

MIREXOS 

PhytoSpherix™

The Next Revolution in Anti-Aging

# PhytoSpherix™

The trend towards multifunctional cosmetics relies on the development of innovative materials that can do more with less.

**PhytoSpherix™** is a completely natural form of glycogen, sourced and produced from plants by a patent pending new green process in Canada.

**Mirexus Inc** is research intensive company focussed entirely on commercializing phytoglycogen in the personal care sector. We are building our own manufacturing facility set to produce 4 tons/year next year, and scaling to 300 tons/year as sales grow.

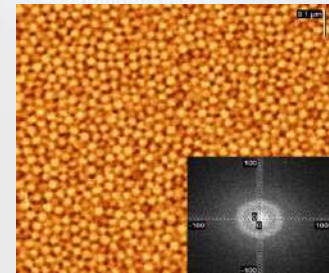


# What is Glycogen?

- Glycogen is a natural material found in most living organisms
  - One of nature's ways to store energy
    - A natural polysaccharide (sugar)
- Glycogen is commonly extracted from animal sources, but has limitations:
  - Difficult to extract
  - Difficult to purify (animal proteins)
  - Polydisperse
- Glycogen extracted from plants is called *phytoglycogen*
- In 2008 Mirexus discovered that **the true native form of glycogen in sweet corn is a monodisperse particulate material**
- Mirexus also discovered that it can be isolated in its natural state
  - **No chemicals, enzymes or harsh conditions**
    - Low proteins & lipids
    - No animal proteins
    - No glycogen debris
    - Extremely uniform
- Only use non-GMO sweet corn



## Monodisperse



The main reason our material has such unique properties

# Regulatory Compliance

**PhytoSpherix™ is not classified as a nanomaterial by cosmetic regulatory and certification bodies (Health Canada, EU, COSMOS, ACO etc.) because:**

- PhytoSpherix™ is water soluble (individual molecules remain in solution indefinitely)
  - PhytoSpherix™ is not biopersistent – the material is quickly and easily degraded to simple sugars in the environment and in the body
  - PhytoSpherix™ is not intentionally manufactured – it is simply extracted from sweet corn in the same state as it is found in nature
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## Global Acceptance

**PhytoSpherix™ (INCI: Glycogen):**

- Is listed on the Inventory of Existing Cosmetics Ingredients in China (IECIC)
- Does not contain any of the prohibited or restricted ingredients on the Health Canada Cosmetic Ingredient Hot List
- Is compliant with the Korean Cosmetic Products Act (KPCA)
- Is compliant with the ASEAN Cosmetics Directive
- Is REACH exempt - According to Annex V of Regulation (EC) No. 1907/2006 (REACH)

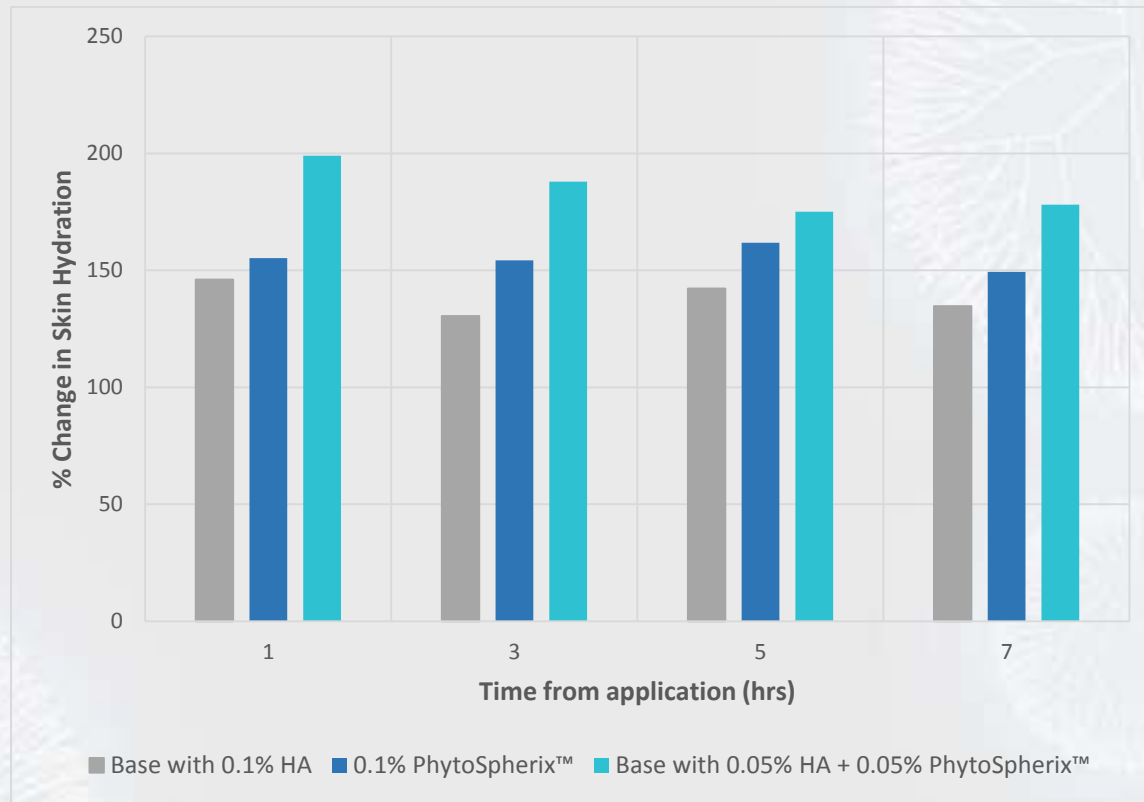
# PhytoSpherix™



## A superb moisturizer

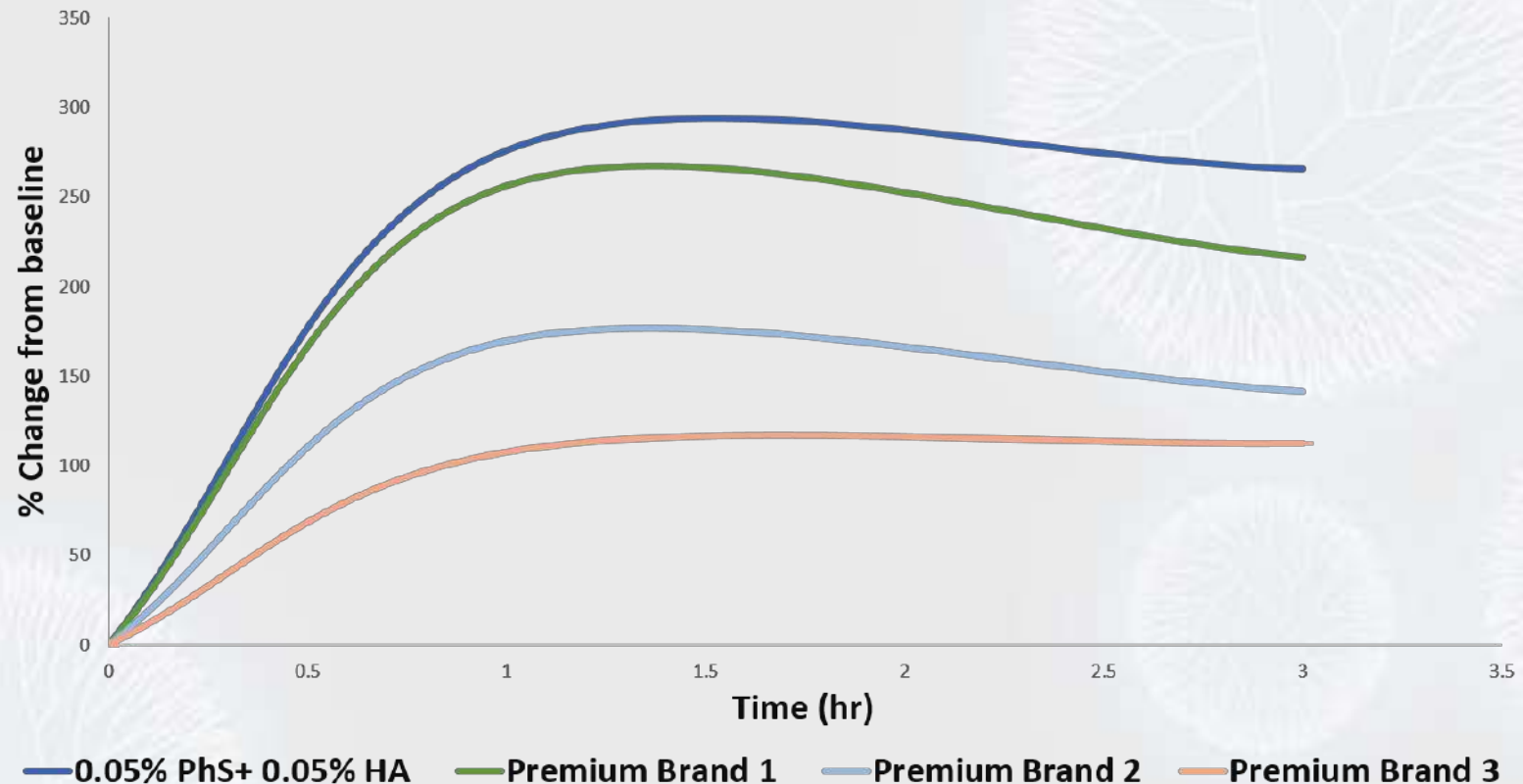
Tightly holds water for long periods of time and boosts hydration performance when used on its own or in combination with HA (hyaluronic acid)

# Moisturizer: Synergy with Hyaluronic Acid



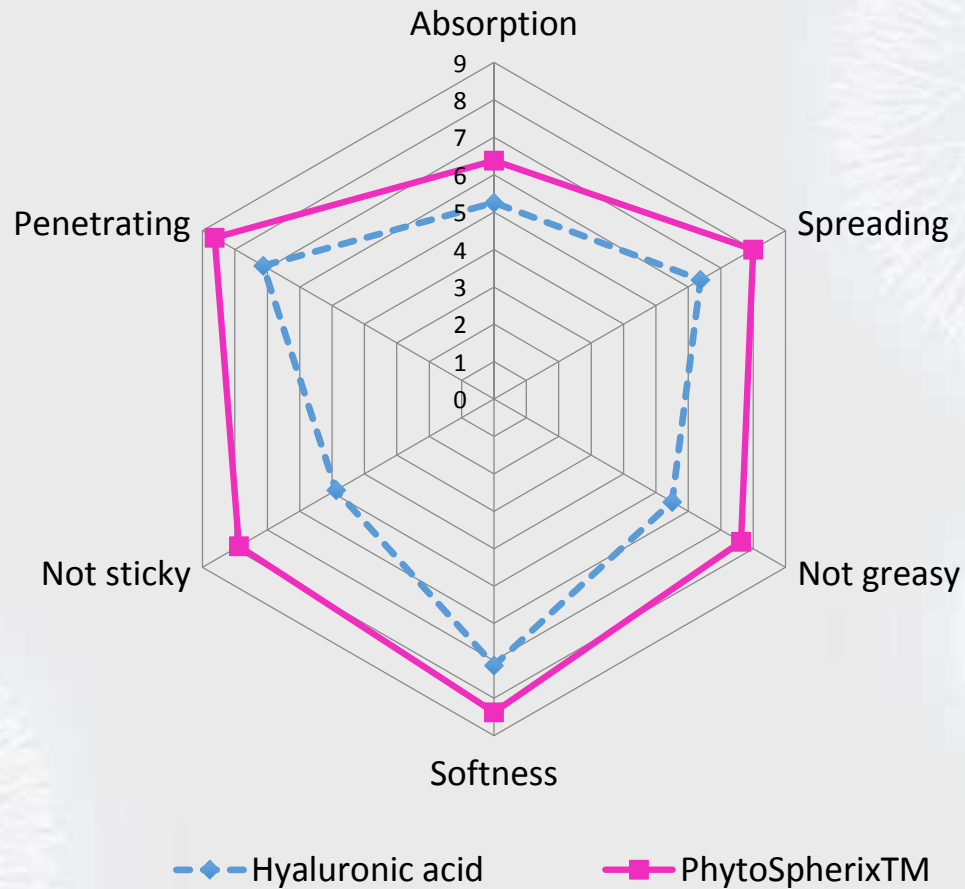
Hydrating effect of **PhytoSpherix™** compared to and in synergy with Hyaluronic Acid. Provides long-lasting hydration with enhanced sensory appeal.

# Comparison to Premium Creams on the Market



Combinations of **PhytoSpherix™** and hyaluronic acid perform better than premium creams on the market

# Moisturizers: Sensory Profile



The cream containing **PhytoSpherix™** was favoured by 100% of panelists over the same moisturizer formula with hyaluronic acid

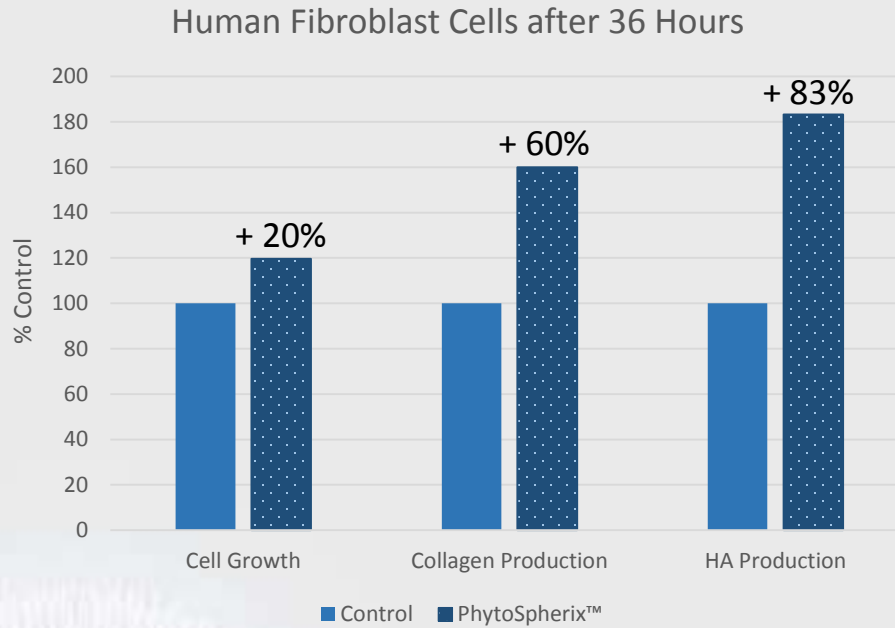
# PhytoSpherix™



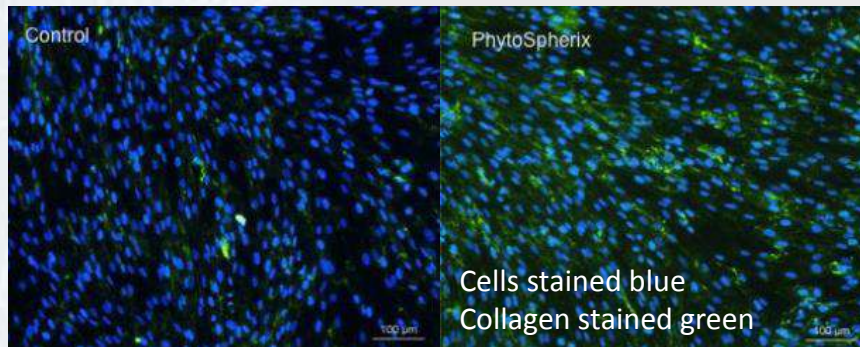
## A powerful anti-aging ingredient

PhytoSpherix™ increases cellular metabolism and promotes collagen and hyaluronic acid production in skin cells

# Anti-Aging: Cellular Response

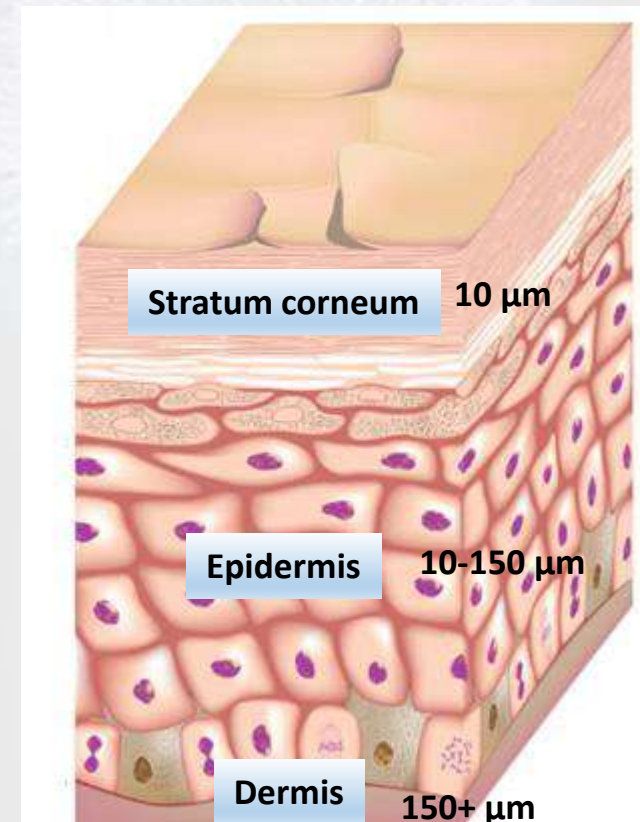
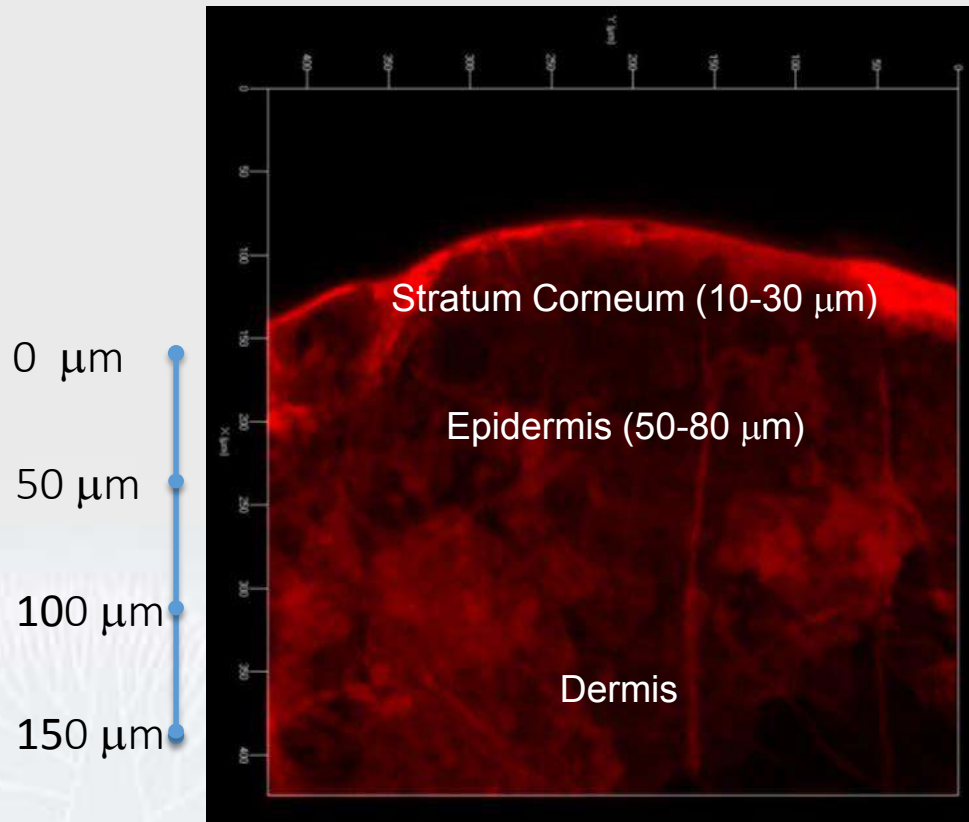


**PhytoSpherix™** increases cellular growth rate, HA production, and collagen production in human skin fibroblast cells.



A microscope image of cells (blue) producing collagen (green) with and without **PhytoSpherix™**.

# Anti-Aging: Skin Penetration



Fluorescently tagged **PhytoSpherix™** has been shown to penetrate the skin to the layers where skin cells are growing – translating to a dramatic anti-aging impact!

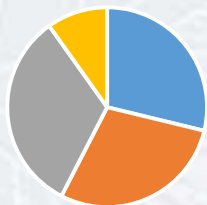
# 3<sup>rd</sup> Party Clinical Trial

- 0.1% and 0.3% PhytoSpherix™ vs Rich Placebo
  - Creams applied 2x per day for 6 weeks
  - Double blind study
  - 30 volunteers in each group (90 total)
- Study included:
  - Expert grading of efficacy across 9 categories
  - Full-face digital images using the VISIA CR2

Ingredient	Rich Placebo (%w/w)	0.1%/0.3% PhytoSpherix Cream (% w/w)
Aqua	73.05	72.95/72.75
Glycerin	5.0	5.0
Glycogen (PhytoSpherix™)	-----	0.1/0.3
Xanthan Gum	0.5	0.5
Prunus amygdalus dulcis (almond) oil	5.0	5.0
Persea gratissima (avocado) oil	5.0	5.0
Butyrospermum parkii (shea) butter	4.0	4.0
Cetyl alcohol	2.0	2.0
Dimethicone	2.0	2.0
Sorbitan stearate	1.4	1.4
Stearyl alcohol	1.0	1.0
Phenoxyethanol SA (phenoxyethanol (and) sorbic acid (and) caprylyl glycol)	0.8	0.8
Tocopherol acetate	0.2	0.2
Triethanolamine	0.05	0.05

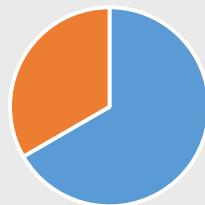
## Volunteer Profile

Subject Age



■ 49-55 ■ 56-60 ■ 61-65 ■ 66-70

Fitzpatrick Skin Type



■ II ■ III

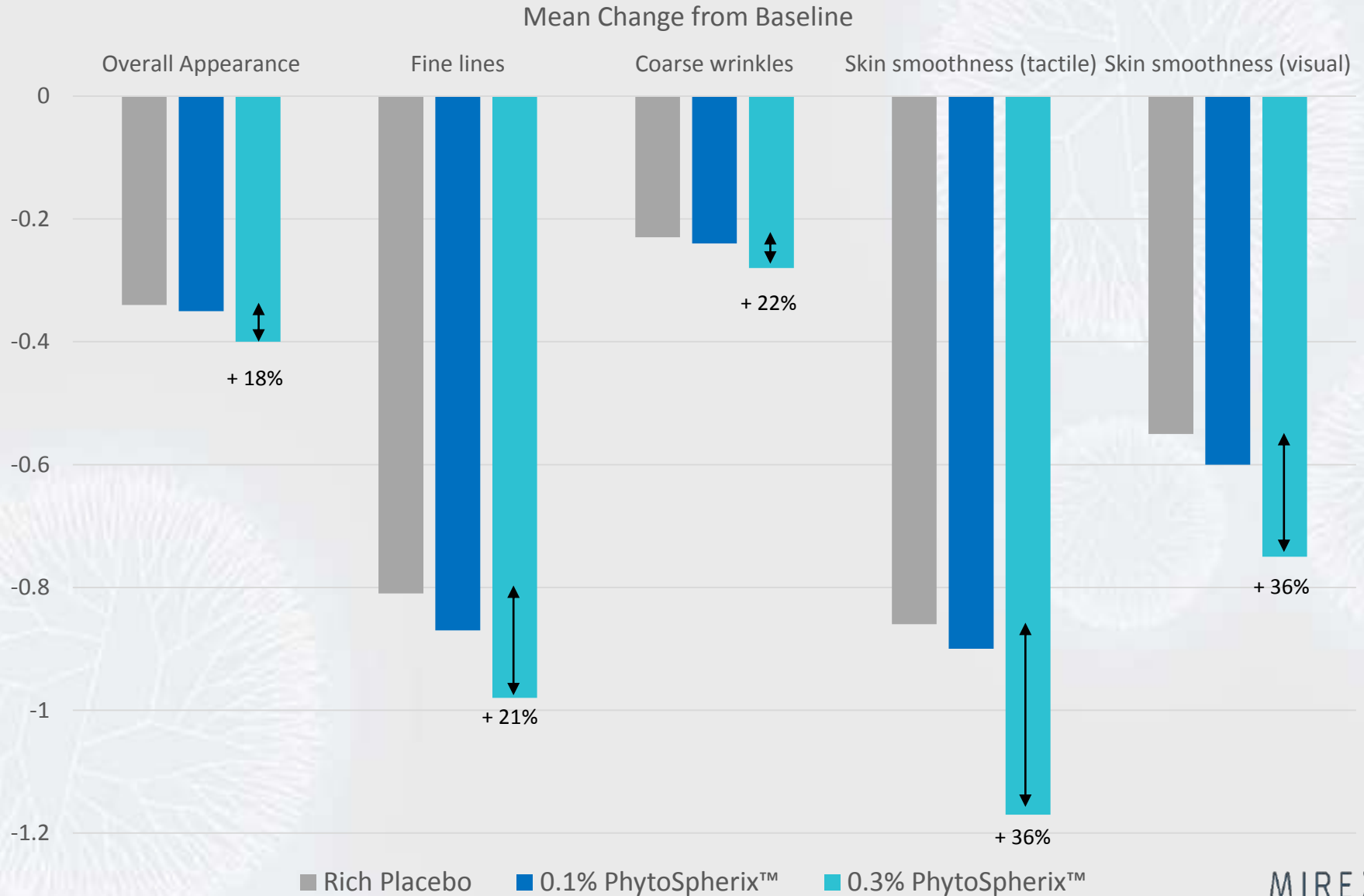
# Conclusions from Expert Grading

**Using standard methods of statistical analysis the following conclusions were made:**

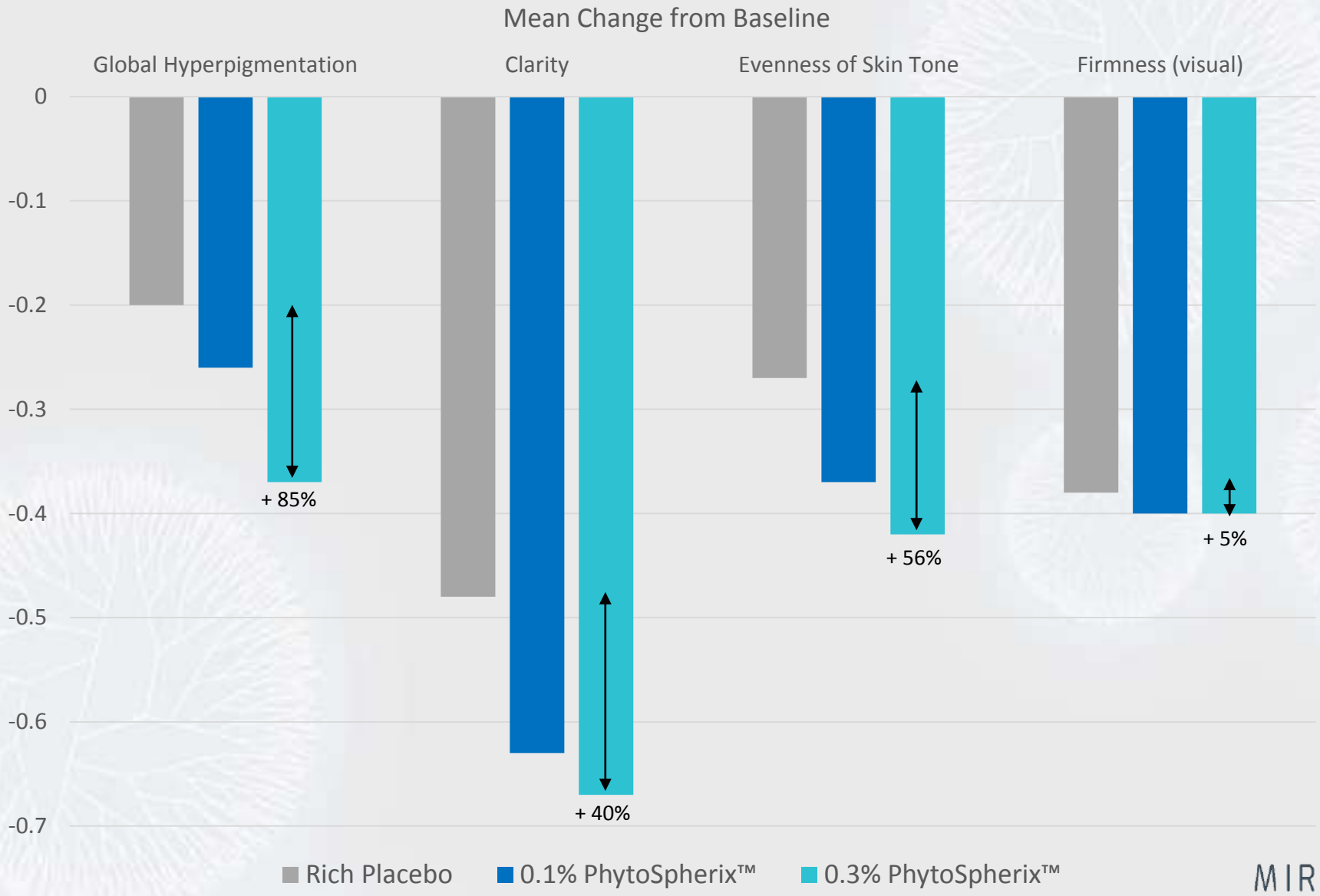
- Both 0.1% and 0.3% PhytoSpherix™, as well as the rich placebo, showed an improvement over the baseline
- Both 0.1% and 0.3% PhytoSpherix™ showed enhanced performance compared to the rich placebo across all 9 categories
- 0.3% PhytoSpherix™ showed enhanced performance compared to 0.1% PhytoSpherix™ across 8 of 9 categories



# Comparative Look at Efficacy – Expert Grading



# Comparative Look at Efficacy – Expert Grading Cont'd

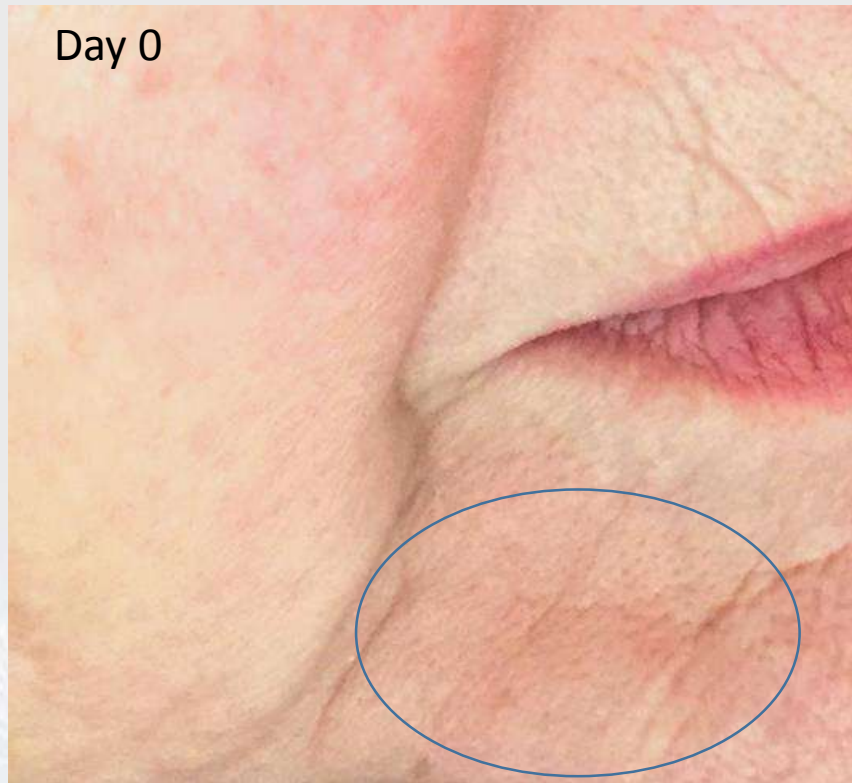


# Before & After Images: Example 1



**PhytoSpherix™** reduces fine lines and wrinkles around the eyes

# Before & After Images: Example 2



**PhytoSpherix™** reduces fine lines and wrinkles around the chin area

# Before & After Images: Example 3



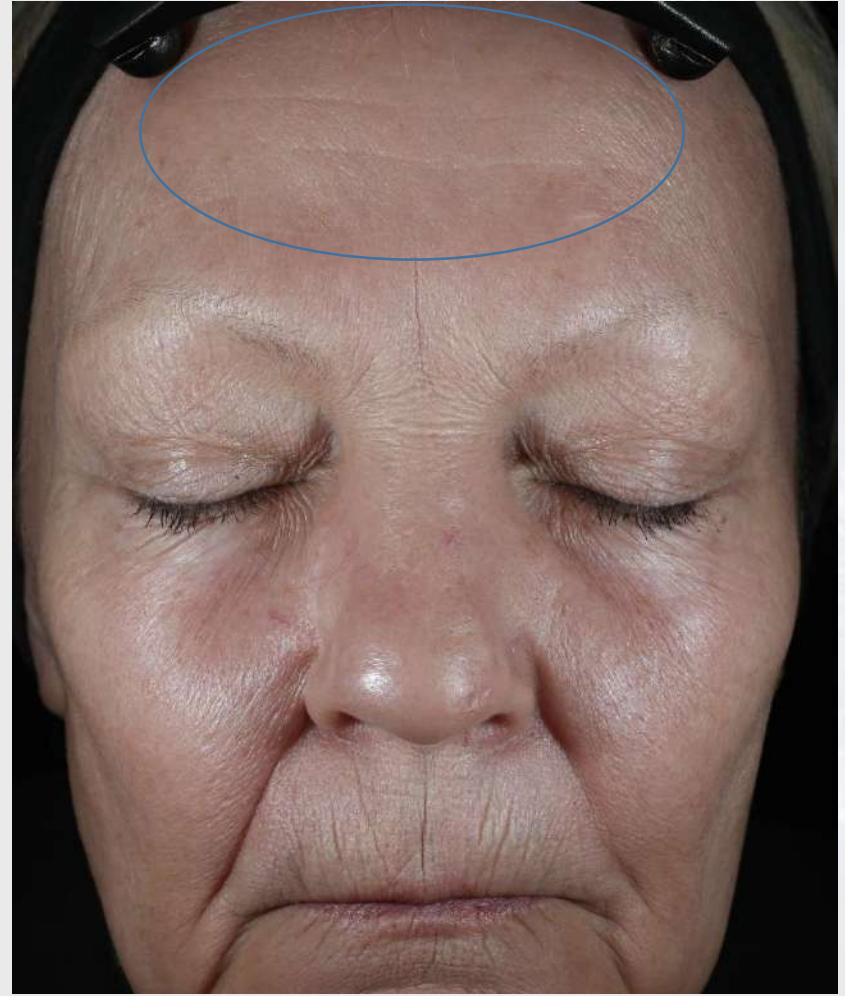
**PhytoSpherix™** reduces the appearance of deep wrinkles on the forehead

# Before & After Images: Example 4



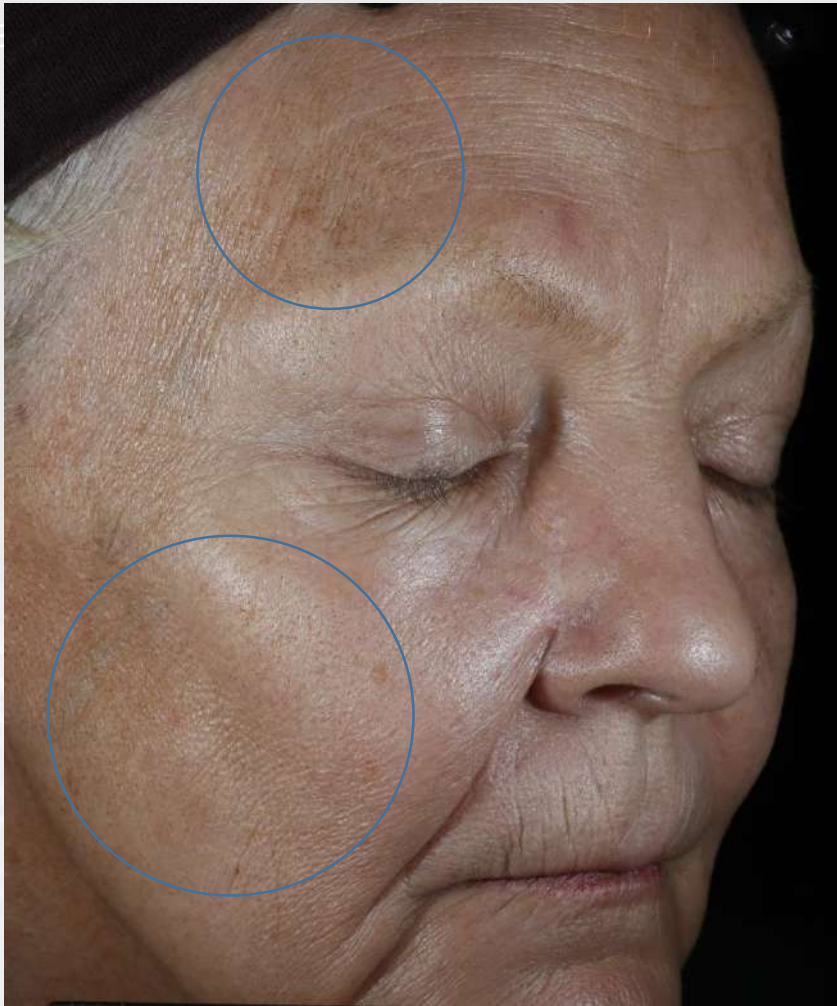
**PhytoSpherix™** reduces hyperpigmentation

# Before & After Images: Example 5



**PhytoSpherix™** reduces hyperpigmentation and improves clarity

# Before & After Images: Example 6



**PhytoSpherix™** reduces hyperpigmentation and improves clarity

# Mechanism of Action

## The data presented elucidates the mechanism of action for the anti-aging effects of PhytoSpherix™:

- We have demonstrated that PhytoSpherix™ is able to penetrate the inter-cellular spaces in human skin, to reach the live cells in the epidermis and dermis.
- *In vitro* testing of dermal cells show that PhytoSpherix™ increases cell growth as well as endogenous collagen and HA production - both essential polysaccharides for healthy skin, and whose production declines with age.
- Clinical trials demonstrate the ability of PhytoSpherix™ to effectively hydrate the skin on its own and in synergy with HA, as well as visibly reduce the appearance of fine lines and wrinkles.

These studies suggest that the anti-aging effect of **PhytoSpherix™** is due to the unique ability of this material to hold moisture, penetrate the stratum corneum and epidermis, and nourish the living cells of the dermal layer.

# PhytoSpherix™



## A formulator's dream!

Does not impact the rheology of formulations, is water soluble, non-ionic, and temperature stable

# Formulation Benefits

## PhytoSpherix™:

- Is readily soluble in water
- Is non-ionic and demonstrates excellent compatibility with other cosmetic ingredients
- Is stable from pH 3-10, and in temperatures up to 180° C
- Only requires a small dose to achieve great results
- Free from allergens

## Formulating with PhytoSpherix™

Typical Usage level ranges from 0.05-0.3% depending on the application and desired effect.

- **Moisturizing Creams:** 0.1-0.2% when used alone, or 0.05-0.1% when used in combination with other actives (i.e. hyaluronic acid)
- **Anti-aging Formulas:** 0.1 – 0.3%



- So safe it was approved by Health Canada as a food ingredient
- COSMOS & ECOCERT approved
- Dermatologist tested





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