aspiring to **elevate the performance** of our cosmetic products with the same commitment to excellence the pharmaceutical industry is so well-known for.

Our recent launch combines a harmonious blend of **cosmetic allure and pharmaceutical precision**, displaying our dedication to pushing the boundaries of beauty and skincare through scientific innovation.

Breaking Conventional Practices

definition

The smallest forms of extracellular vesicles and are natural, membrane-derived particles

Our research led to *exosomes* which are currently mainly in the space of **pharmaceuticals for drug delivery**.

Extracellular vesicles are shed by most cells in response to intracellular and extracellular stimuli and have been **proven to serve as therapeutic and diagnostic applications**.

Exosomes are capable of **increasing cell-to-cell contact** and intracellular communication, therefore **increasing the efficiency** of which actives and ingredients can be delivered to intended cells.

Currently, exosomes are mainly being used in modern medical treatments for the repair and regeneration of skin tissue, and are **derived from human or animal stem cells**.

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Liposomes vs. Exosomes: What Sets These Delivery Systems Apart?

In simple terms... is it evolving science

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Similar

Composed of a lipid bilayer

Ability to be loaded with lipophilic and hydrophilic drugs

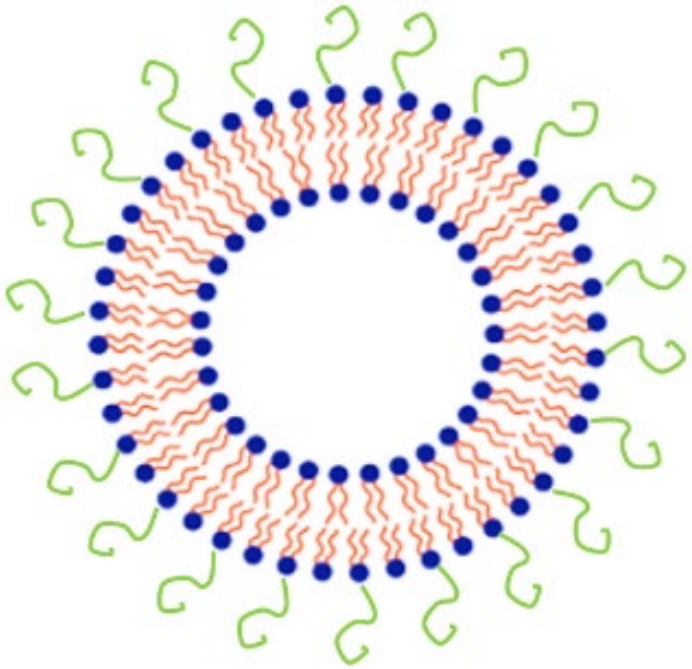
Different

Membrane proteins – more stable structure

Smaller particle size – deeper penetration

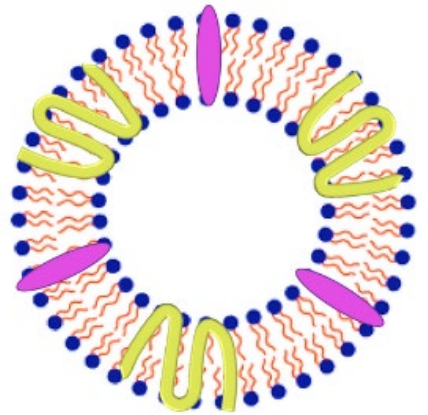
Natural

Liposomes



50 – 450 nm

Exosomes



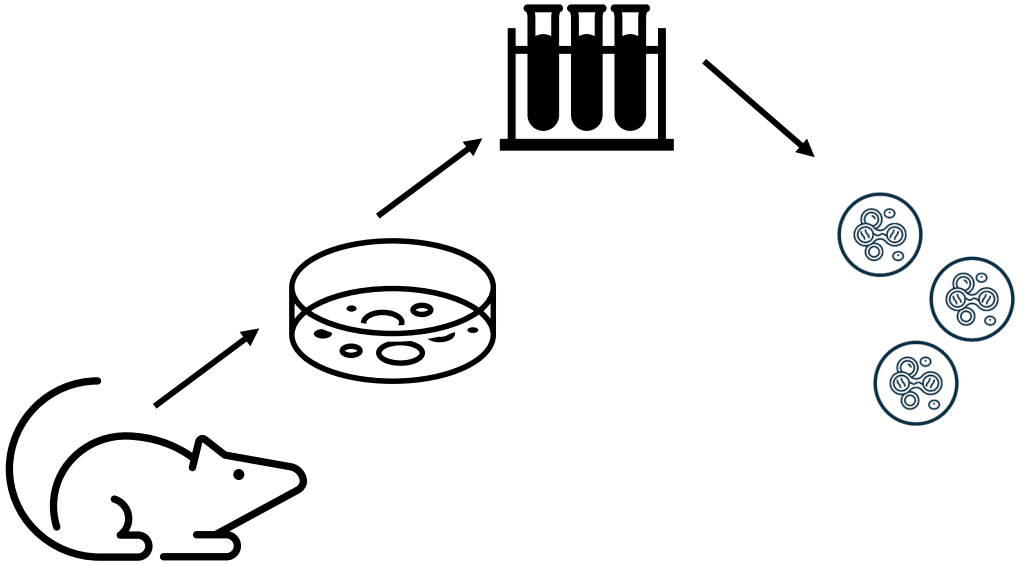
40 – 100 nm

Pharma vs. AC: What Sets *Our* Delivery Systems Apart?

In simple terms... we looked to nature

Pharma

Human/Animal Stem Cells



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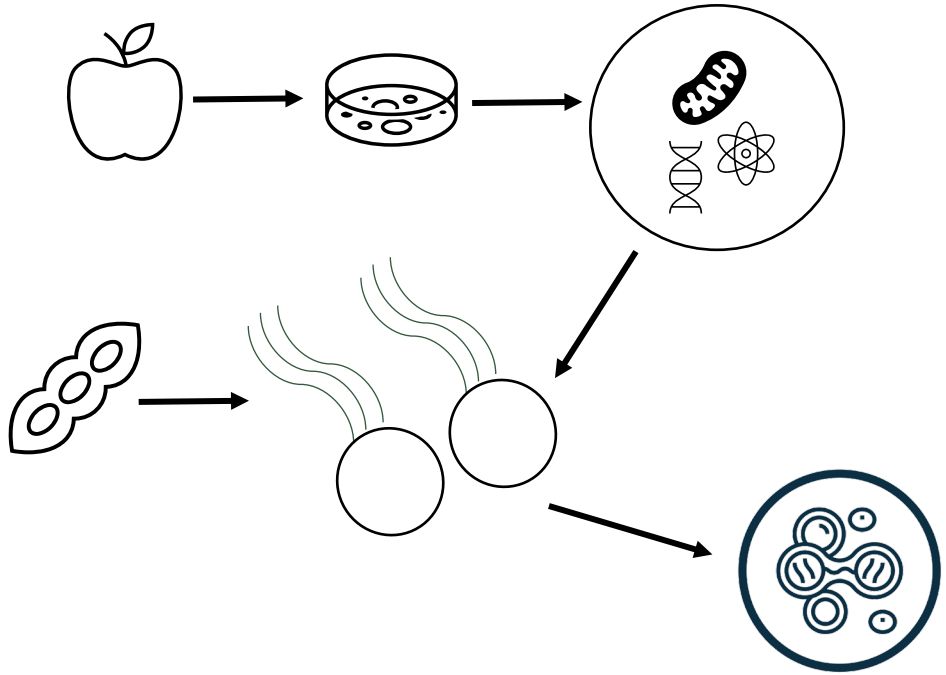
Cellular Processes from Plants



Green Chemistry Practices

Active Concepts' Renowned Commitment

As a company, we pride ourselves on **sustainable and eco-friendly practices**, so when our research led us to exosomes, we did not want to derive them from animal or human stem cells.

Additionally, exosomes on the market are only being **targeted one way**: skin tissue regeneration.

What if...

We created all natural vesicles that are biomimetic to exosomes, but **derived from botanicals**

and

Targeted each vesicle for a **specific benefit**?

Introducing BioAuthentic Exosomes

We are experts in green chemistry, and, therefore, have added to our **Delivery System** technology platform by looking at how **nature does delivery**. Active Concepts releases **BioAuthentic Exosomes** – all-natural vesicles that are functionally identical to exosomes, extracted from **natural sources**, and target **specific benefits**.

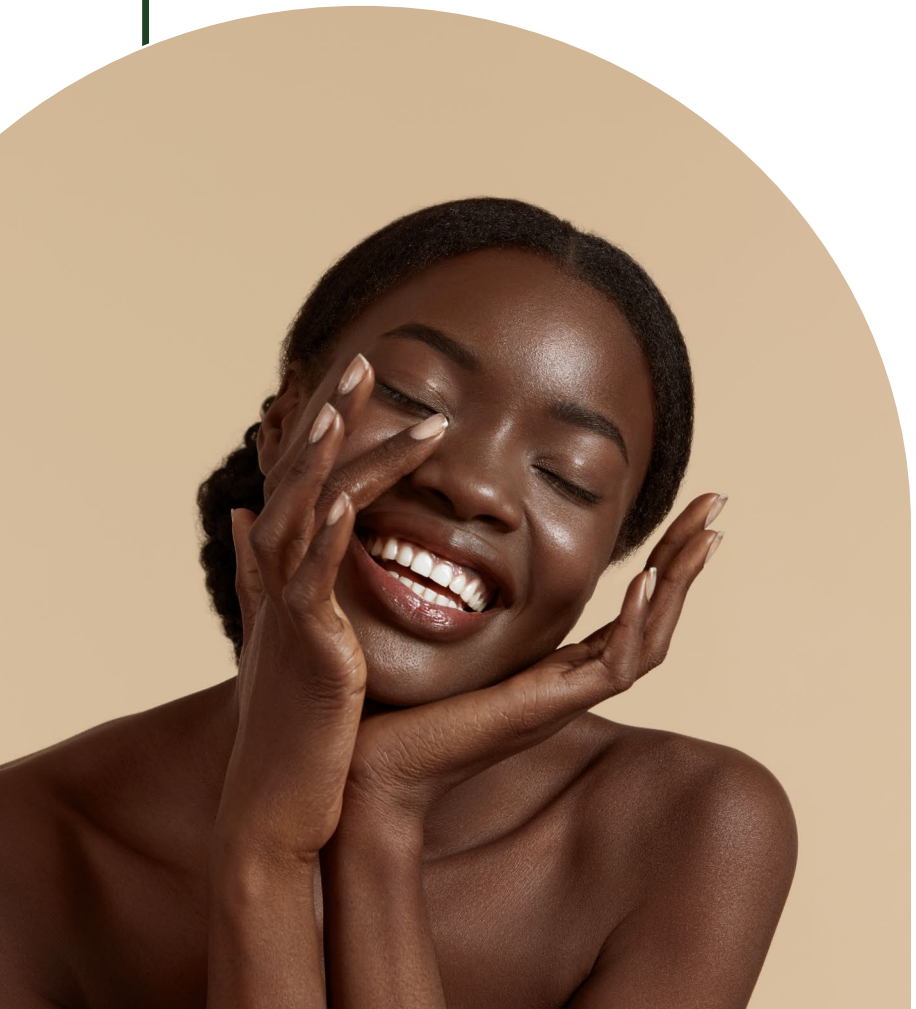
By encapsulating actives held together with protein boats for **increased stabilization**, these natural delivery systems ensure increased activity of personal care benefits.

Evolving Technology • Sustainable Practices • Brand Differentiation • Targeted & Enhanced Benefits

01

AC ExoVitalize

INCI: *Water & Citrus Paradisi (Grapefruit) Fruit Extract & Citrullus Lanatus (Watermelon) Fruit Extract & Phospholipids*



Wake Up Skin on a Cellular Level

Tired skin paves the way to sagging, fine lines, and a lackluster complexion. Just like our mind needs energy to focus and our body needs energy to move, **our cells need energy** to perform vital functions.

AC ExoVitalize encapsulates watermelon and grapefruit extracts, utilizing their essential amino acid content to enhance the processes of **glycolysis** and **oxidative phosphorylation**.

These two imperative cellular processes **rapidly increase adenosine triphosphate** (ATP) production, directly providing cells with more energy.

cellular energetics | revitalize the skin | amino acids

Farm Level Sourcing

Grapefruit

Florida, USA
Sicily, Italy

The father-son duo in Florida benefit from "Small Farm Advantage," meaning all fruit is picked by hand in small quantities, focusing on quality. Two sisters in Sicily run an all-female company, utilizing photovoltaics as a renewable energy source and sub-irrigation to reduce water waste.

Watermelon

Oregon, USA
Mantova, Italy

The watermelon from Oregon is an organic farm that covers over 4,000 acres, always seeking ways to emulate the principles of how nature is created to operate. In Mantova, the watermelon comes from a company that uses a biomass plant to produce energy when processing waste and also utilizes photovoltaic solar panels.

AC ExoVitalize Available Efficacy Studies

In Vitro .

- Glycolysis*
- Oxidative Phosphorylation
- SA-Beta-gal Analysis
- Endothelial Permeability Assay

In Vivo .

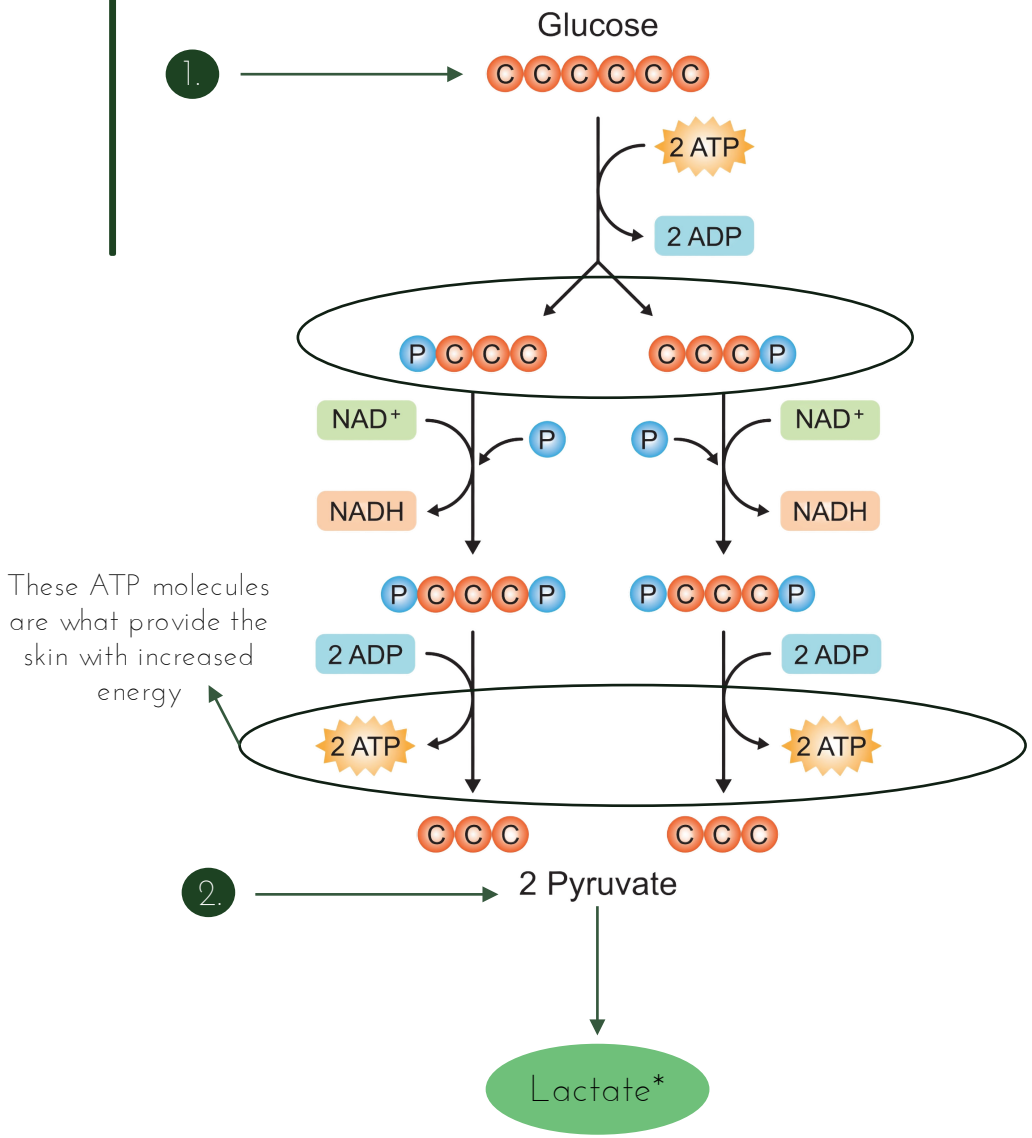
- Undereye Study

*Standardized Activity

Safety & Tox

- AMES
- Cellular Viability
- Dermal and Ocular
- Phototoxicity
- OECD 201 Freshwater Alga Growth Inhibition
- OECD 301B Ready Biodegradability
- OECD TG 442C – Direct Peptide Reactivity Assay
- OECD TG 442D In Vitro Skin Sensitization Report

Glycolysis



Glycolysis is a process that occurs in the cytosol of cells that oxidizes glucose molecules, the most crucial organic fuel in animals, plants, and microbes. This process is required for the acceleration of cell migration.

1. Energy-Requiring Phase

The starting material, glucose, gets 2 phosphates added from ATP, making the molecule unstable. This causes it to split in half, forming two 3-carbon sugars.

2. Energy-Releasing Phase

Each 3-carbon sugar is converted into another 3-carbon molecule, pyruvate, by a series of reactions. In this series, 2 ATPs and 1 NADH are made. We care about the ATP molecules as that is what is providing the skin with extra energy.

*However, another byproduct we want our attention on is lactate.

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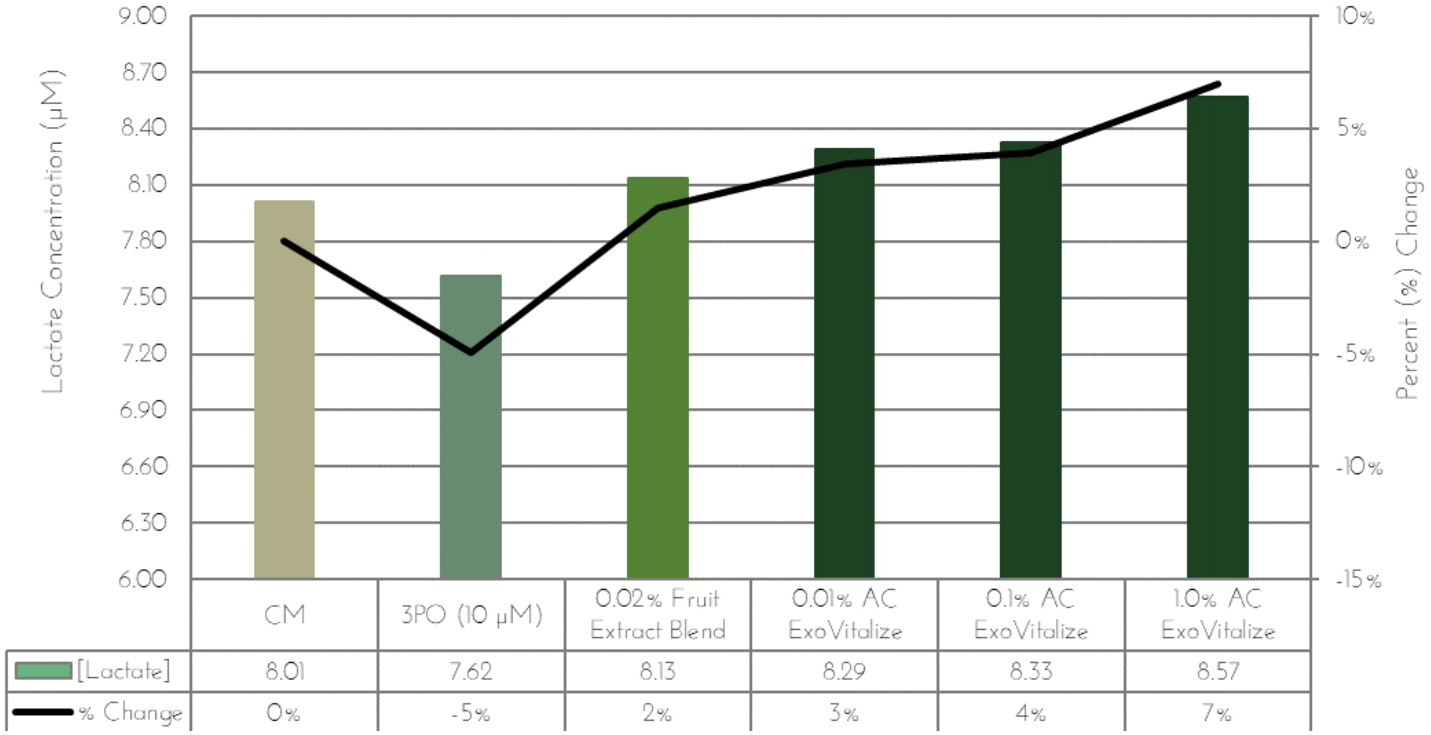
Glycolysis Assay

When sufficient oxygen is not present in the cells for further oxidation of pyruvate and NADH, NAD+ is regenerated from NADH by the reduction of pyruvate to lactate.



	CM	3PO (10 µM)	0.02% Fruit Extract Blend	0.01% AC ExoVitalize	0.1% AC ExoVitalize	1.0% AC ExoVitalize
[Lactate]	8.01	7.62	8.13	8.29	8.33	8.57
% Change	0%	-5%	2%	3%	4%	7%

Fig 1. The Effect of **AC ExoVitalize** on Fibroblast Lactate Production.

Lactate is a by-product of glycolysis, and the amount produced by cells is directly proportional to the rate of glycolysis. The key active ingredients in AC ExoVitalize, *Citrus paradisi* (Grapefruit) Fruit Extract and *Citrullus lantus* (Watermelon) Fruit Extract were tested to demonstrate the superior nature of BioAuthentic Exosomes as a delivery system.

While the fruit blend at 0.02% concentration increased glycolysis by 2%, AC ExoVitalize at a 0.01% concentration increased glycolysis by

+3%

Benefits

AC ExoVitalize outperformed the fruit blend at increasing the rate of glycolysis, indicating this ingredient can assist in reducing the physical signs of aging by increasing intracellular matrix synthesis and deposition.

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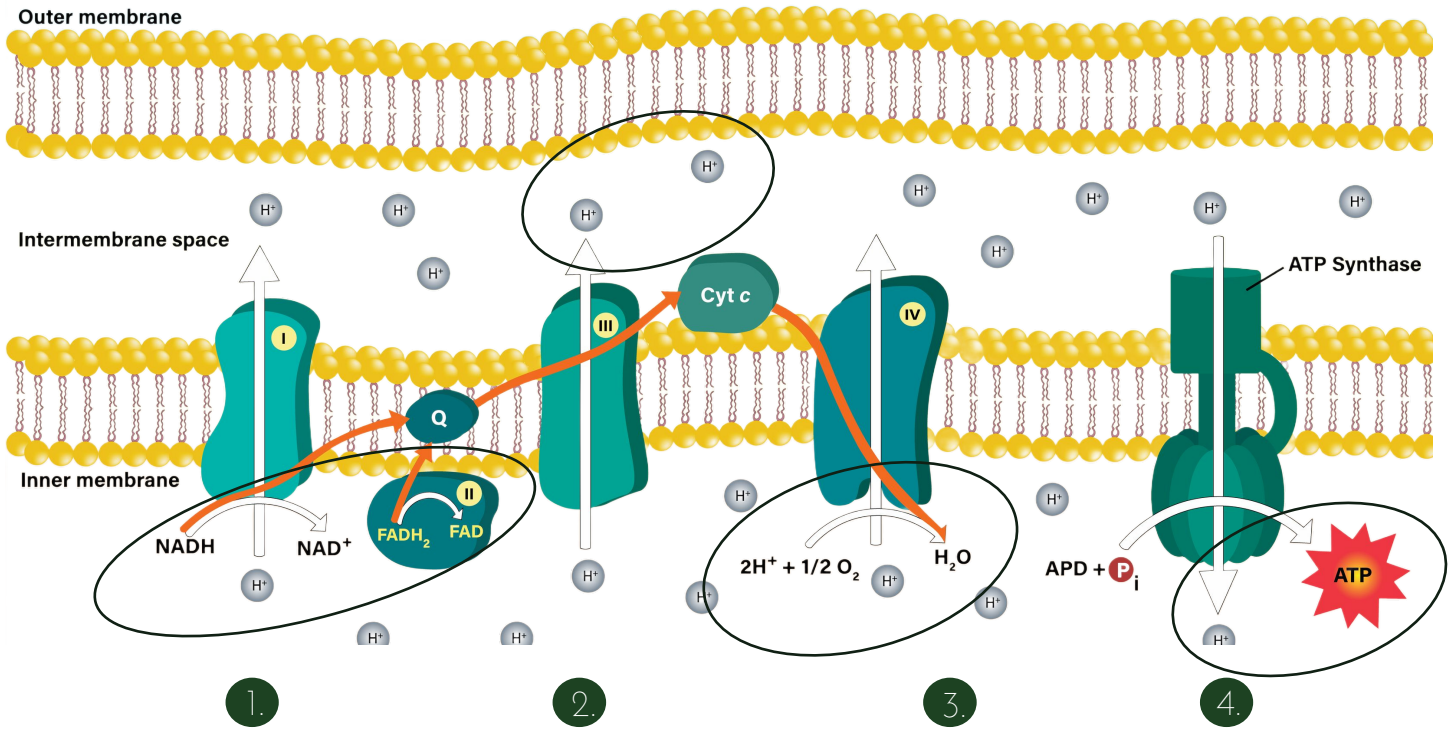
Oxidative Phosphorylation

Oxidative phosphorylation occurs in the mitochondria. The electron transport chain passes electrons from one molecule to another, releasing energy in an electrochemical gradient. Chemiosmosis uses the energy stored in this gradient to make ATP.



1. Electron Delivery

NADH & $FADH_2$ transfer their electrons at the beginning of the transport chain.

2. Electron Transfer + Proton Pump

Electrons get passed down the chain and move from a higher to lower energy level. Some of the energy pumps hydrogen ions out of the membrane, establishing an electrochemical gradient.

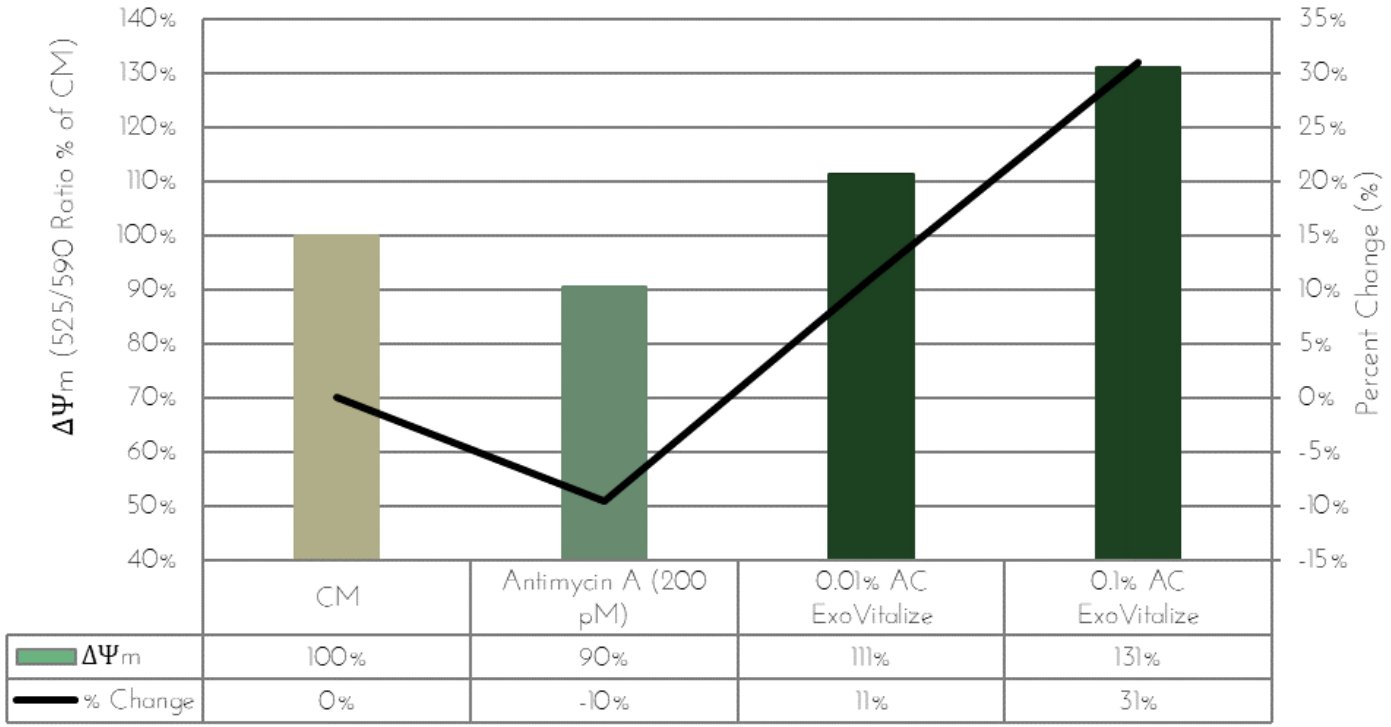
3. Splitting Oxygen to Form Water

At the end of the ETC, electrons are transferred to molecular oxygen, which splits in half and takes up a proton to form water.

4. Gradient-Drive Synthesis of ATP

As protons flow down the gradient back into the matrix, they pass through ATP synthase, which harnesses the flow of protons to synthesize ATP.

Oxidative Phosphorylation



	CM	Antimycin A (200 pM)	0.01% AC ExoVitalize	0.1% AC ExoVitalize
ΔΨm	100%	90%	111%	131%
% Change	0%	-10%	11%	31%

Fig 2. The Effect of AC ExoVitalize on ΔΨm in Dermal Fibroblasts.

A driving force of oxidative phosphorylation is the mitochondrial membrane potential (ΔΨm) which represents the transmembrane potential of hydrogen ions. Maintaining ΔΨm is necessary as the proton flux from the cytosol to the matrix is harnessed to generate ATP.

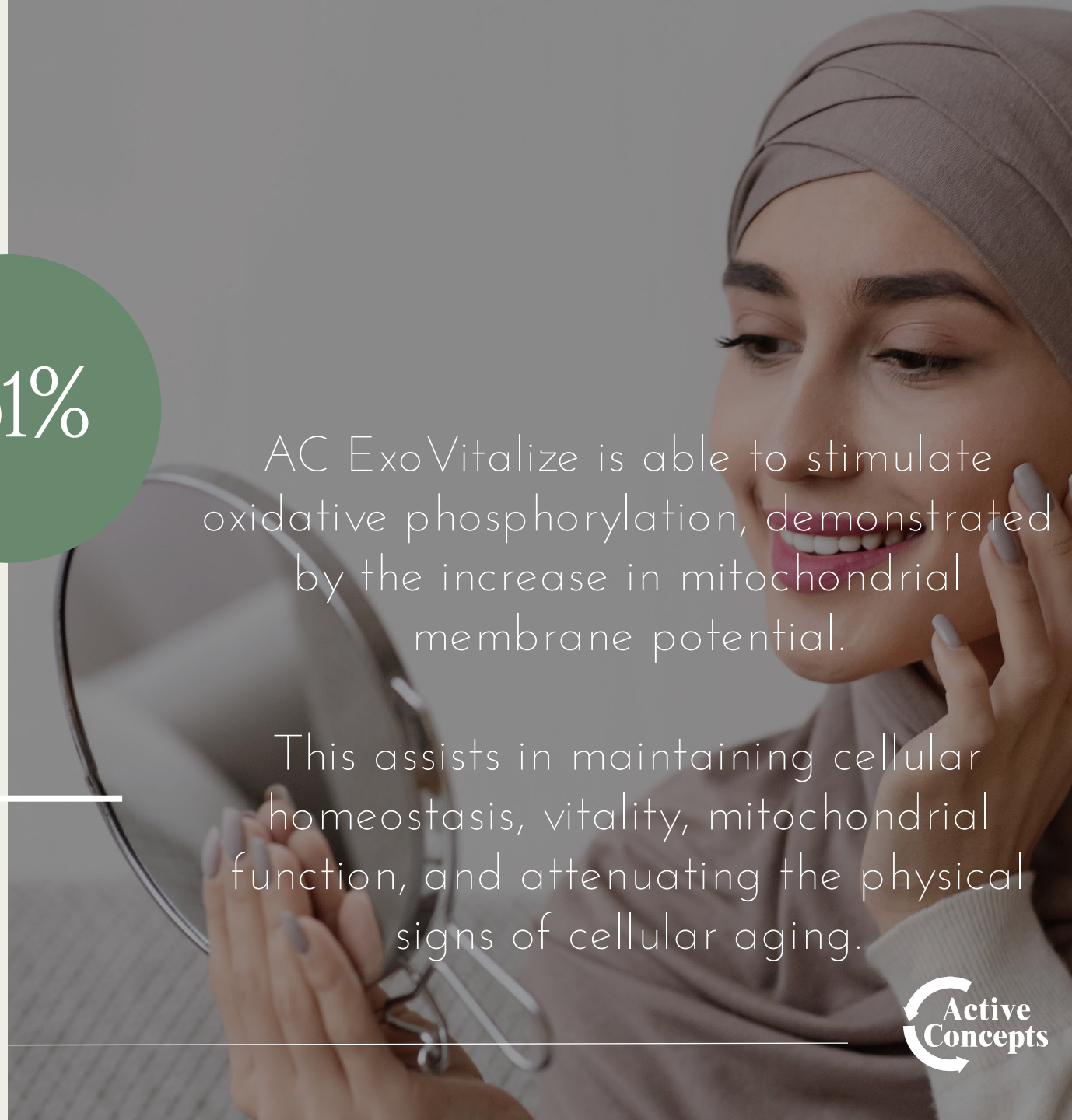
AC ExoVitalize at 0.1% concentration increased $\Delta\Psi m$ compared to untreated fibroblasts by

+31%

Benefits

AC ExoVitalize is able to stimulate oxidative phosphorylation, demonstrated by the increase in mitochondrial membrane potential.

This assists in maintaining cellular homeostasis, vitality, mitochondrial function, and attenuating the physical signs of cellular aging.



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SA-Beta-gal Assay

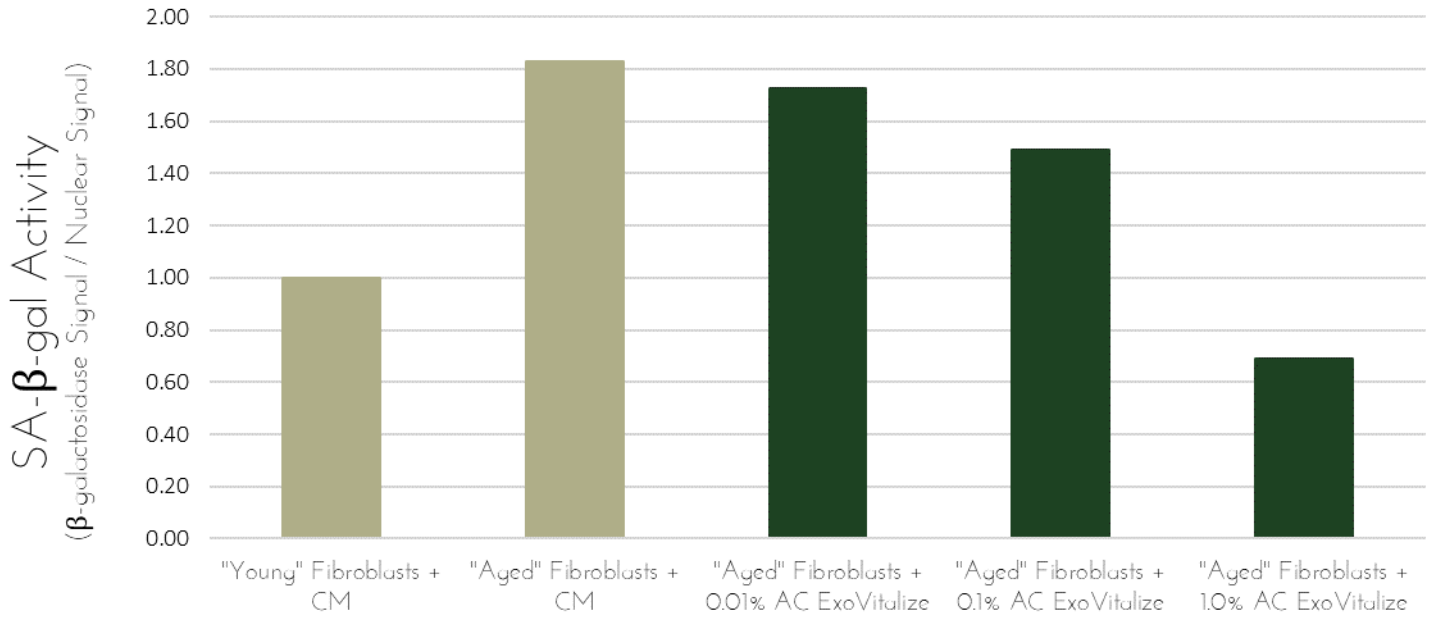
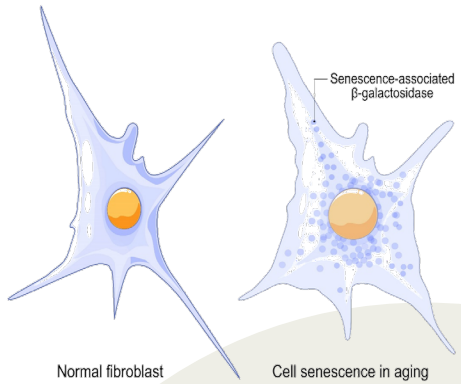


Fig 3. The Effect of **AC ExoVitalize** on Cellular Senescence Levels in "Aged" Fibroblasts.

Cellular Senescence



Cellular senescence is a state of **permanent cell cycle arrest** that accompanies aging and contributes to a decline in normal skin function and physiology. **SA-Beta-gal** is the gold standard biomarker to identify senescence *in vitro* as the enzyme beta-galactosidase explicitly accumulates in the lysosomes of senescent cells.

AC ExoVitalize at 0.1% concentration reduced SA-Beta-gal activity compared to untreated "aged" fibroblasts by

-19%

Benefits

AC ExoVitalize effectively reduces cellular senescence and may attenuate or reverse the alterations in skin structure and physiology that occur during aging.

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Undereye Study

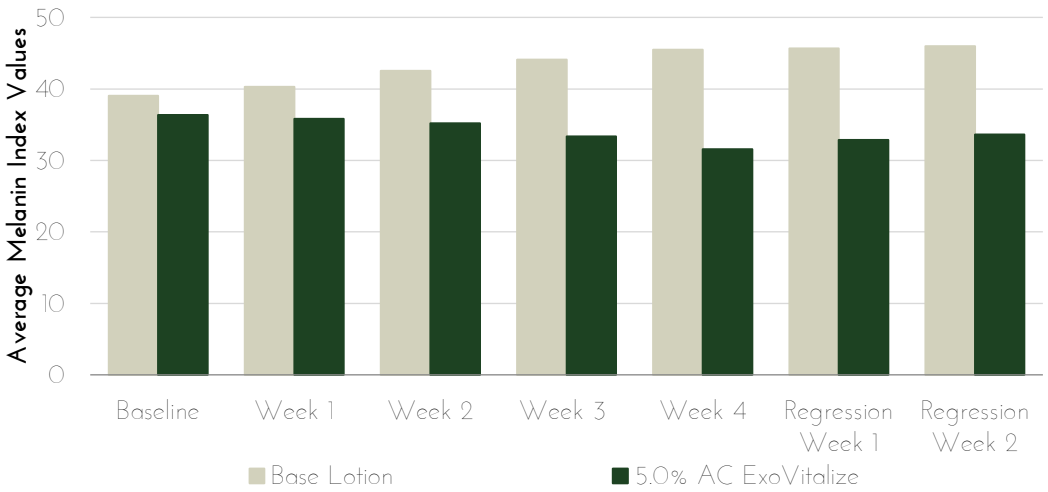

Fig 4. The Effect of **AC ExoVitalize** on Pigmentation.

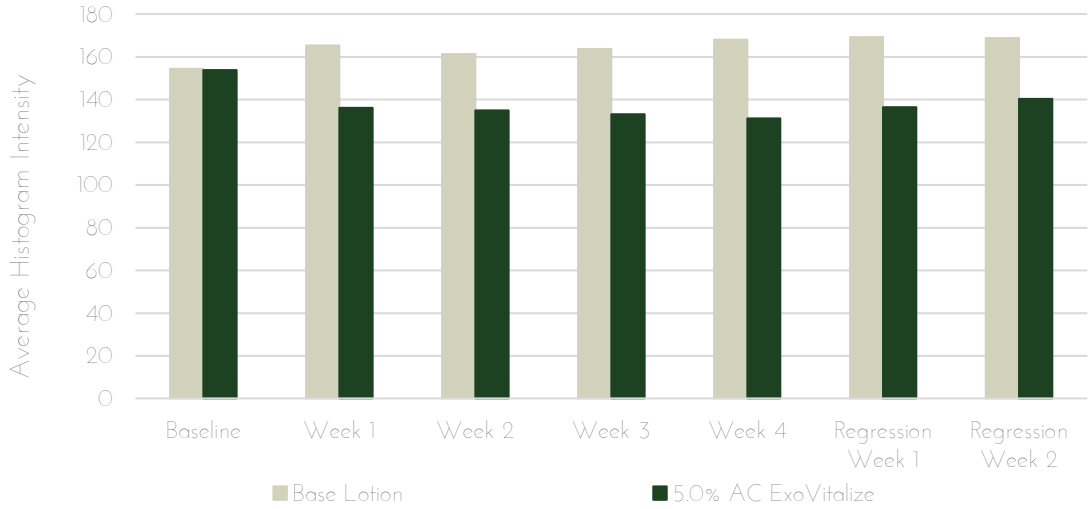

Fig 5. The Effect of **AC ExoVitalize** on Undereye Color Intensity.

This study evaluated the effect of AC ExoVitalize on skin pigmentation under the eye via VISIA image analysis and pigmentation measurements via the DermaLab Combo handheld probe. 8 M/F participants between the ages of 23-54 participated in this 6 week blind study, either applying a base lotion or 5.0% AC ExoVitalize.

Undereye Study

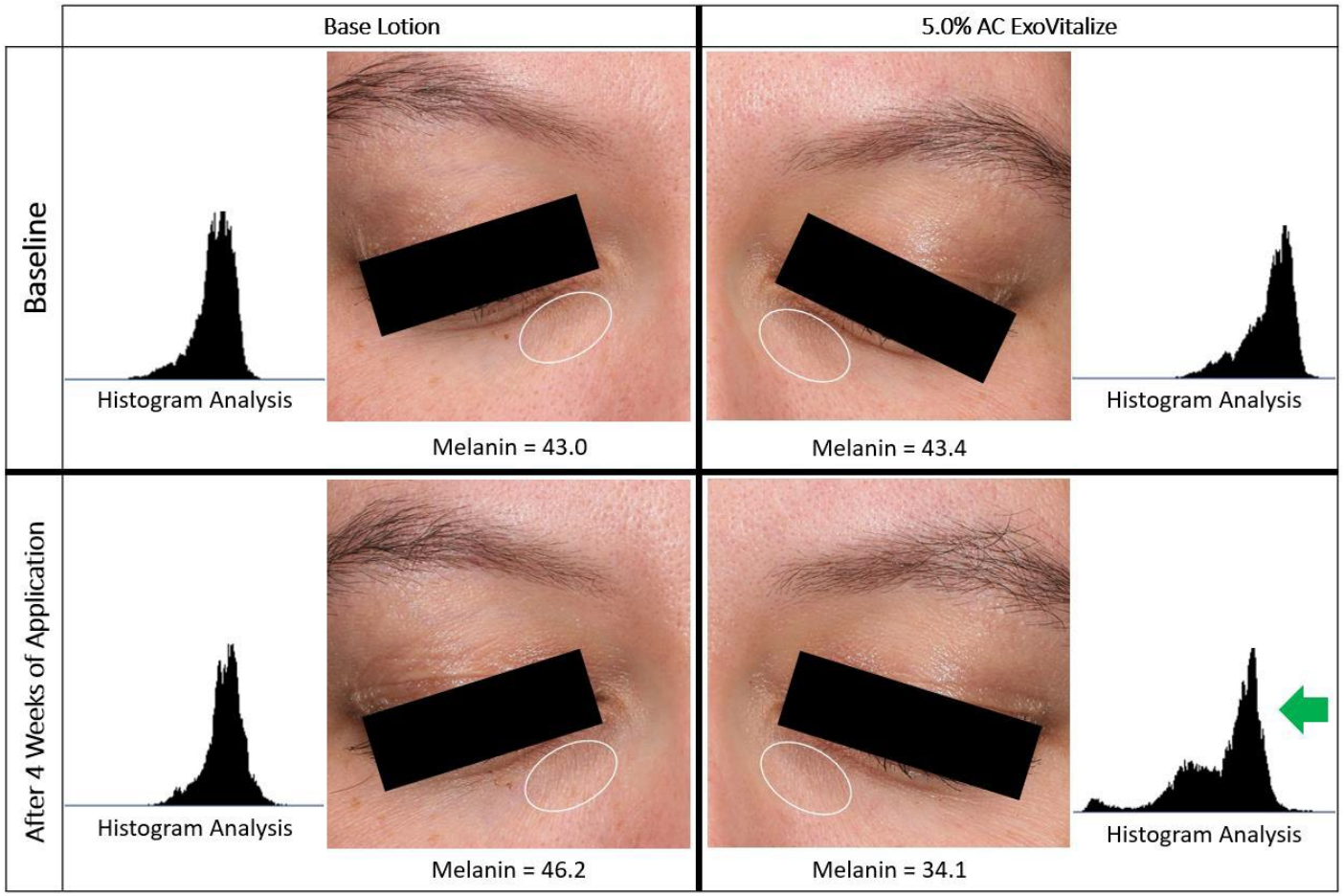

Fig 6. VISIA Images and Histogram Analysis at Baseline and After 4 Weeks of Application of Base Lotion and 5.0% AC ExoVitalize.

Images taken by the VISIA System were exported and analyzed using ImageJ software (NIH) to assess color intensity of the undereye region. Specifically, histogram analysis was used to evaluate red, green, and blue color distribution. The left side of the histogram reflects exclusively red pixels while the right reflects exclusively blue pixels. A shift towards the right side of the histogram indicates a darker color.

AC ExoVitalize at 5.0% concentration decreased skin pigmentation and undereye color intensity by

–13% & –15%

Benefits

AC ExoVitalize effectively reduces the visual consequences of undereye dark circles and discoloration, providing a more youthful and awake appearance.

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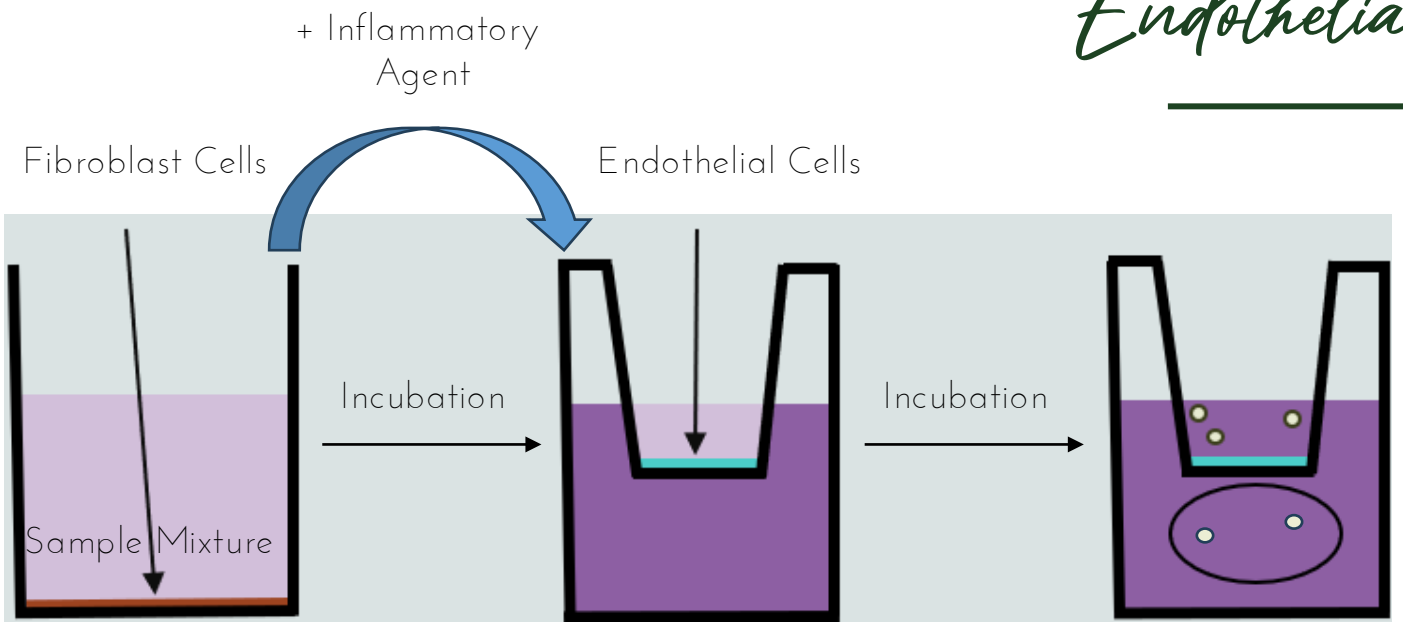
Undereye Mechanism – Endothelial Permability

Dark circles and discoloration under the eye are associated with fatigue and a less youthful appearance. Ultimately, this is a result of **poor vascular integrity** in the vessels lying close to the epidermis, facilitating the appearance of blue and purple hues (or dark circles).

On a cellular level, **endothelial function modulates vascular integrity**. In particular, endothelial cell permeability plays a fundamental role in the formation of dark circles as increased permeability leads to a pooling of deoxygenated blood under the eye, resulting in discoloration and the appearance of aging.

The relationship between **dermal fibroblasts and dermal endothelial cells** is vital to maintaining vascular integrity. Fibroblasts synthesize the extracellular matrix, providing an anchor point for endothelial cells and greatly reduces permeability. Therefore, undereye discoloration can be improved by augmenting the fibroblast-released beneficial molecules.

Endothelial Permeability Assay



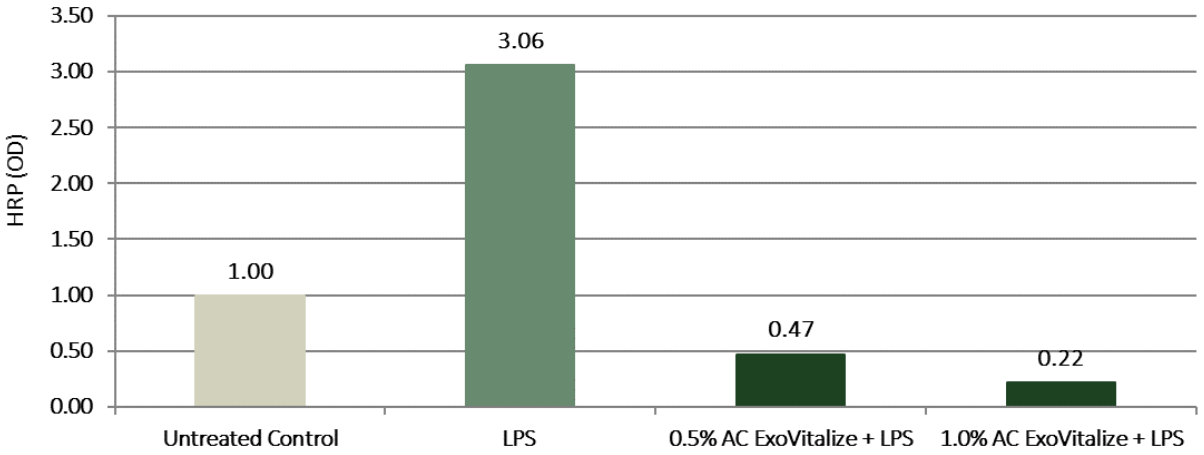


Fig 7. The Effect of AC ExoVitalize on Dermal Microvascular Endothelial Cell Permeability Relative to Untreated Control.

Human dermal fibroblasts were seeded and grown to confluency in complete media.

AC ExoVitalize at concentrations of 0.5% and 1.0% was added to the complete media.

Fibroblasts were incubated and conditioned media from each well was collected.

Human dermal microvascular endothelial cells (DMVECs) were seeded onto the membrane of transwell inserts and grown to confluency.

A solution of 1 µg/mL LPS + fibroblast conditioned media was used to treat endothelial monolayers, creating an inflammatory environment.

After incubation, treatment media was removed, and inserts were placed in a new plate containing fresh media.

200 µL of 3 µg/mL HRP solution was added to each insert.

Transwell inserts were discarded, and 20 µL of the media in the wells was transferred in duplicate to a 96-well plate.

50 µL of TMB substrate solution was added to all wells for the colorimetric reaction.

After a 5-minute incubation in the dark, 25 µL of stop solution was added to stop the reaction, and optical density (OD) was read at 450 nm.

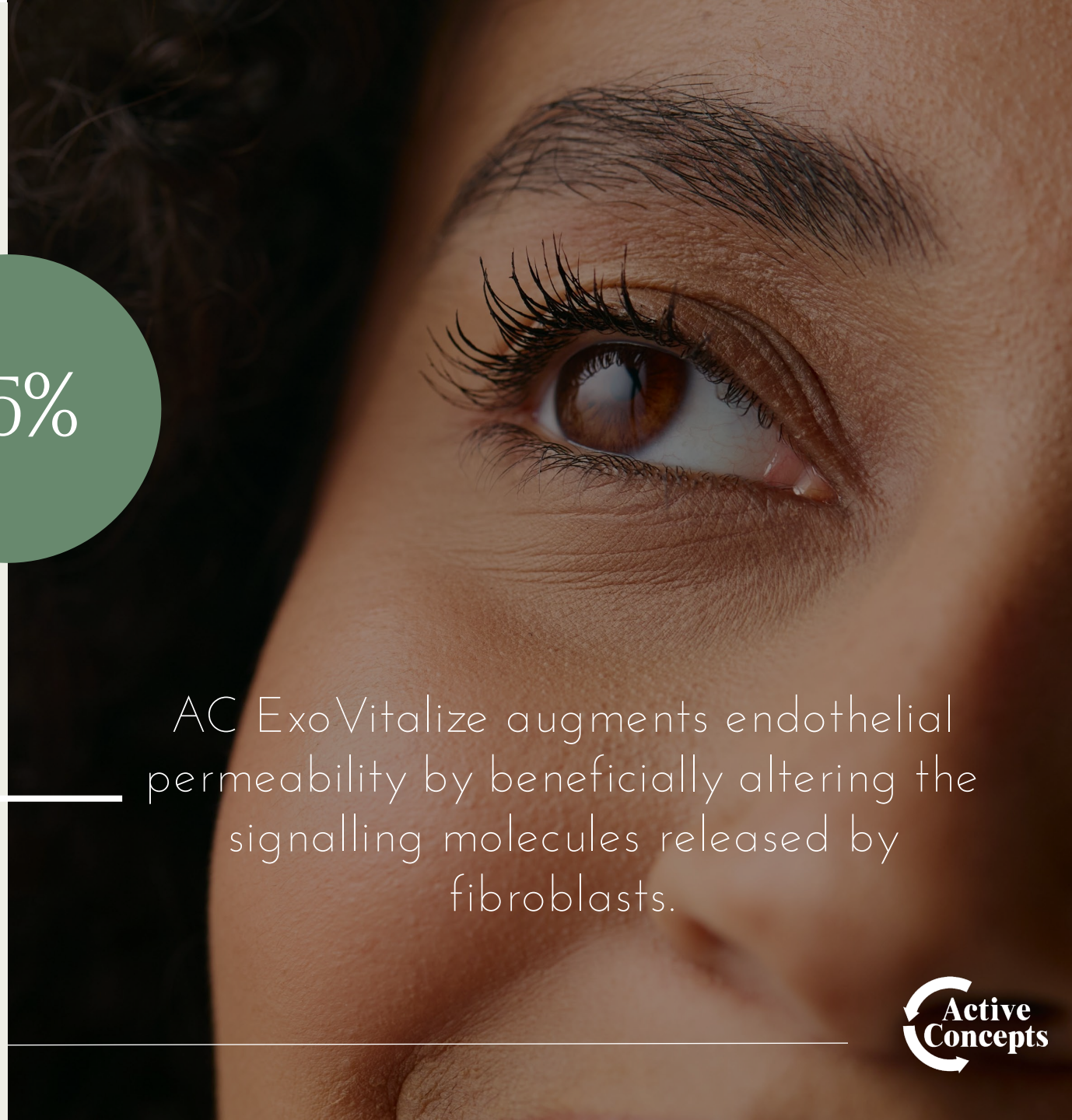
Permeability was normalized to the Untreated Control.

AC ExoVitalize at 1.0% in vitro reduced endothelial permeability compared to LPS-treated fibroblasts by

-85%

Benefits

AC ExoVitalize augments endothelial permeability by beneficially altering the signalling molecules released by fibroblasts.



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Summary

WHAT.

AC ExoVitalize is a natural BioAuthentic Exosomal delivery system that **wakes up the skin on a cellular level**.

WHY.

AC ExoVitalize provides the skin with precursors for the cellular processes of **glycolysis** and **oxidative phosphorylation**, allowing the skin to produce more energy.

MADE OF.

AC ExoVitalize is composed of **watermelon and grapefruit extracts**, as they are known fruits with **essential amino acid content**.

ACTION.

AC ExoVitalize revolutionizes delivery systems in cosmetics, targeting the specific benefit of **cellular energetics**. Allow this innovative ingredient to efficiently wake up the skin!

AC ExoVitalize

Code: 60193

INCI: Water & Citrus Paradisi (Grapefruit) Fruit Extract & Citrullus Lanatus (Watermelon) Fruit Extract & Phospholipids

Appearance: Liquid Exosomal Dispersion, Light Beige to Tan

Suggested Use Level: 1-10%

Suggested Applications: Cellular Energetics, Anti-Aging

Standardized for: Activity: Increase in Lactate, Protein, Particle Size

In Vitro

In Vivo

ISO 16128 NI & NOI

Vegan Compliant

COSMOS Compliant

China Compliant

Product Passport

02
AC ExoTone

INCI: *Water & Pyrus Malus (Apple) Fruit Extract & Phospholipids*

Harmonize Skin Complexion

In many cultures, even skin tone is considered a standard of beauty and is a significant motivator for consumers. However, exposure to environmental stressors can lead to sunspots and hyperpigmentation.

AC ExoTone encapsulates upcycled apple extract, as apples are known to contain alpha hydroxy acids, or AHAs. This ingredient capitalizes on the apple's natural ability to lighten the skin and even skin tone.

even skin tone | upcycled apples | harmony

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Farm Level Sourcing

Lincolnton, NC

Active Concepts' home base is in Lincolnton, NC where every year there is an apple festival. Five local apple growers participate, and apples that don't get sold are upcycled by Active Concepts into efficacious personal care ingredients.

Val di Non, Trentino

Our Italian apple orchard supplier not only promotes biodiversity, but also doesn't use synthetic pesticides. With a diverse and natural ecosystem, they provide a refuge for plants and insects.

Nantou Area, Taiwan

Our supplier in Taiwan strictly follows safe standards, ensures their crops receive natural sunlight, and never use herbicides. Being a family-owned farm for more than forty years, they ensure their employees are also treated like family.

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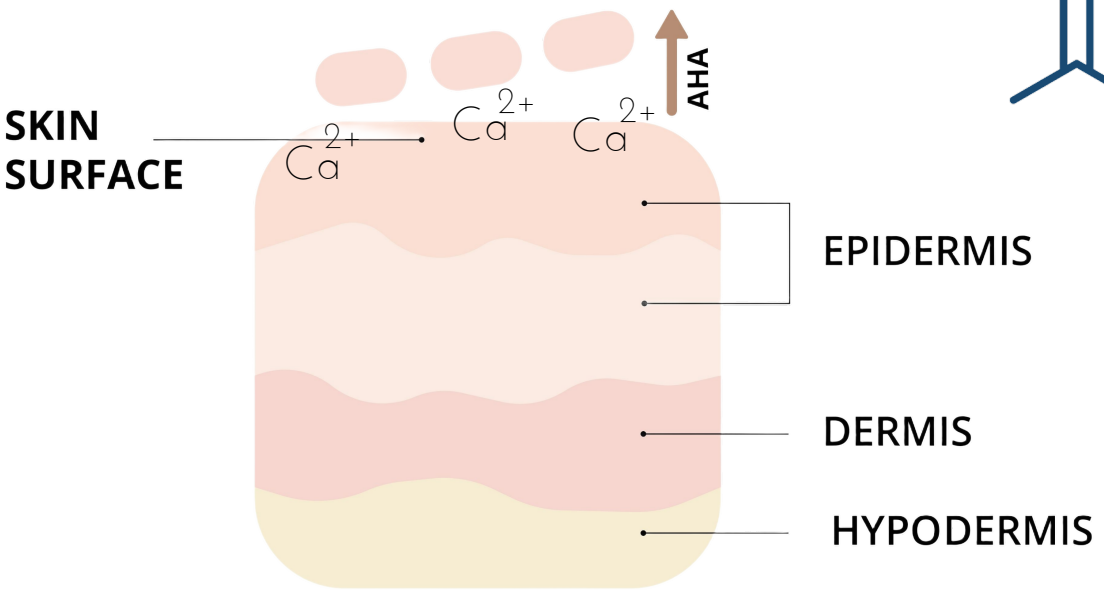
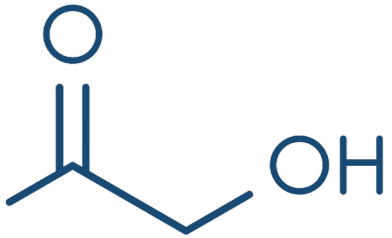
AHA Exfoliation

Alpha hydroxy acids are a class of chemical compounds made up of a carboxylic acid with a hydroxyl group substituent on the adjacent carbon.





Mechanism

AHAs are able to bind to cell adhesion molecules and reduce the extracellular calcium ion concentration, therefore disrupting cellular adhesion.

This process results in shedding the outermost layer of the skin. The reduction of calcium ion levels promotes cell growth and cellular differentiation, leaving behind more refreshed and youthful skin.

AC ExoTone Available Efficacy Studies

In Vitro .

- Tyrosinase Inhibition*

In Vivo .

- Cellular Renewal Assay
- VISIA: Reduction in Cumulative Spots
- VISIA: Reduction in UV Spots
- VISIA: Reduction in Visible Pores

Safety & Tox

- AMES
- Cellular Viability
- Dermal and Ocular
- Phototoxicity
- OECD 201 Freshwater Alga Growth Inhibition
- OECD 301B Ready Biodegradability
- OECD TG 42C – Direct Peptide Reactivity Assay
- OECD TG 42D In Vitro Skin Sensitization Report

*Standardized Activity

Tyrosinase Inhibition

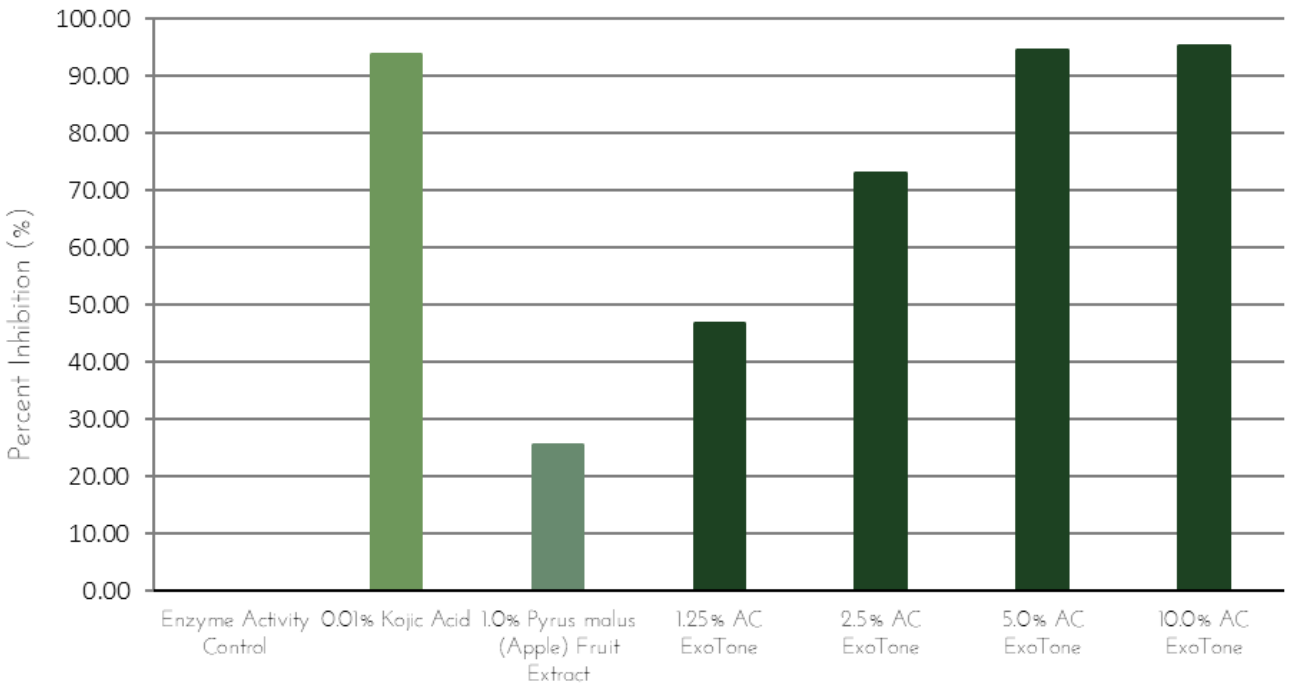
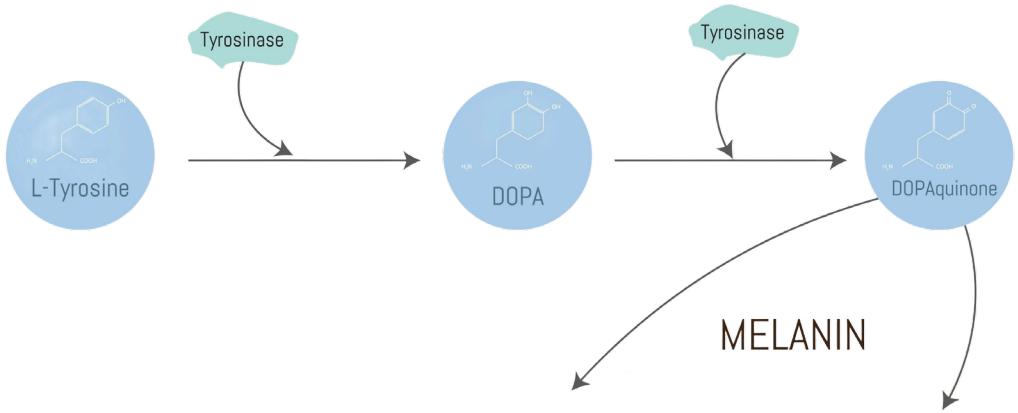


Fig 8. The Effect of **AC ExoTone** on Tyrosinase Inhibition.

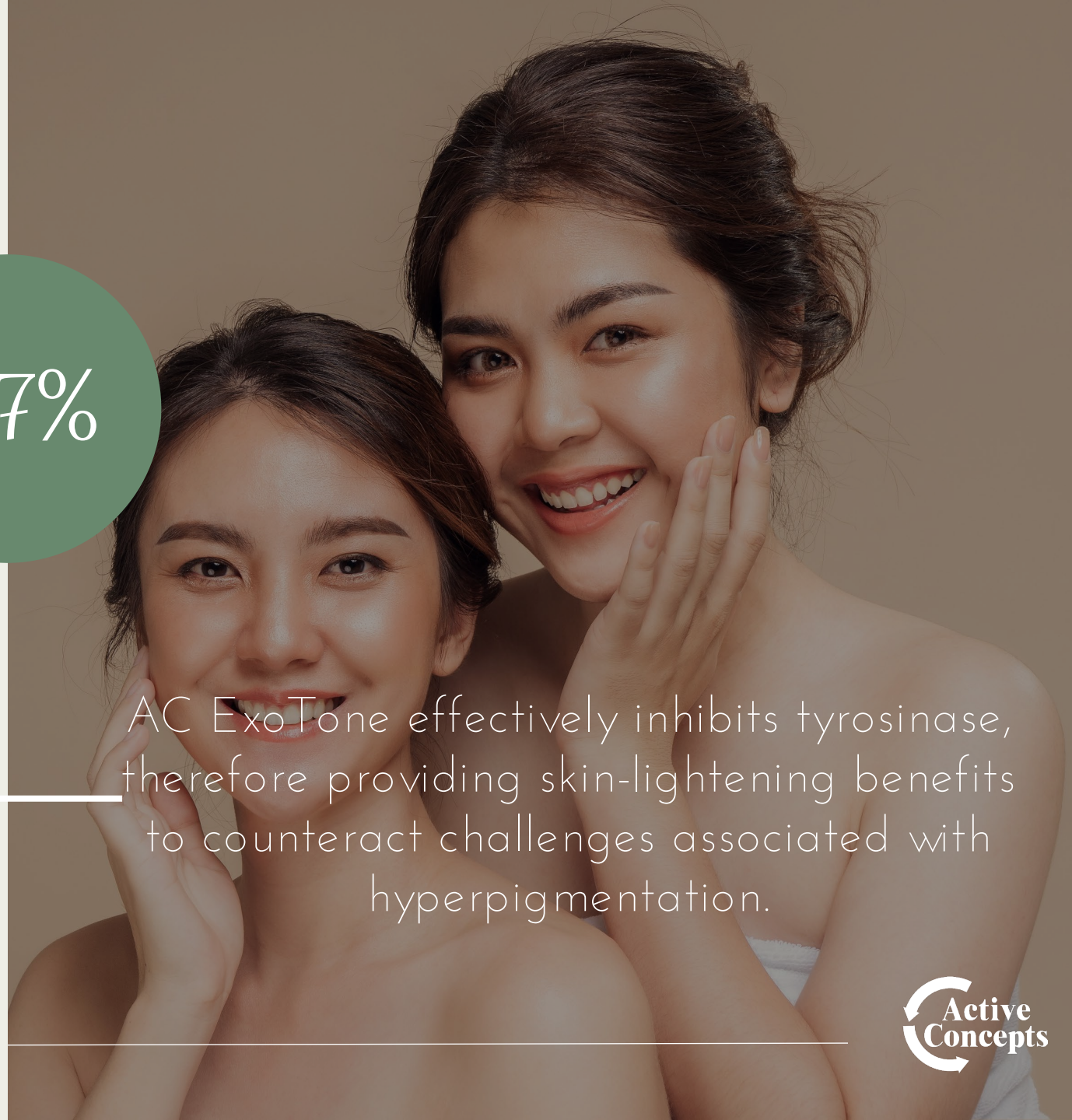


AC ExoTone was tested for its ability to inhibit tyrosinase, a key enzyme in melanin synthesis, indicating a potential component to reduce hyperpigmentation. The key active ingredient in AC ExoTone, *Pyrus malus* (Apple) Fruit Extract was tested to demonstrate the superior nature of BioAuthentic Exosome delivery systems.

While 1% of the *Pyrus malus* (Apple) Fruit Extract decreased tyrosinase inhibition by 25%, 1.25% of AC ExoTone increased tyrosinase inhibition by

-47%

Benefits



AC ExoTone effectively inhibits tyrosinase, therefore providing skin-lightening benefits to counteract challenges associated with hyperpigmentation.

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Cellular Renewal

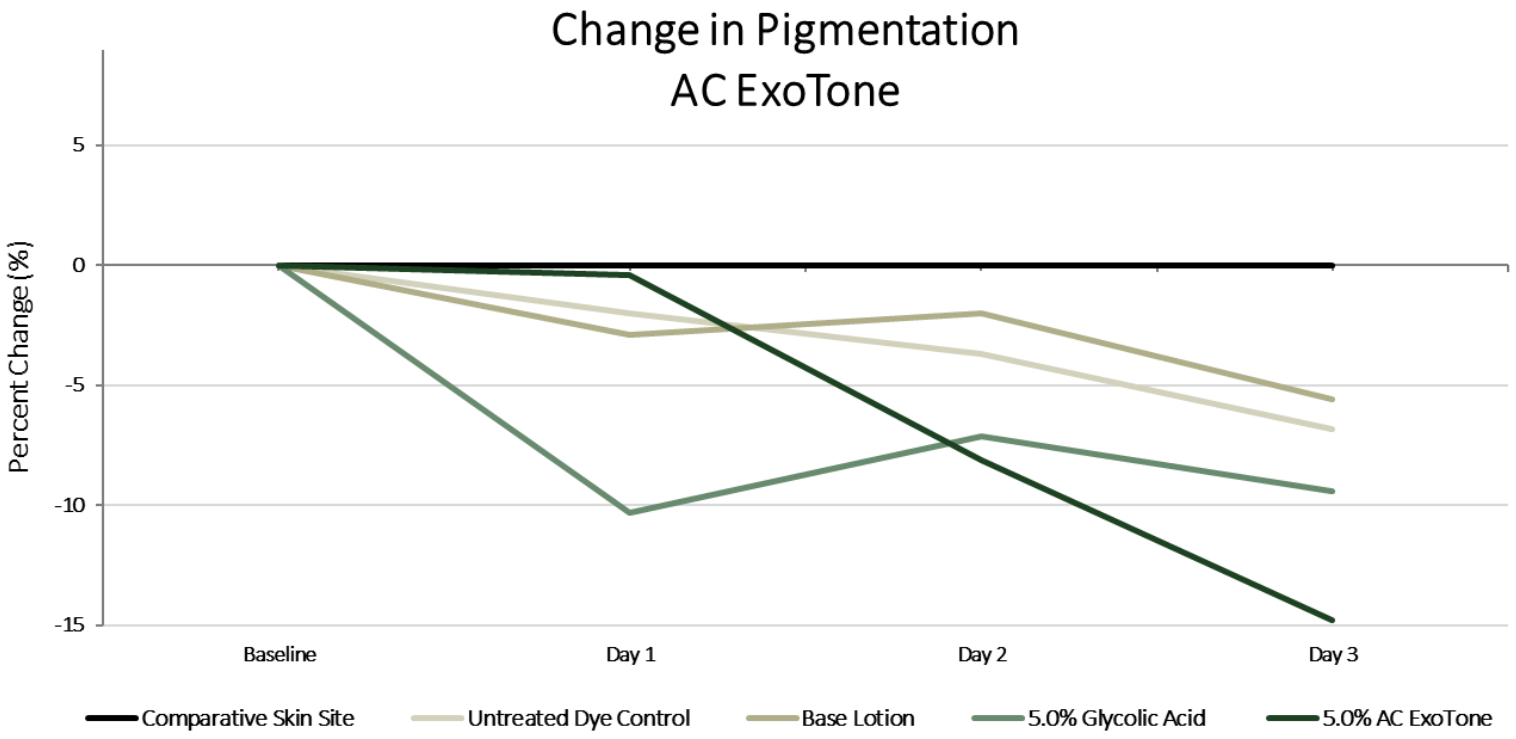
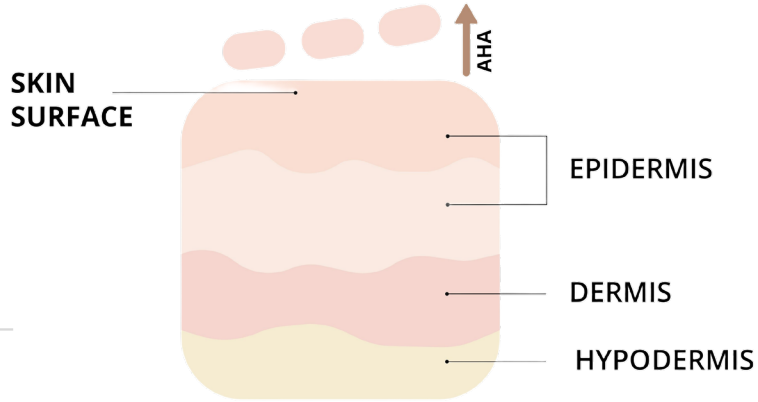


Fig 9. Percent Changes in Pigmentation.

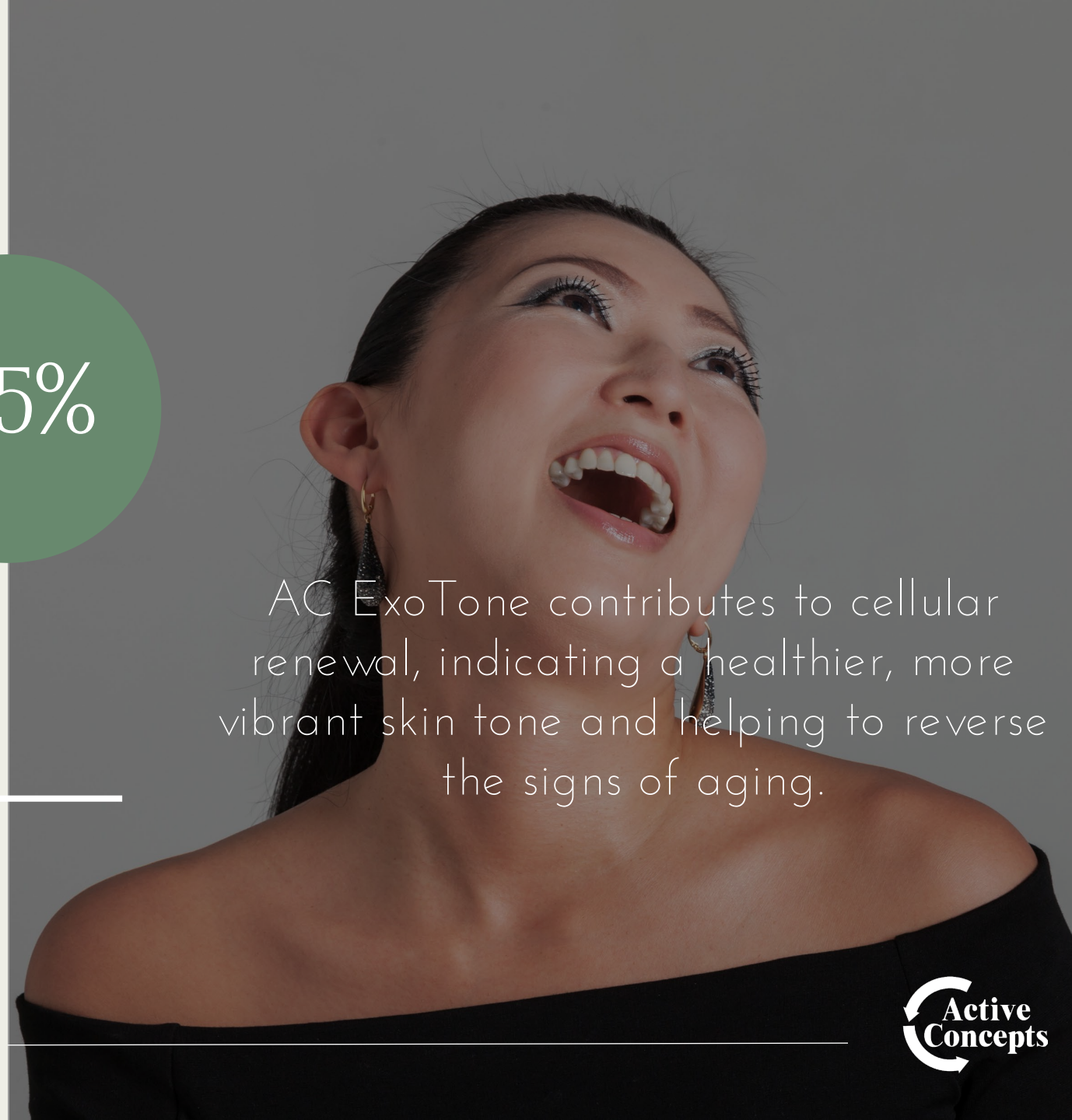


M/F volunteers, free of any skin pathologies, applied Dermal Dye Max to 4 identified test patches on the volar forearm and let it develop for 24 hours. The 5th site was a control with no applications. Participants applied 0.2 mg of each variable and pigmentation readings were taken every 24 hours for 4 days.

At 5%, AC ExoTone was able to induce a change in pigmentation over 4 days compared to the positive control by

+15%

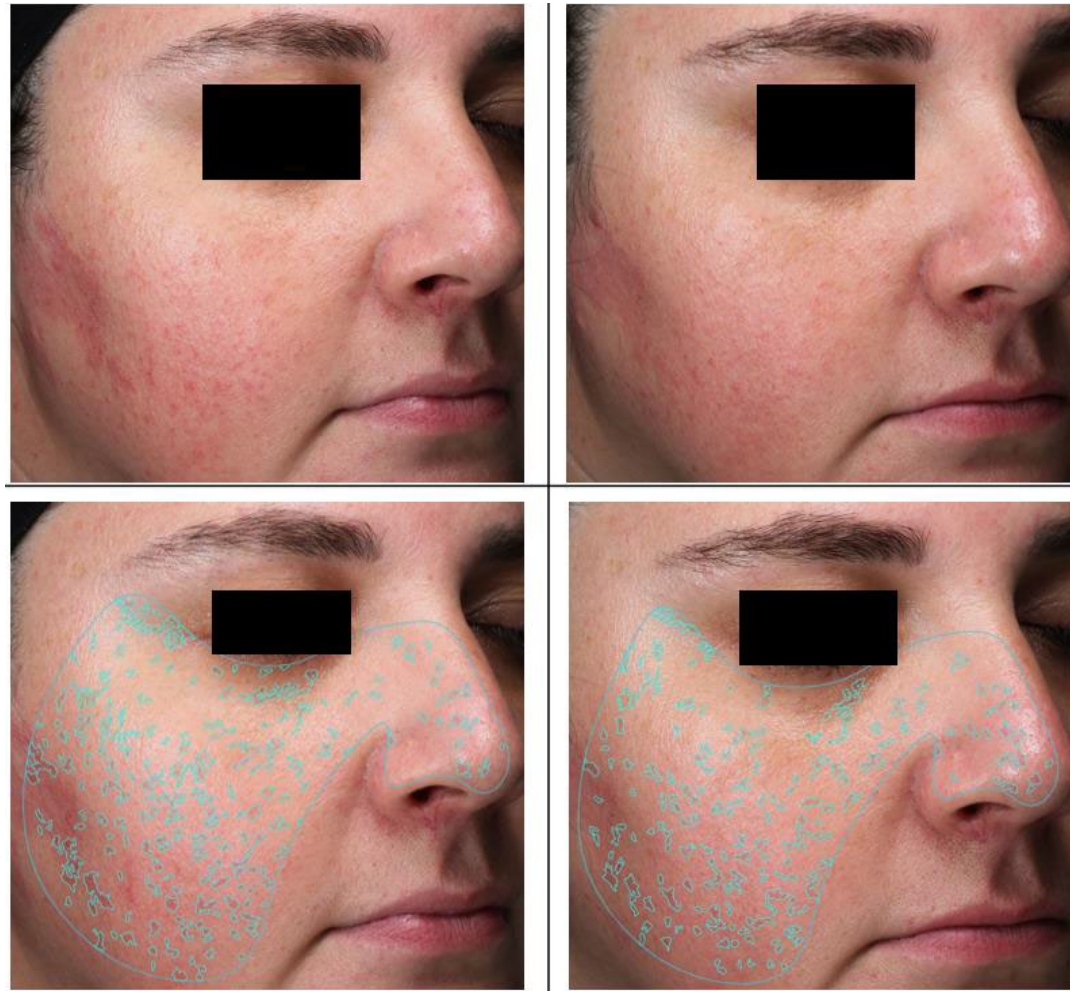
Benefits



AC ExoTone contributes to cellular renewal, indicating a healthier, more vibrant skin tone and helping to reverse the signs of aging.

Active Concepts

VISIA: Reduction in Cumulative Spots



T=0
200 Cumulative Spots

T=4 Weeks
169 Cumulative Spots

Fig 10. Images of Participant Treated with 3% AC ExoTone. Natural Photos (Top) and VISIA Image Enhancement (Bottom) Before and After 4 Weeks..

Photographic assessments were performed using the VISIA Complexion Analysis System. 10 M/F participants over the course of 6 weeks applied 3% AC ExoTone or a control to their faces with images taken once a week for 4 weeks and then for 2 weeks after application.

At 3%, AC ExoTone demonstrated a decreased cumulative spot count and simulated skin age compared to the baseline by

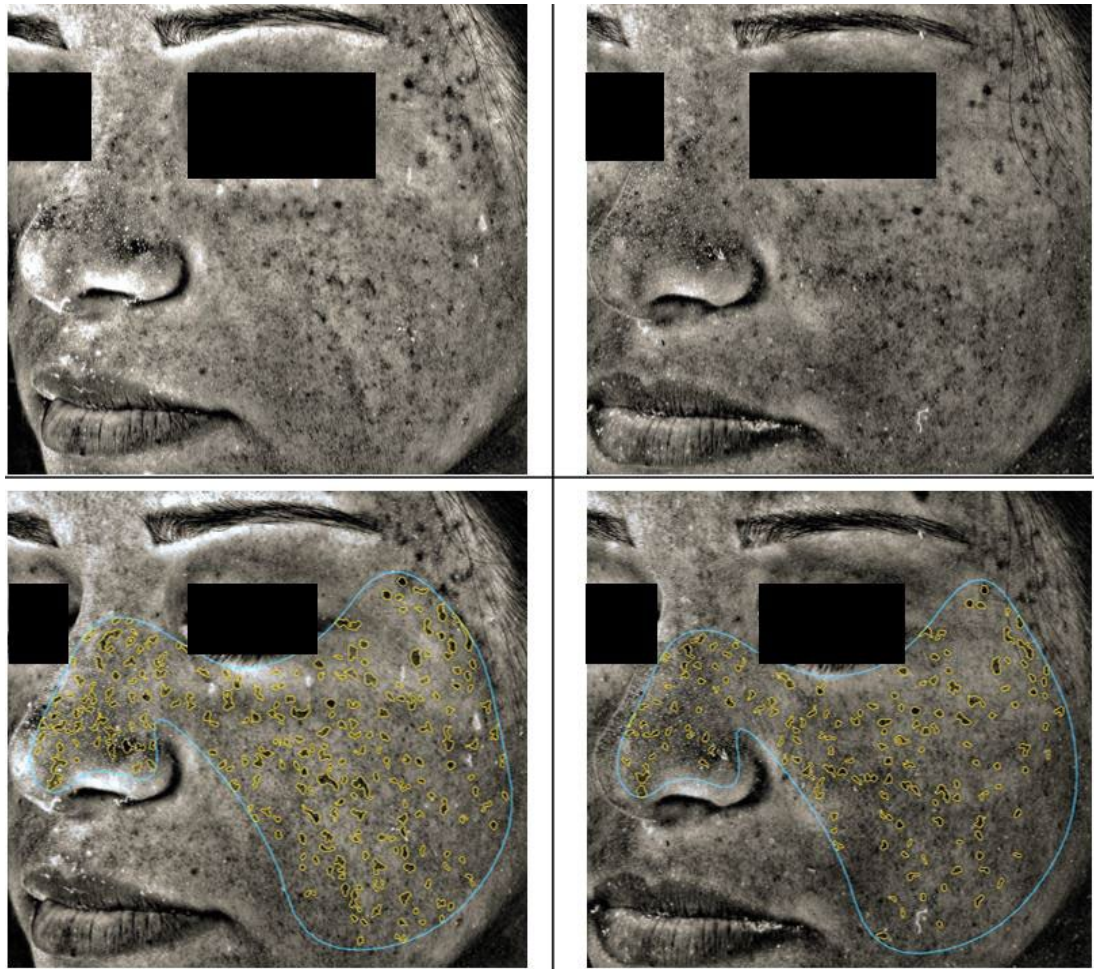
Benefits

–4%, 1 year

AC ExoTone improves skin health by reducing the number of spots present on the skin. Additionally, it can decrease simulated skin age, also proving the skin looks younger.

Active Concepts

VISIA: Reduction in UV Spots



T=0
219 UV Spots

T=4 Weeks
150 UV Spots

Fig 11. Images of Participant Treated with 3% AC ExoTone. Natural Photos (Top) and VISIA Image Enhancement (Bottom) Before and After 4 Weeks..

Photographic assessments were performed using the VISIA Complexion Analysis System. 10 M/F participants over the course of 6 weeks applied 3% AC ExoTone or a control to their faces with images taken once a week for 4 weeks and then for 2 weeks after application.

Active Concepts

At 3%, AC ExoTone decreased UV spot count and simulated skin age compared to the baseline by

−7%, 1 year

Benefits

AC ExoTone improves skin health by reducing the visual consequences of UV spots, providing a more even complexion.

Active Concepts

VISIA: Reduction in Visible Pores

Baseline
251 Pores

After 4 Weeks
215 Pores

Fig 12. Images of Participant Treated with 3.0% AC ExoTone. Natural photos (top) and VISIA Image Enhancement (bottom) Before and After Four weeks.

Photographic assessments were performed using the VISIA Complexion Analysis System. 10 M/F participants over the course of 4 weeks applied 3% AC ExoTone or a control to their faces with images taken once a week for 4 weeks.

Active Concepts

At 3%, AC ExoTone decreased the appearance of pores and simulated skin age over the course of 4 weeks compared o the baseline by

–14%, 9 months

Benefits

AC ExoTone is able to improve the overall appearance of aging by reducing the appearance and size of visible pores.

Active Concepts

Summary

WHAT. AC ExoTone is a natural BioAuthentic Exosomal delivery system that **harmonizes skin tone**.

WHY. AC ExoTone harnesses the power of **natural alpha hydroxy acids** to promote cellular renewal.

MADE OF. AC ExoTone sources apples from Italy and Taiwan, and supports Active Concepts' hometown of Lincolnton, NC by **upcycling apples** from their apple festival.

ACTION. AC ExoTone revolutionizes delivery systems in cosmetics, targeting the specific benefit of **evening skin tone**. Allow this innovative ingredient to efficiently harmonize your skin!

AC ExoTone

Active Concepts

Code: 60194

INCI: Water & Pyrus Malus (Apple) Fruit Extract & Phospholipids

Appearance: Liquid Exosomal Dispersion, Light Beige to Tan

Suggested Use Level: 1-10%

Suggested Applications: Even Skin Tone, Cellular Renewal

Standardized for: Activity: Tyrosinase Inhibition, Protein, Particle Size

In Vitro

In Vivo

ISO 16128
NI & NOI

Vegan Compliant

COSMOS Compliant

China Compliant

Product Passport

03
AC ExoRestore

INCI: *Water & Momordica Charantia Fruit Extract & Phospholipids*

Foster Skin Recovery

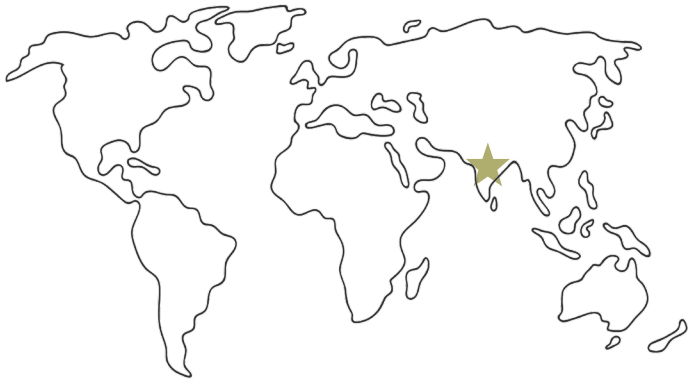
Skin is sensitive and can easily acquire injuries from acne breakouts, microtears, harsh exfoliation, and outside stressors. However, topically applying prebiotics allows the skin microbiome to rebalance, therefore initiating soothing and wound healing benefits.

AC ExoRestore encapsulates bitter melon extract, as bitter melons are known to contain prebiotics. Rebalancing our skin with prebiotics acts as an internal instructor for our immune system, leading to skin restoration.

wound healing | bitter melon prebiotics | restoration

Active Concepts

Farm Level Sourcing



Bitter Melon From India

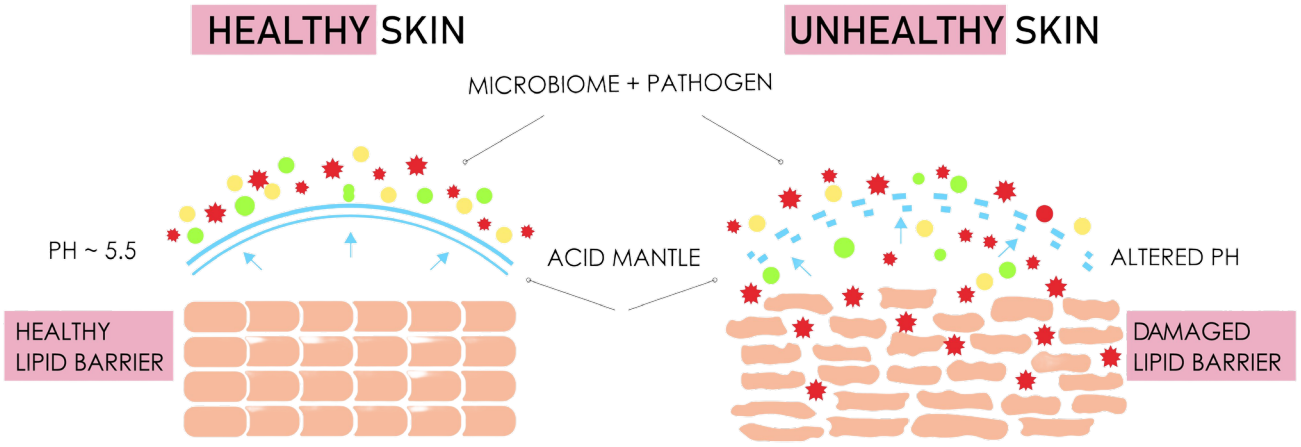
Active Concepts sources bitter melon from India and ships them to our 3 manufacturing sites in the US, Italy, and Taiwan. The husband-and-wife team runs a family business that has been around for 180 years.

Their soil is free from fertilizers and pesticides, ensuring nutrient-rich soil. They work closely with neighboring small family farmers to also share their products. Sustainably providing high-quality products, they are able to focus on family tradition while still practicing innovation.

Active Concepts

Skin Immunity

Prebiotics are compounds that foster growth or activity of beneficial microorganisms, such as bacteria and fungi.



Mechanism

Our skin is composed of a microbiome, and when the commensal-pathogenic ratio is off, this can cause a disrupted skin barrier.

Topically applying prebiotics helps the skin to produce certain antimicrobial amino peptides that benefit the immune responses in the skin, helping to eliminate pathogens and encourage wound healing.

AC ExoRestore Available Efficacy Studies

In Vitro .

- Sirius Red Fast Green Assay*
- Scratch Assay

In Vivo .

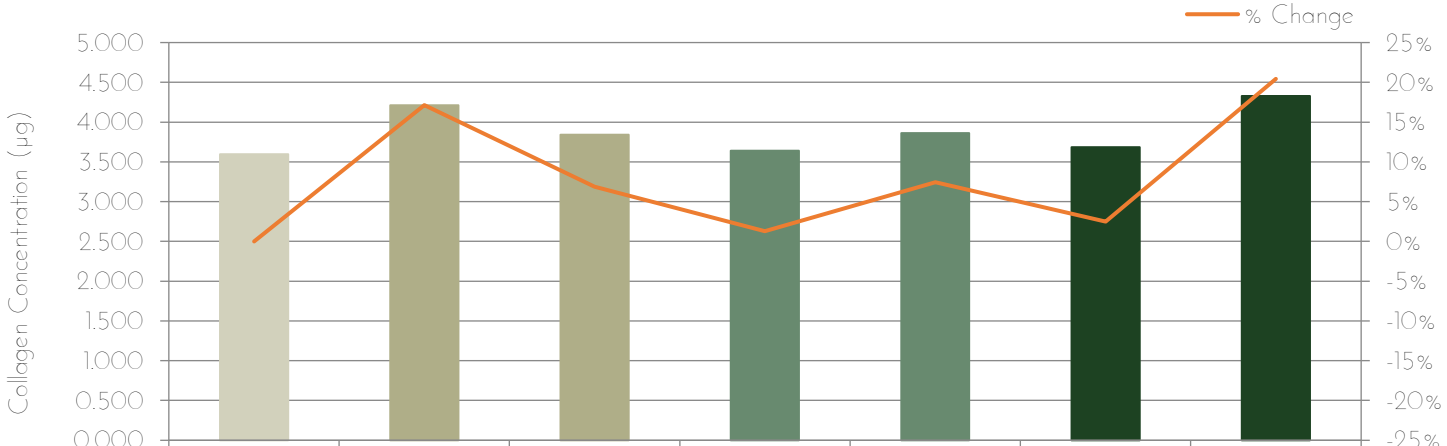
- DermaLab Ultrasound Skin Density

*Standardized Activity

Safety & Tox

- AMES
- Cellular Viability
- Dermal and Ocular
- Phototoxicity
- OECD 201 Freshwater Alga Growth Inhibition
- OECD 301B Ready Biodegradability
- OECD TG 42C – Direct Peptide Reactivity Assay
- OECD TG 42D In Vitro Skin Sensitization Report

Sirius Red Fast Green



	Complete Media	AA2G (100 µM)	IGF-1 (50 ng/mL)	0.002% Momordica charantia Fruit Extract	0.02% Momordica charantia Fruit Extract	0.01% AC ExoRestore	0.1% AC ExoRestore
Collagen (ug)	3.594	4.210	3.842	3.641	3.862	3.684	4.329
% Change	0%	17%	7%	1%	7%	3%	20%

Fig 13. The Effect of **AC ExoRestore** on Collagen Concentrations.

Sirius Red is a unique dye that binds to helical structures of types I through V collagen, while Fast Green binds to non-collagenous proteins. These two dyes work in conjunction to provide a semi-quantitative method for determining amounts of collagen and non-collagenous proteins in a sample. AC ExoRestore was tested against the main ingredient component, *Momordica charantia* (Bitter Melon) Fruit Extract to demonstrate the superior nature of BioAuthentic Exosomal delivery systems.

Fibroblasts treated with 0.01% and 0.1% AC ExoRestore increased collagen synthesis by

+3% and +20%

Benefits

While the bitter melon extract alone only increased collagen synthesis by 1% ad 7%.

AC ExoRestore effectively increases collagen production that may lead to improvements in dermal-epidermal junction integrity.

Active Concepts

Scratch Assay

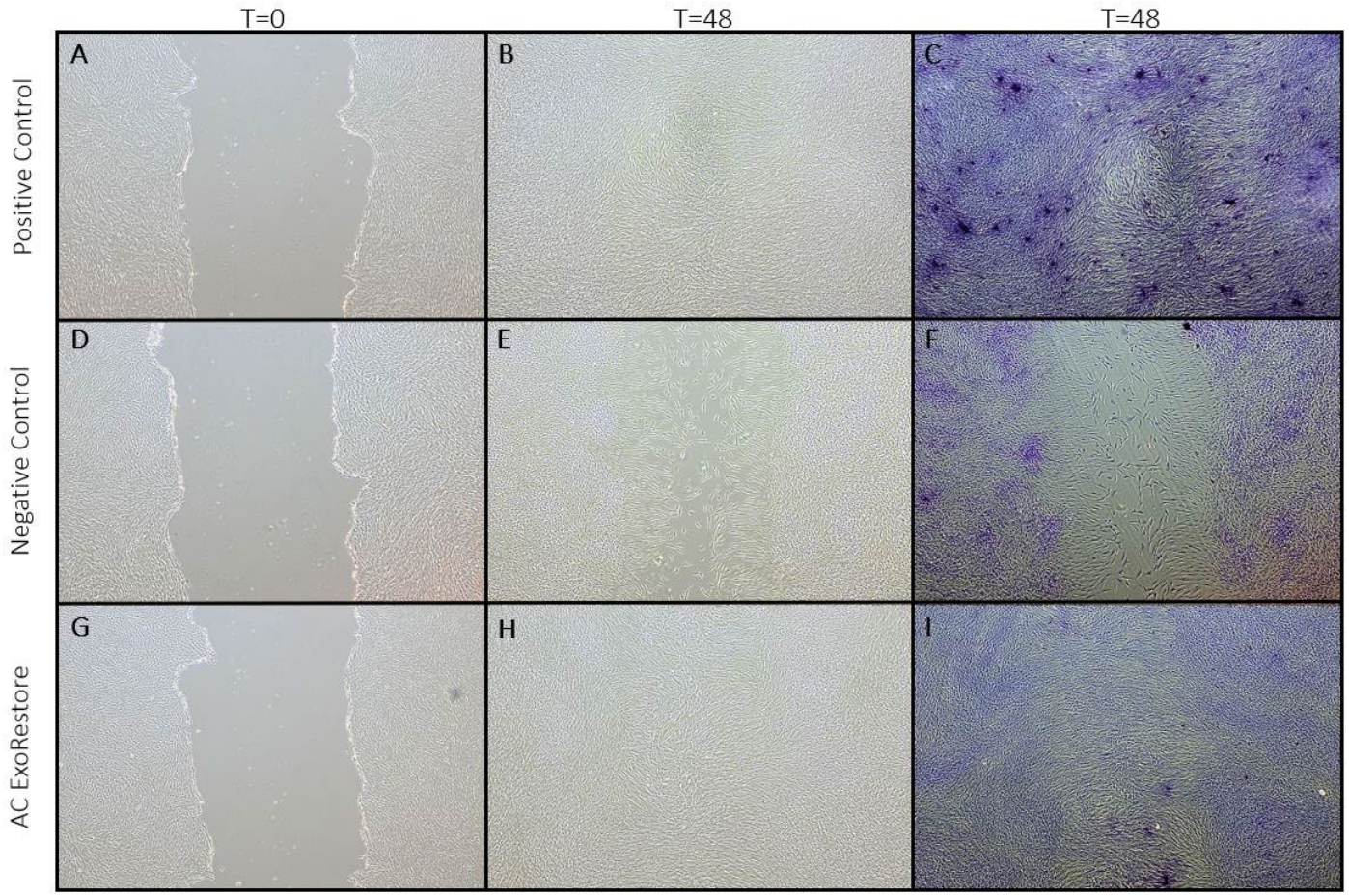
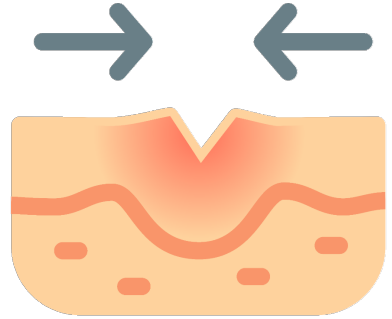


Figure 14. Images of EGF-1 (positive control), Serum Free Complete Media (negative control), and 0.01% AC ExoRestore at t=0 (A, D, G) and t=48 (B, E, H). At experiment completion (t=48), cells were fixed in paraformaldehyde and stained with crystal violet (C, F, I).

Wound Healing Process



Wounded tissue begins a complex and structured series of events in order to repair the damaged region. Some of these events include upregulation of angiogenic factors, causing increased vascularization, increased deposition of extracellular matrix, and increased cell proliferation.

Fibroblasts treated with 0.01% AC ExoRestore increased cell migration after 48 hours by

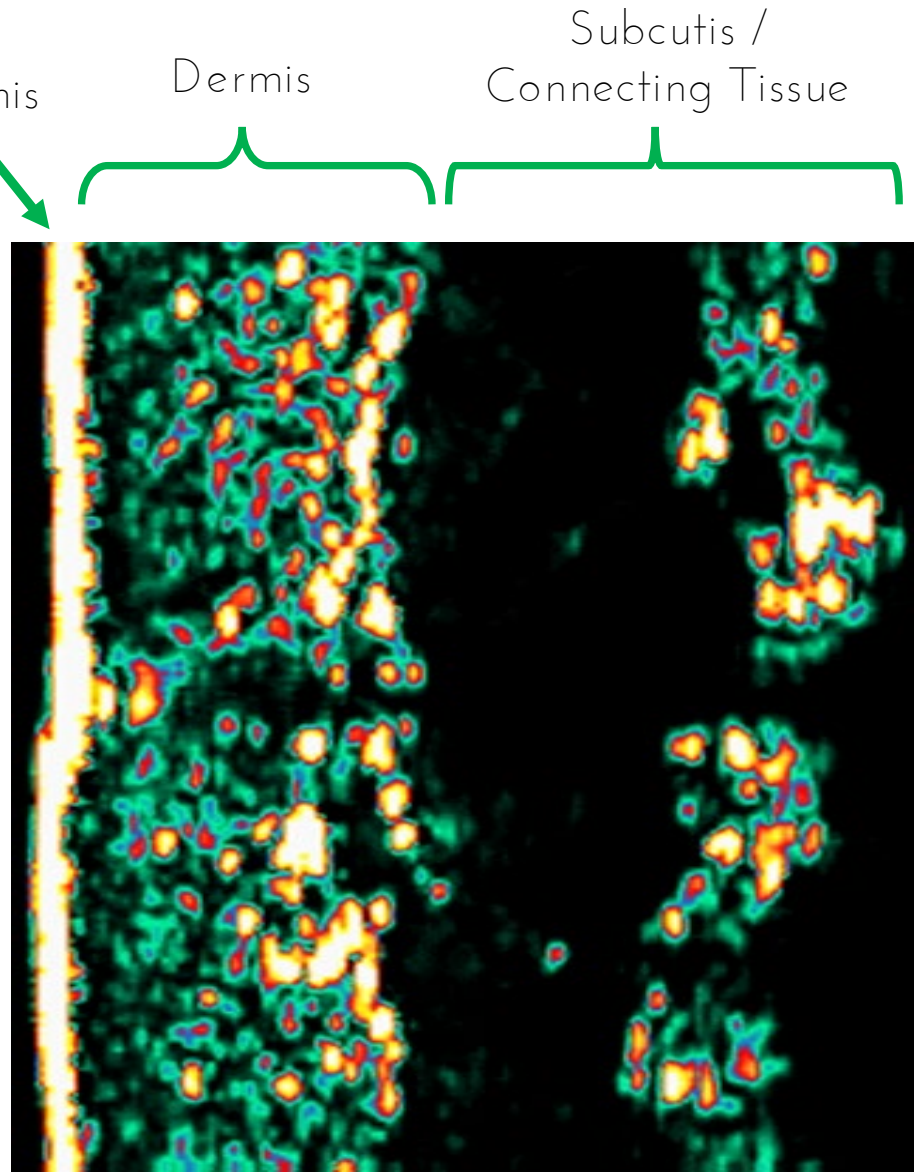
+100%

Benefits

AC ExoRestore has wound healing properties and triggers cellular migration, restoring the skin's balance at a quicker rate.

Active Concepts

High Resolution Ultrasound Skin Imaging Assay



As we age, collagen naturally decreases resulting in sagging, wrinkles, and fine lines. A High-Resolution Ultrasound Skin Imaging Assay was conducted to assess the ability of AC ExoRestore to improve the **Dermal Age-Band, Dermal Collagen Thickness, and Collagen Fiber Density**.

Ultrasound skin imaging is based on measuring reflections of an emitted acoustic pulse that are transmitted into the skin. After processing the reflected signals, a cross-sectional image is generated based on the intensity of the reflected signals.

Signal intensity is converted to a color scale with **dark colors representing areas of low reflection**. This means that there are no changes, or very small changes, in density between the structures in the skin. **Bright colors represent areas with strong reflection** indicating substantial changes in density between structures.

High Resolution Ultrasound Skin Imaging Assay

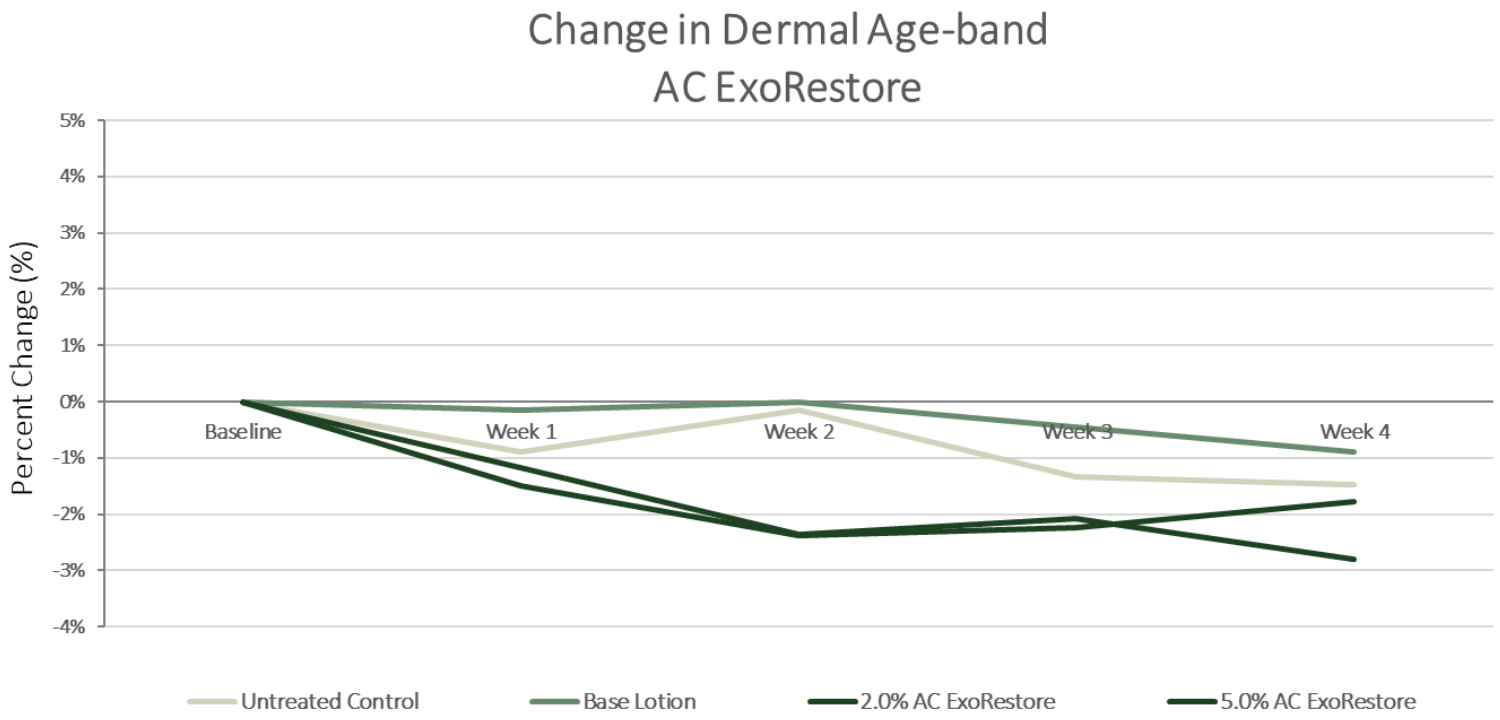


Fig 15. Percent Change in Dermal Age-Band Relative to Baseline.

Dermal Age-Band represents the area just behind the epidermis with higher values indicative of aging and photo damage.

14 volunteers between the ages of 22 and 45, known to be free of any skin pathologies, participated in this study. Four randomly assigned test sites were identified on the volar forearm and baseline measurements were recorded. Following baseline, participants applied 0.2g of each test material on their forearms twice a day for four weeks. Readings were recorded once a week.

High Resolution Ultrasound Skin Imaging Assay

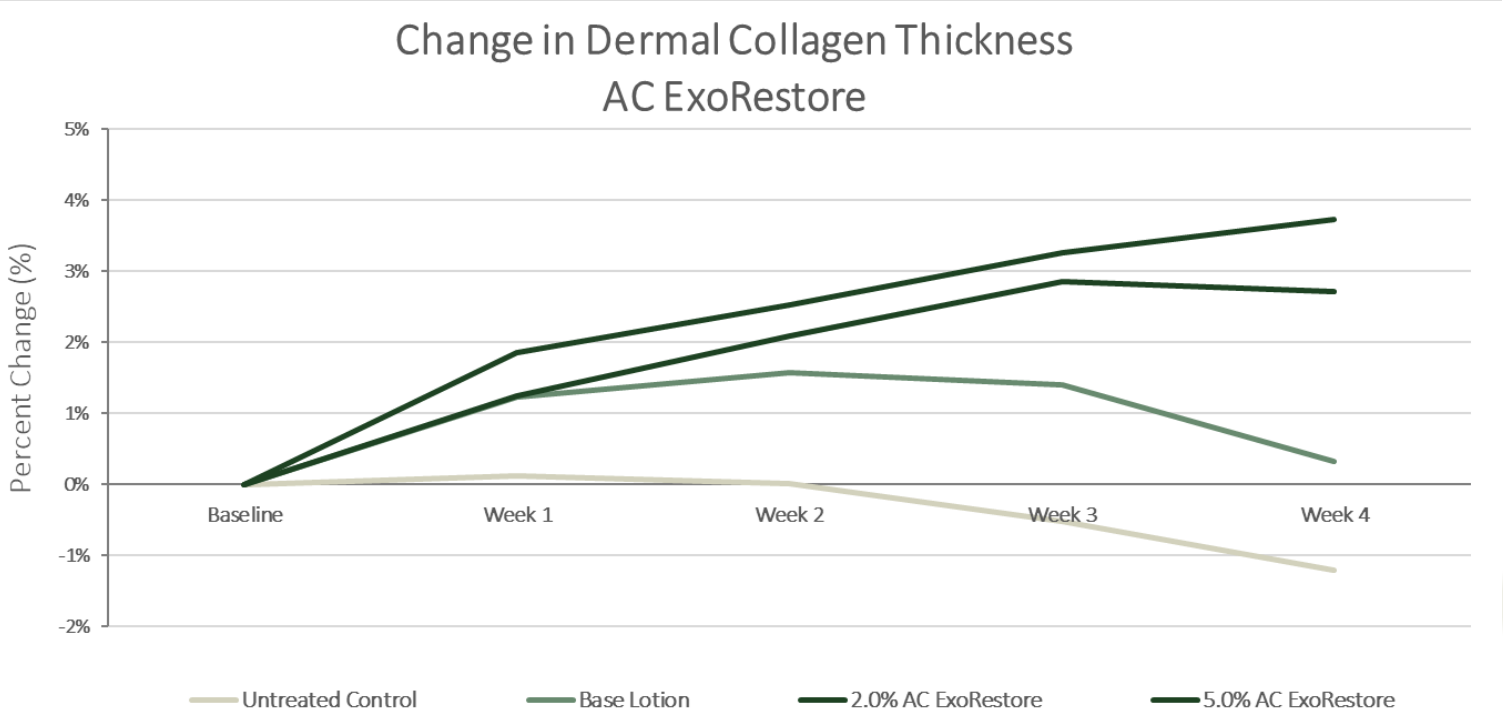


Fig 16. Percent Change in Dermal Collagen Thickness Relative to Baseline.

Dermal collagen thickness measures the area behind the epidermis to the back of the dermis, with lower values correlating with age and less collagen.

14 volunteers between the ages of 22 and 45, known to be free of any skin pathologies, participated in this study. Four randomly assigned test sites were identified on the volar forearm and baseline measurements were recorded. Following baseline, participants applied 0.2g of each test material on their forearms twice a day for four weeks. Readings were recorded once a week.

High Resolution Ultrasound Skin Imaging Assay

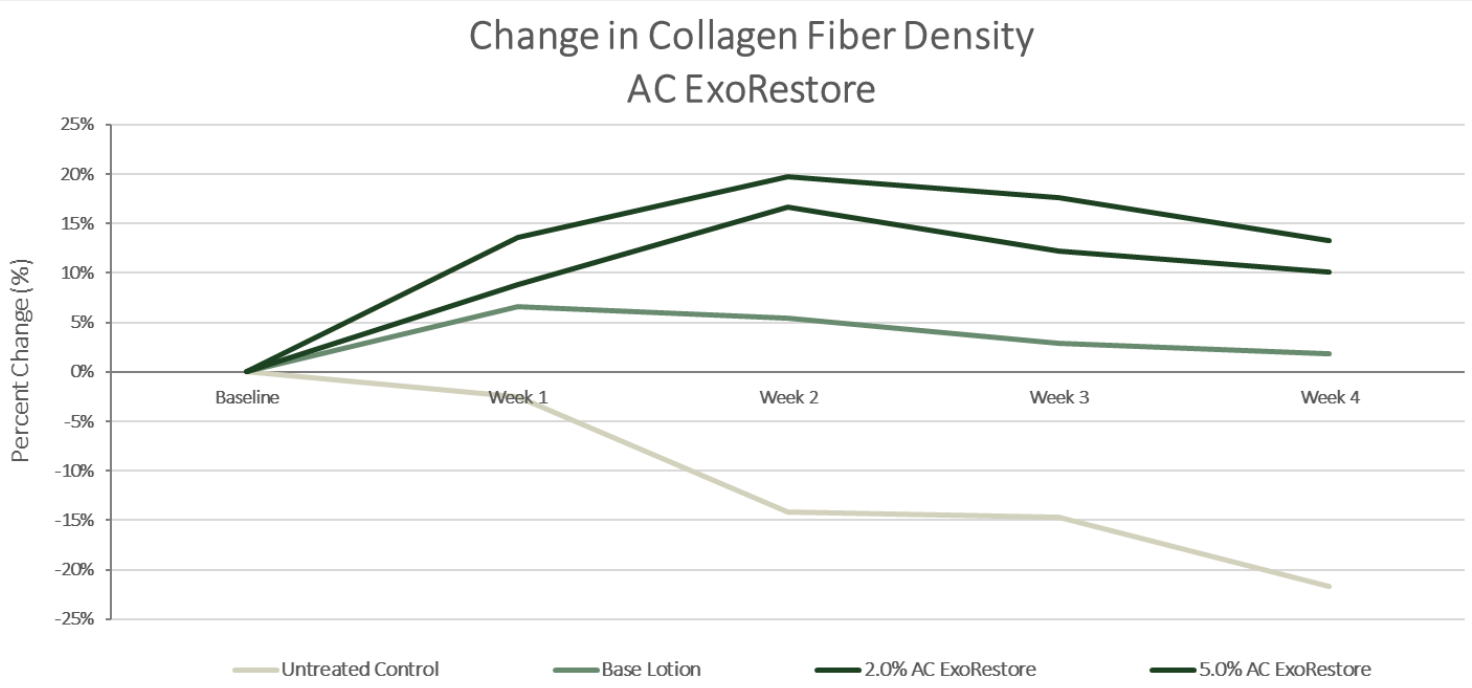


Fig 17. Percent Change in Collagen Fiber Density Relative to Baseline.

Collagen fiber density is an indicator of the amount of collagen within the dermis, with greater intensities correlating with higher levels of collagen.

14 volunteers between the ages of 22 and 45, known to be free of any skin pathologies, participated in this study. Four randomly assigned test sites were identified on the volar forearm and baseline measurements were recorded. Following baseline, participants applied 0.2g of each test material on their forearms twice a day for four weeks. Readings were recorded once a week.

5.0% AC ExoRestore improves normal skin aging by reducing Dermal Age-Bound values, increasing Dermal Collagen Thickness, and increasing Collagen Fiber Density after 4 weeks by

–3%, +4%, and +13%

Benefits

AC ExoRestore effectively improves normal skin aging, collagen thickness, and collagen density when added to personal care applications.

Active Concepts

Summary

WHAT.

AC ExoRestore is a natural BioAuthentic Exosomal delivery system that **fosters wound healing**.

WHY.

AC ExoRestore harnesses the power of topically applying a **natural source of prebiotics** to stimulate an immune response by the skin.

MADE OF.

AC ExoRestore sources **bitter melon** from a family-owned farm in India, as bitter melons are known to contain natural prebiotics.

ACTION.

AC ExoRestore revolutionizes delivery systems in cosmetics, targeting the specific benefit of **enhancing wound healing**. Allow this innovative ingredient to efficiently repair the skin barrier!

AC ExoRestore

Code: 60195

INCI: Water & Momordica Charantia Fruit Extract & Phospholipids

Appearance: Liquid Exosomal Dispersion, Light Beige to Tan

Suggested Use Level: 1-10%

Suggested Applications: Encourage Wound Healing, Repair Skin Barrier

Standardized for: Activity: SRFG, Protein, Particle Size

In Vitro

In Vivo

ISO 16128 NI & NOI

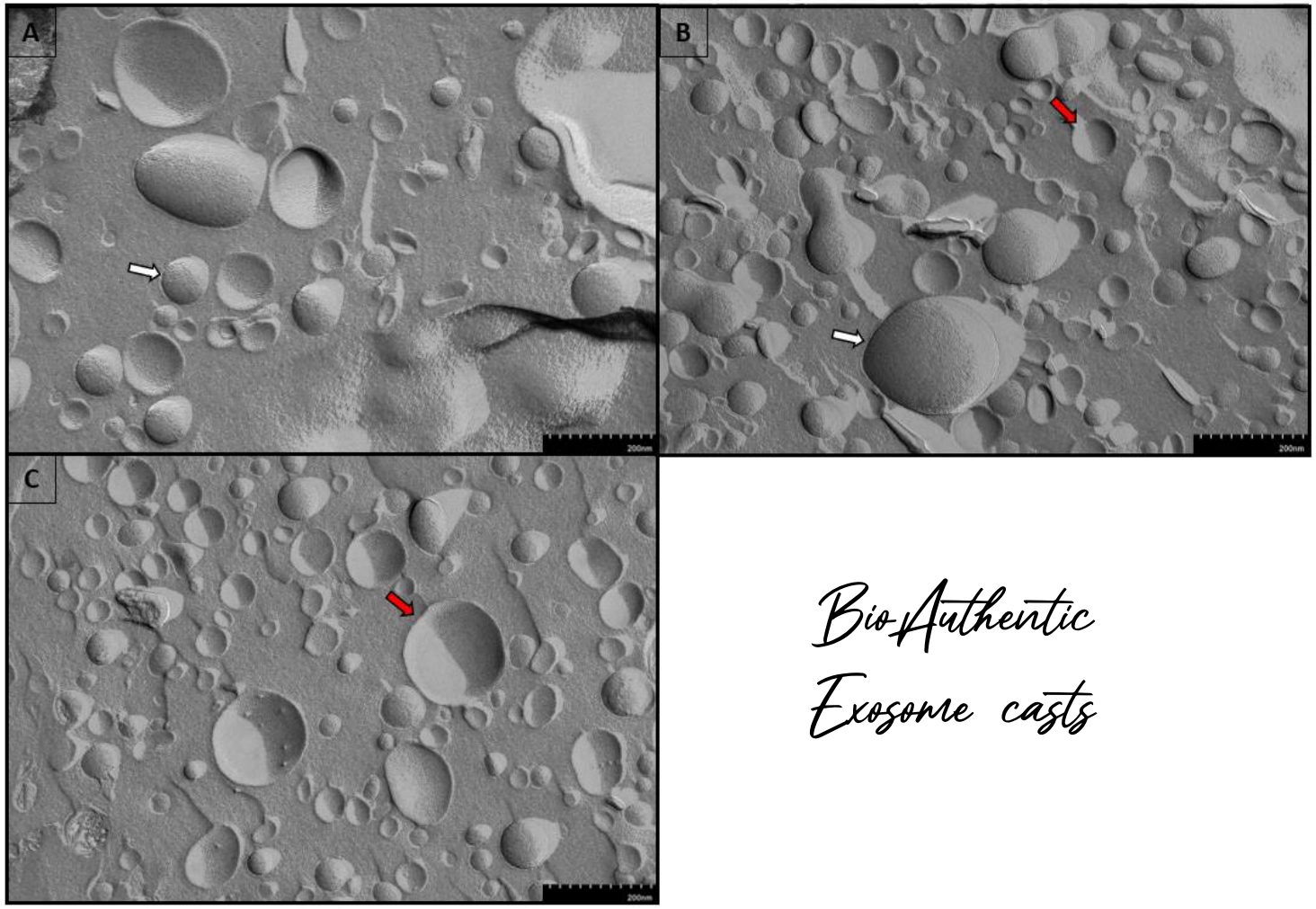
Vegan Compliant

COSMOS Compliant

China Compliant

Product Passport

Transmission Electron Microscopy



Bio-Authentic Exosome casts

Freeze fracture transmission electron microscopy (TEM) was utilized to confirm the presence and size of BioAuthentic Exosomes. The exosomes were sandwiched between two small blank metal disks and plunge-frozen in liquid ethane. The metal disks were fractured open under liquid nitrogen temperatures and the freshly cleaved surfaces were coated with platinum and carbon to make a cast. The TEM microscope accelerates a beam of electrons through the platinum-carbon cast and imprints an image that is detected.

Fig 18. TEM Images of BioAuthentic Exosomes at 60x magnification. The red and white arrows, respectively, indicate examples of "craters" or "bubbles" in the platinum-carbon cast, demonstrating the presence, size, and structure of BioAuthentic Exosomes.

Introducing BioAuthentic Exosomes

The personal care industry is a **perpetual state of evolution**, driven by innovation and a commitment to meeting the ever-changing needs of consumers. In this dynamic landscape, we are excited to introduce to our customers the opportunity to participate in the innovation that is **BioAuthentic Exosomes**.

Embrace the future of the cosmetics industry – a future that combines innovation, natural goodness, and advanced delivery systems to elevate your skincare and haircare routine to new heights.

Active Concepts

Evolving Technology • Sustainable Practices • Brand Differentiation • Targeted & Enhanced Benefits

References

1. https://www.khanacademy.org/science/biology/cellular-respiration-and-fermentation/glycolysis/a/glycolysis
2. https://www.khanacademy.org/science/ap-biology/cellular-energetics/cellular-respiration-ap/a/oxidative-phosphorylation-etc
3. Kalluri R, LeBleu VS. The biology, function, and biomedical applications of exosomes. Science. 2020 Feb 7;367(6478):eaau6977. doi: 10.1126/science.aau6977. PMID: 32029601; PMCID: PMC7717626.
4. Hannafon BN, Ding WQ. Intercellular communication by exosome-derived microRNAs in cancer. Int J Mol Sci. 2013 Jul 9;14(7):14240-69. doi: 10.3390/ijms140714240. PMID: 23839094; PMCID:PMC3742242.
5. Chaudhry R, Varacallo M. Biochemistry, Glycolysis. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.govbooks/NBK482303/
6. Cooper GM. The Cell: A Molecular Approach. 2nd edition. Sunderland (MA): Sinauer Associates; 2000. The Mechanism of Oxidative Phosphorylation. Available from: https://www.ncbi.nlm.nih.gov/booksNBK9885/
7. Wanninger, Andrea, et al. "Upcycling of plant residuals to cosmetic ingredients." Int. J. Agric. Eng. Technol. Soc. Sci 1 (2020).
8. Kornhauser, Andrija, Sergio G. Coelho, and Vincent J. Hearing. "Applications of hydroxy acids: classification, mechanisms, and photoactivity." Clinical, cosmetic and investigational dermatology (2010):135-142.
9. Dandawate, Prasad R., et al. "Bitter melon: a panacea for inflammation and cancer." Chinese journal of natural medicines 14.2 (2016): 81-100.
10. Hartajanie, Laksmi, et al. "Probiotics fermented bitter melon juice as promising complementary agent for diabetes type 2: study on animal model." Journal of nutrition and metabolism 2020 (2020).
11. Habeebuddin, M.; Karnati, R.K.; Shiroorkar, P.N.; Nagaraja, S.; Asdaq, S.M.B.; Khalid Anwer, M.; Fattepur, S. Topical Probiotics: More Than a Skin Deep. Pharmaceutics 2022, 14, 557. https://doi.org/10.3390pharmaceutics14030557

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