

MIREXOS

Cargill Beauty  
Unleashing Nature  
*Sustainably*

# PhytoSpherix™

The *Pluri*-Functional Plant-Based Glycogen



# Overview: Mirexus and Cargill Beauty

## A Global Strategic Partnership

**Mirexus** is a Canadian biotechnology company based in Guelph Ontario. We manufacture phytoglycogen for the personal care sector, with significant laboratory resources for physical, chemical and biological research for development of new products and applications.

**Cargill Beauty** is the personal care platform within Cargill, whose mission is to offer a diverse portfolio of nature-derived ingredients, with a responsible supply chain, fully integrated processes and application expertise.

We have agreed to enter into a long term **strategic partnership**, allowing Cargill Beauty to deliver Mirexus' innovative, natural bio-active - **PhytoSpherix™** - to targeted Cargill customers in the Global Personal Care market.

## Webinar Speakers

### Mirexus Inc:

Marty Kurylowicz, PhD  
*Director of New Product  
Development*

### Cargill Beauty:

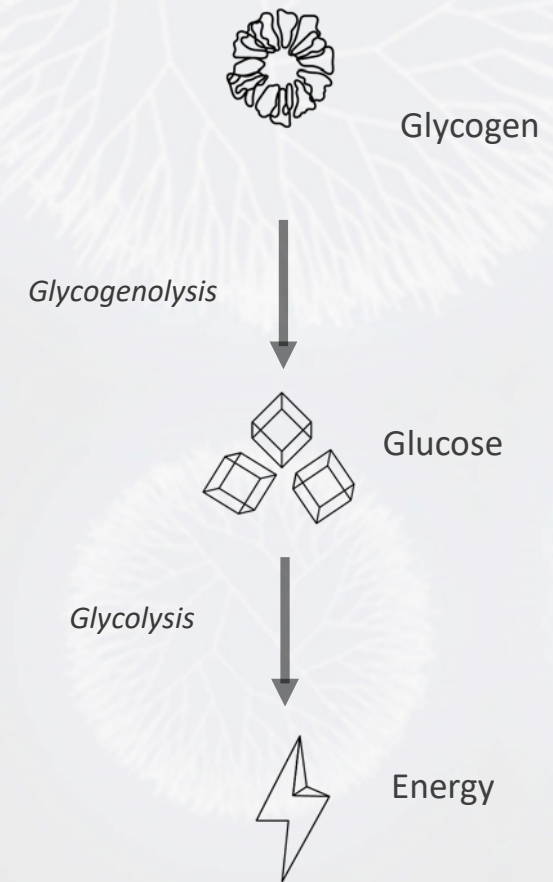
Jeanmarie Cakouros  
*Marketing Manager, Americas*

Smita Fulzele  
*Applications Laboratory Leader*

# PhytoSpherix™: Stored Cellular Energy

## Glycogen: The quick energy source

- Glycogen is naturally present in our body.
- When needed, our muscles use glycogen as the first source of energy as it is readily available and quickly transformed into glucose.
- In our skin, glycogen is also produced in stressful conditions (UV exposure) to improve the skin's cell energy level as an « emergency response ».
- The ability of our cells to produce energy decreases over time. Adding glycogen topically provides the most efficient energy source to our cells for a multifunctional effect on the overall skin appearance.



# PhytoSpherix™: Natural and Sustainable



## Sweet Corn: Sustainable Vegetable Agriculture (↑\$)



- Non-GMO: there are no engineered varieties
- Local: short transport, distributed processing, timing
- Small farms: 30,000 independent producers in N.A.
- Best Practices: Crop rotation, minimum till, organic manure
- Optimize: fertilizers, nutrient and soil types, seed varieties



## Field Corn: High-Intensity Grain Agriculture (↓\$)



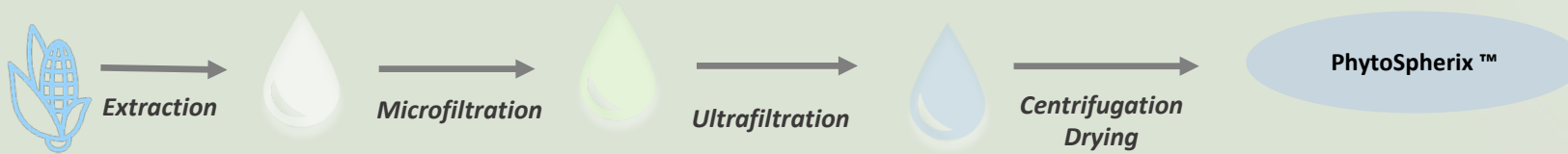
- GMO – engineered for high-density, fast growth, pest resistance
- Commodity Farming – animal feed, starch, ethanol, HFCS
- Industrialized Farming: 99% of all corn grown is field corn

PhytoSpherix™ is made using a scalable, green, water-based, mechanical extraction method using no harsh solvents or chemical conditions

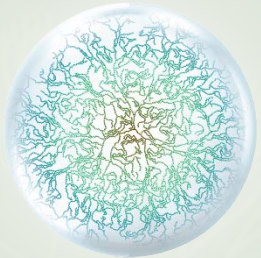


# PhytoSpherix™: The Multi-Functional Glycogen

- PhytoSpherix™ is a native form of glycogen obtained through a patented, green, water based, process.



- Highly branched polysaccharide with an unique spherical dendrimeric structure



- 100% nature-derived from non-GM sweet corn.

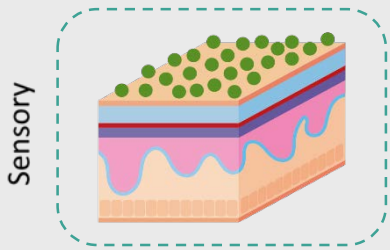


COSMOS  
APPROVED

**Due to its native  
bio-identical structure  
PhytoSpherix™ has same  
effect as glycogen.**

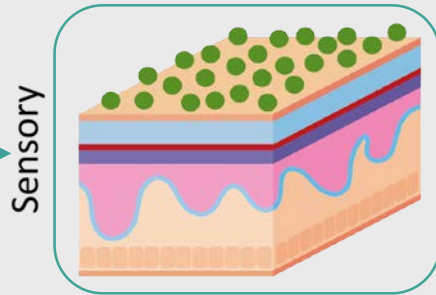
# PhytoSpherix™: The *Pluri*-Functional Glycogen

At the skin surface: \*



Provides a cushiony effect

At the skin surface



Provides a cushiony effect

## Sensory signature

PhytoSpherix™ improves the sensory profile compared to Hyaluronic Acid.

- PhytoSpherix™ (0.1%)
- Hyaluronic Acid: 800-1200 KDa (0.1%)

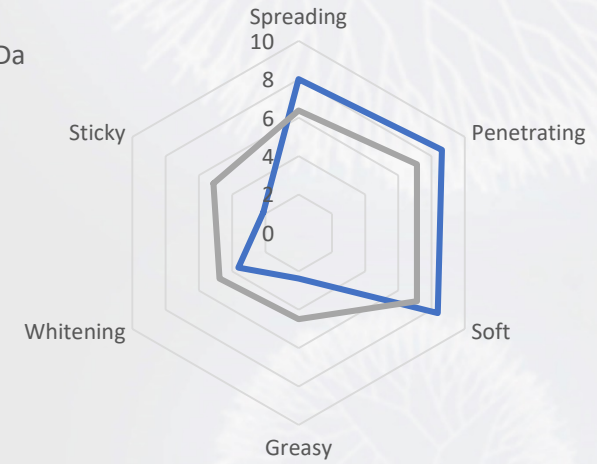
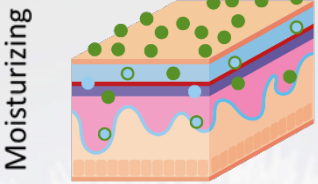
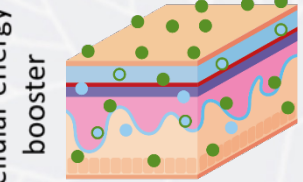


Figure 1: Sensory profile comparison

Skin penetration



Water absorption & retention



Used as a quick energy

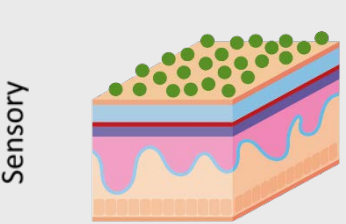
Cellular energy booster

\*Illustrative only

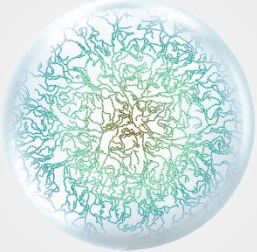
# PhytoSpherix™: The *Pluri*-Functional Glycogen



At the skin surface:

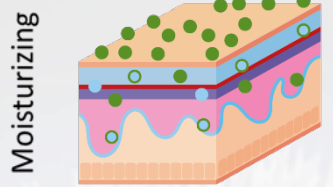


Sensory



*Provides a cushiony effect*

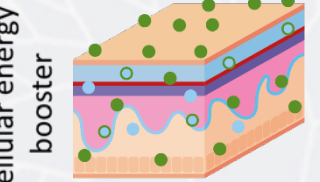
**Skin penetration**



Moisturizing

*Water absorption & retention*

Due to its modular spherical structure it penetrates quickly into the skin.



Cellular energy booster

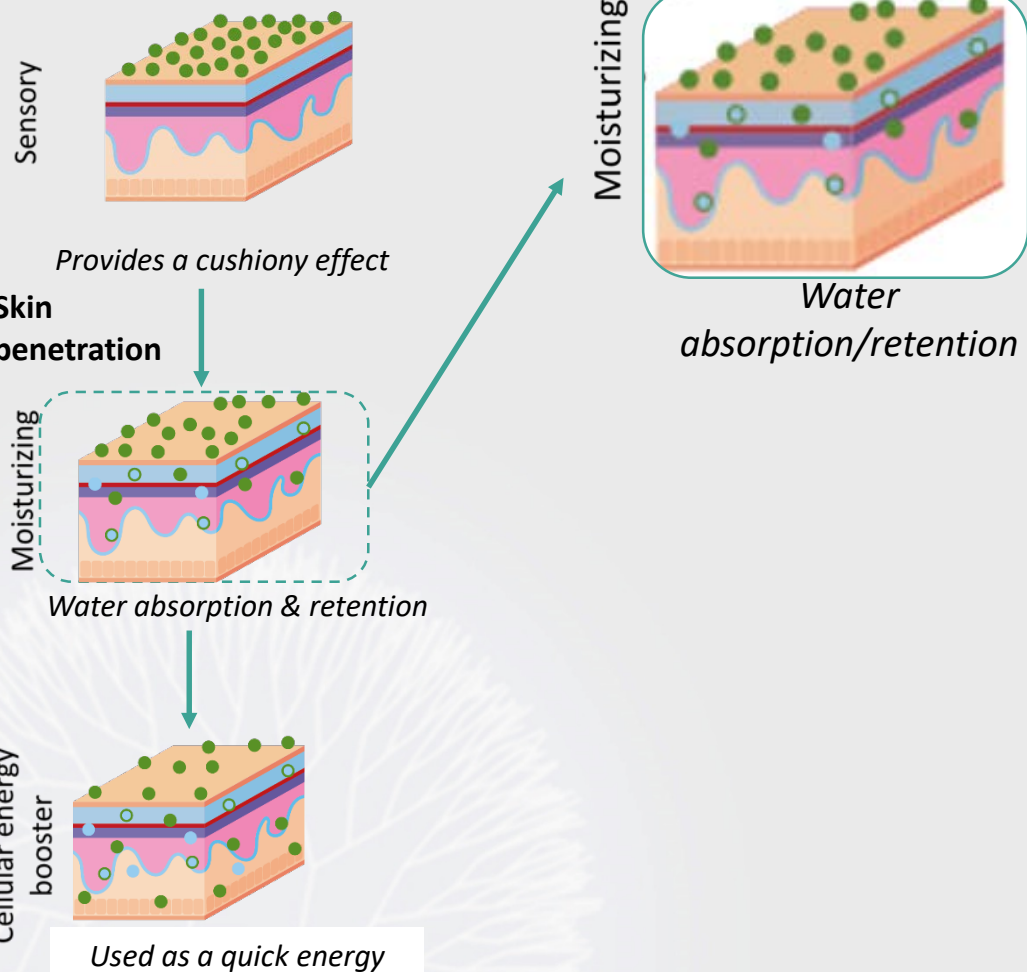
*Used as a quick energy*

\*Illustrative only



# PhytoSpherix™: The *Pluri*-Functional Glycogen

At the skin surface:



## A high capacity water retention

PhytoSpherix™ captures water at the upper skin layer level without swelling and is able to retain it for a longer period of time – up to 10 days – in comparison with other moisturizing agents. This effect is due to the unique ability of PhytoSpherix™ to bind water.

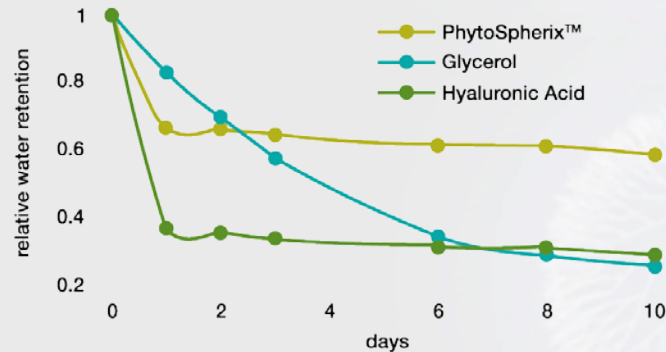
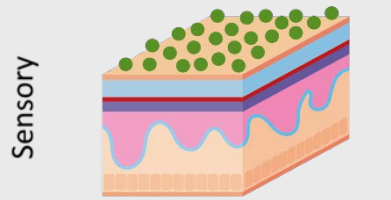


Figure 2: Relative water retention time in 10 days.



# PhytoSpherix™: The *Pluri*-Functional Glycogen

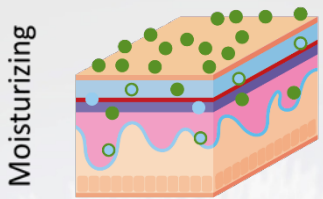
At the skin surface:



Sensory

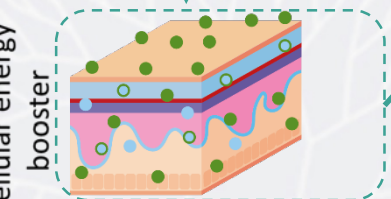
Provides a cushiony effect

Skin penetration



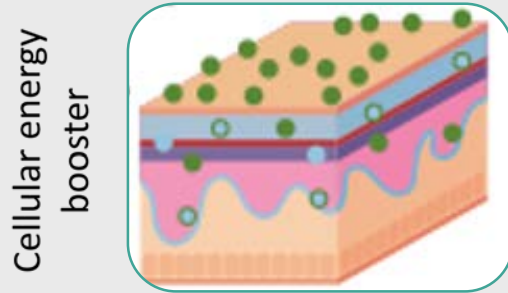
Moisturizing

Water absorption & retention



Cellular energy booster

Used as a quick energy

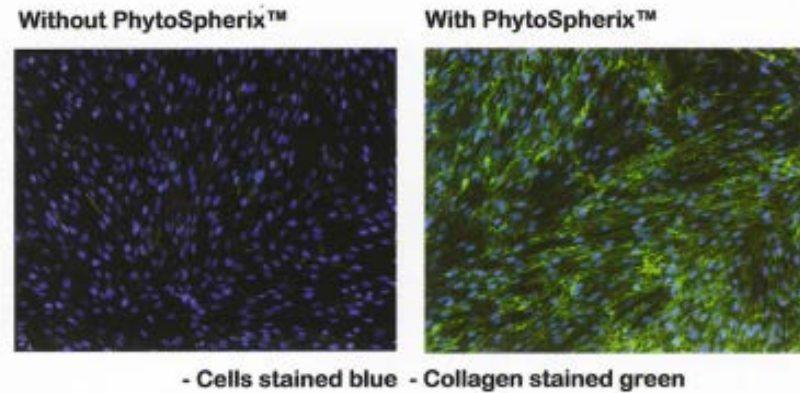


Cellular energy booster

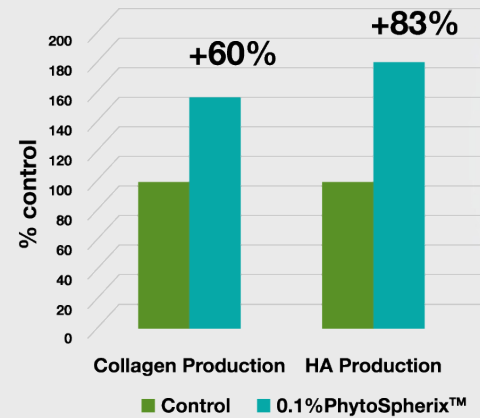
Used as a quick energy

A booster in cellular response

PhytoSpherix™ increases the metabolic activity of fibroblasts.



**Figure 3:** Collagen (green) production by cells (blue) without and with PhytoSpherix™ (0.1%)



**Figure 3:** Human fibroblast cells after 36 hours

**Figure 4:** Human fibroblast cells after 36 hours.

\*Illustrative only

# PhytoSpherix™: The *Pluri*-Functional Glycogen

**INCI:** Glycogen

**M.W. :** 15,000,000 Da

**Aspect:** Off white powder

**Safety:** Non-irritant – Dermatologically tested

**Origin:** 100% nature-derived from non-GM sweet corn.

Obtained through a patented, water-based, green process

- ✓ Free from allergens & preservatives
- ✓ COSMOS approved
- ✓ China listed

- ✓ Typical use level: 0.1%(moisturizing) –  
0.3% (anti-aging/radiance)
- ✓ Water dispersible
- ✓ Large stability range: pH 3-10, up to 180°C
- ✓ Non ionic

# PhytoSpherix™: Anti-Aging Wrinkle Reduction

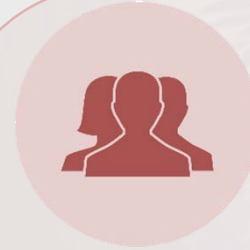
## Protocol

0.1% and 0.3% PhytoSpherix™ vs rich placebo.

- Creams applied 2x per day for 6 weeks
- Double blind study

Study included:

- Expert grading of efficacy accross 5 categories
- Full-face digital images using the VISIA CR2



## Panel

- 30 volunteers on each group
- From 49 to 70 years olds
- Mature skin
- Caucasian skin type

# PhytoSpherix™: Anti-Aging Wrinkle Reduction

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+36 %\*

**Skin smoothness<sup>1</sup>**

-22 %\*

**Deep wrinkles<sup>1</sup>**

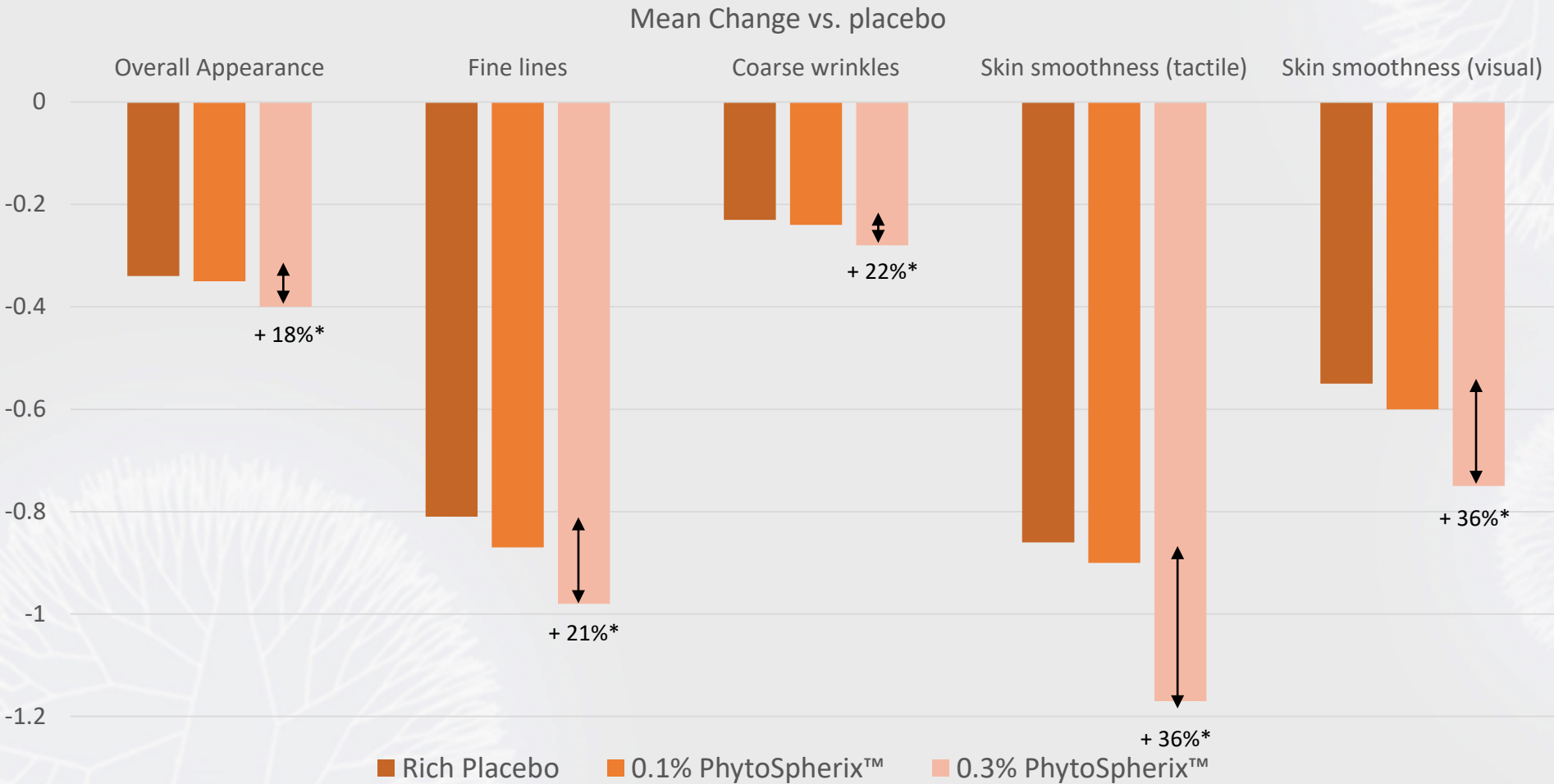
-21 %\*

**Fine lines<sup>1</sup>**

<sup>1</sup>-In vivo, clinical study on 30 women (0.3% PhytoSpherix™) results after 6 weeks with 2 applications/day vs. Placebo.

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# PhytoSpherix™: Anti-Aging Wrinkle Reduction



PhytoSpherix™ plays a major role in the overall aspect of the skin by fighting all the signs of aging.

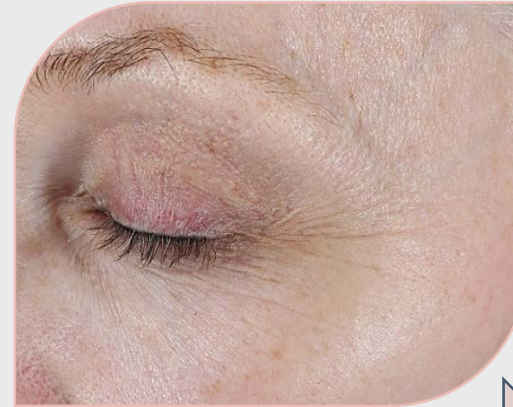
0.3% PhytoSpherix™ showed enhanced performance compared to 0.1% PhytoSpherix™ across the 5 categories.

\*: p ≤ 0,05

# PhytoSpherix™: Anti-Aging Wrinkle Reduction

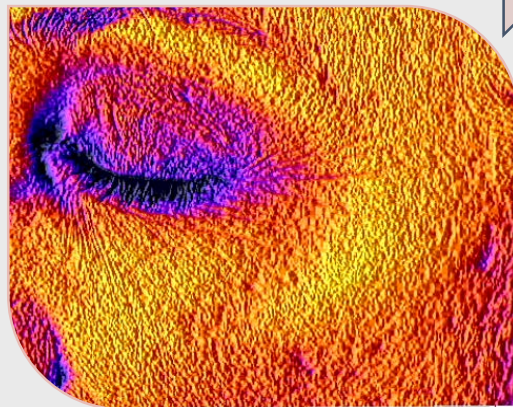
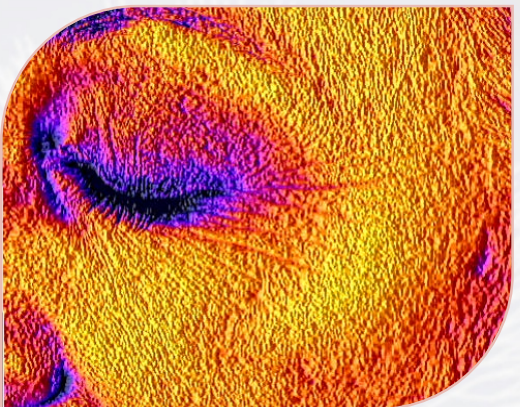
Cargill Beauty  
Unleashing Nature  
Sustainably

PhytoSpherix™ starts to work even at low concentration (0.1%)



Week 0

Week 6



Crow's feet overall reduction  
at 0,1% PhytoSpherix™

Up to :

**-11%** in wrinkle area

**-5%** in wrinkle depth

<sup>1</sup>-In vivo, clinical study on 30 women (0.1% PhytoSpherix™) results after 6 weeks with 2 applications/day vs. Placebo.

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# PhytoSpherix™: Anti-Aging Wrinkle Reduction

Cargill Beauty  
Unleashing Nature  
Sustainably

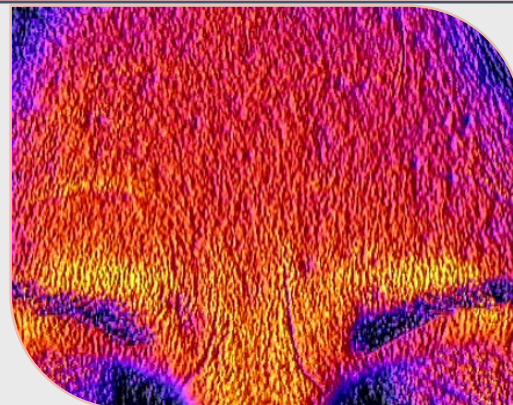
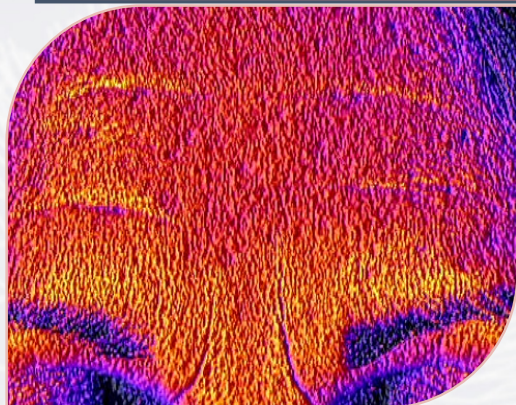
PhytoSpherix™ starts to work even at low concentration (0.1%)



Week 0



Week 6



Lines erasing at 0,1%

PhytoSpherix™

Up to :

-75% in wrinkle area

-20% in wrinkle depth

<sup>1</sup>-In vivo, clinical study on 30 women (0.1% PhytoSpherix™) results after 6 weeks with 2 applications/day vs. Placebo.

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# PhytoSpherix™: Anti-Aging Wrinkle Reduction

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71 %

« My skin is more beautiful »<sup>1</sup>

90 %

« My skin is smoother »<sup>1</sup>

81 %

« I feel good »<sup>1</sup>

71 %

« My skin looks more homogenous »<sup>1</sup>

Self-assessment

<sup>1</sup>-In vivo, self-assessment study on 20 women (0.1% PhytoSpherix™) results after 4 weeks with 2 applications/day vs. T0.

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# PhytoSpherix™:

# New Age

Consumer Positioning



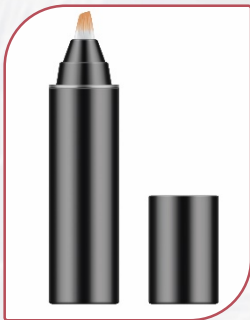
Green energy ampoule»

Or Natural bio-compatible answer to signs of aging.



« Cure de Jouvence»

Sweet corn extract infusion.



« Bio-sphere filler pen»

Dendrimeric vegetal sphere for targeted anti-aging action.

## Protocol

0.1% and 0.3% PhytoSpherix™ vs rich placebo.

- Creams applied 2x per day for 6 weeks
- Double blind study

Study included:

- Expert grading of efficacy accross 5 categories
- Full-face digital images using the VISIA CR2

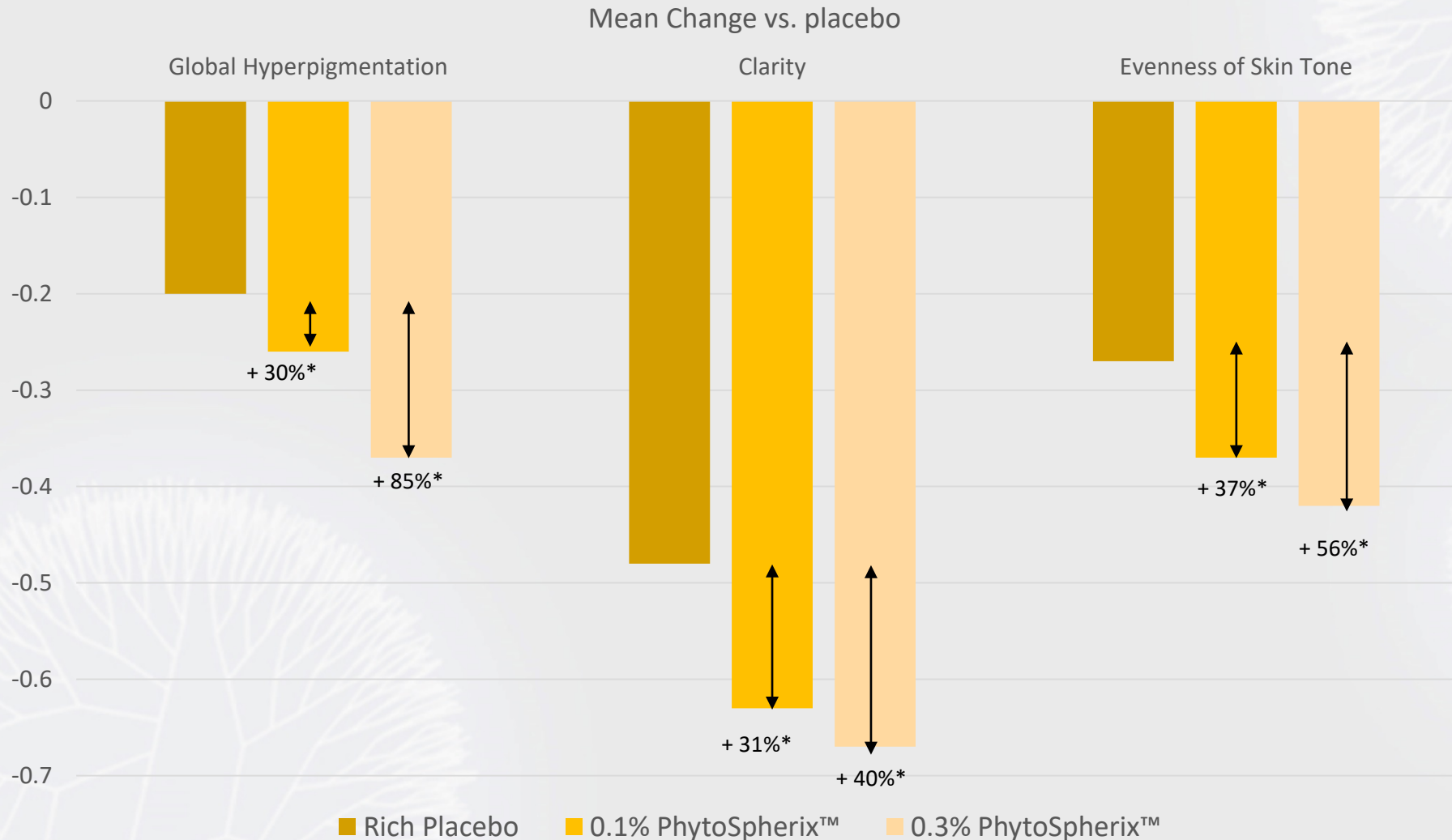


## Panel

- 30 volunteers on each group
- From 49 to 70 years old
- Mature skin
- Caucasian skin type

# PhytoSpherix™:

# Even Skin Tone



PhytoSpherix™ starts to work even at low concentration (0.1%)

0.3% PhytoSpherix™ showed enhanced performance compared to 0.1% PhytoSpherix™ across the 3 categories.

# PhytoSpherix™:

# Even Skin Tone



Week 0



Week 6



## Radiance

Recovery of skin luminosity at  
0.1% PhytoSpherix™  
Up to :

**-15%** redness

**+7%** skin radiance

**+7%** skin homogeneity

# PhytoSpherix™:

# Even Skin Tone

Cargill Beauty  
Unleashing Nature  
Sustainably



**Week 0**



**Week 6**

**Dark spot  
fighter**

Skin tone enhancement at 0.3%  
PhytoSpherix™

Up to :

**-59%** in pigmentation area

Resulting in

**+12%** in skin homogeneity

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## Protocol

- Serum with 0.3% PhytoSpherix™.
- Twice a day application for 4 weeks.

## Study included:

- $a^*$  and  $ITA^\circ$  parameters were analyzed

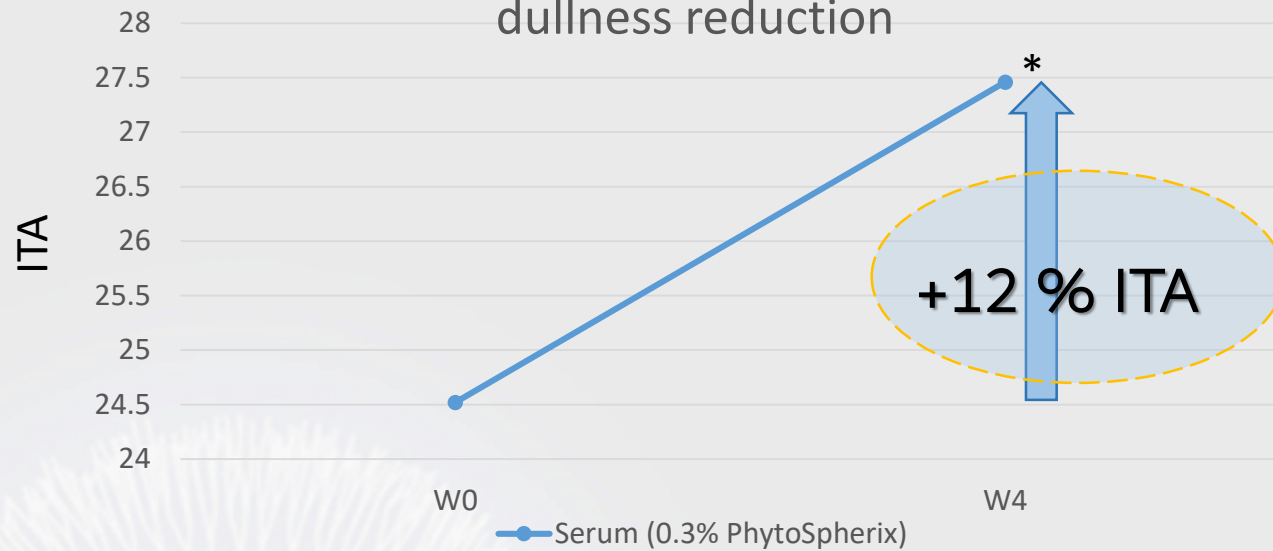


## Panel

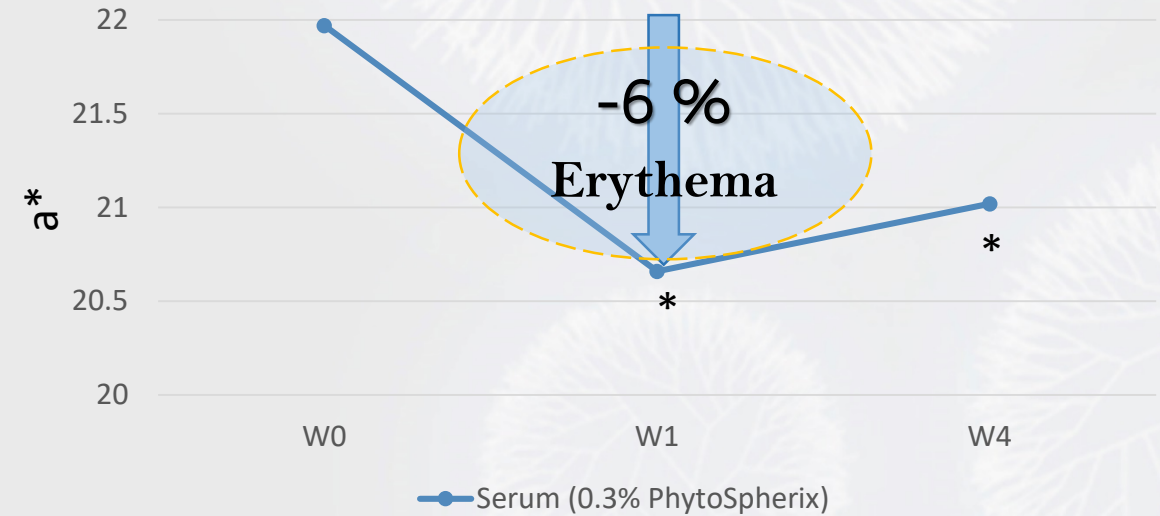
- 30 women
- From 23 to 47 years old
- Asian
- All skin types
- Medium to dark skin tone with a dull facial complexion

# PhytoSpherix™: Even Skin Tone

Improvement of ITA resulting in skin dullness reduction



Diminution of erythema



\*:  $p \leq 0,05$

-85 %\*

**Hyperpigmentation intensity<sup>1</sup>**

+56 %\*

**Even skin tone<sup>1</sup>**

-12 %

**Dullness<sup>2</sup>**

<sup>1</sup>-*In vivo*, clinical study on 30 women (0.3% PhytoSpherix™) results after 6 weeks with 2 applications/day vs. placebo.

<sup>2</sup>-*In vivo*, clinical study on 30 women (0.3% PhytoSpherix™) results after 4 weeks with 2 applications/day vs. baseline.

\*:  $p \leq 0,05$



# PhytoSpherix™: Even Skin Tone

93 %

« My skin is **more silky** »<sup>1</sup>

93 %

« I have a **more even complexion** »<sup>1</sup>

97 %

« My complexion is **more radiant** »<sup>1</sup>

83 %

« I see a **blemish reduction** »<sup>1</sup>

Self-assessment

<sup>1</sup>-*In vivo*, self-assessment study on 20 volunteers (0.3% PhytoSpherix™) results after 4 weeks with 2 applications/day vs. T0.

Consumer Positioning



« Qi-Gong skin mist »

Rebalance your skin energy disorder for a bright aura.



«Spot eraser hand glove »

Local action for targeted results.



«On-the-glow serum »

For a flawless wake-up, say goodbye to dullness & tired skin.



«One month radiance make-over cream »

28 days to be the best version of yourself, naturally.

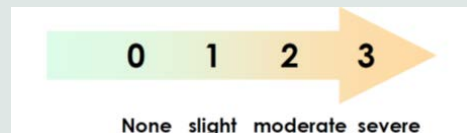
## Clinical trials

- Cream with 0.1% PhytoSpherix™.
- Twice a day application for 4 weeks
- Stinging self-evaluation
- Double blind test
- Application half face: 10% lactic acid
- Application half face: saline solution

The subject has to self-evaluate the following functional signs: stinging, itching and / or burning on an intensity scale from 0 to 3 at 30 seconds, 2 minutes 30 and 5 minutes on the two sides.

- 0: no stinging, burning, itching
- 1: slight stinging, burning, itching
- 2: moderate stinging, burning, itching
- 3: severe stinging, burning, itching

Raw values are the delta of scoring sum at 30 seconds, 2 minutes 30 and 5 minutes of acid lactic vs saline solution (placebo) stinging test.

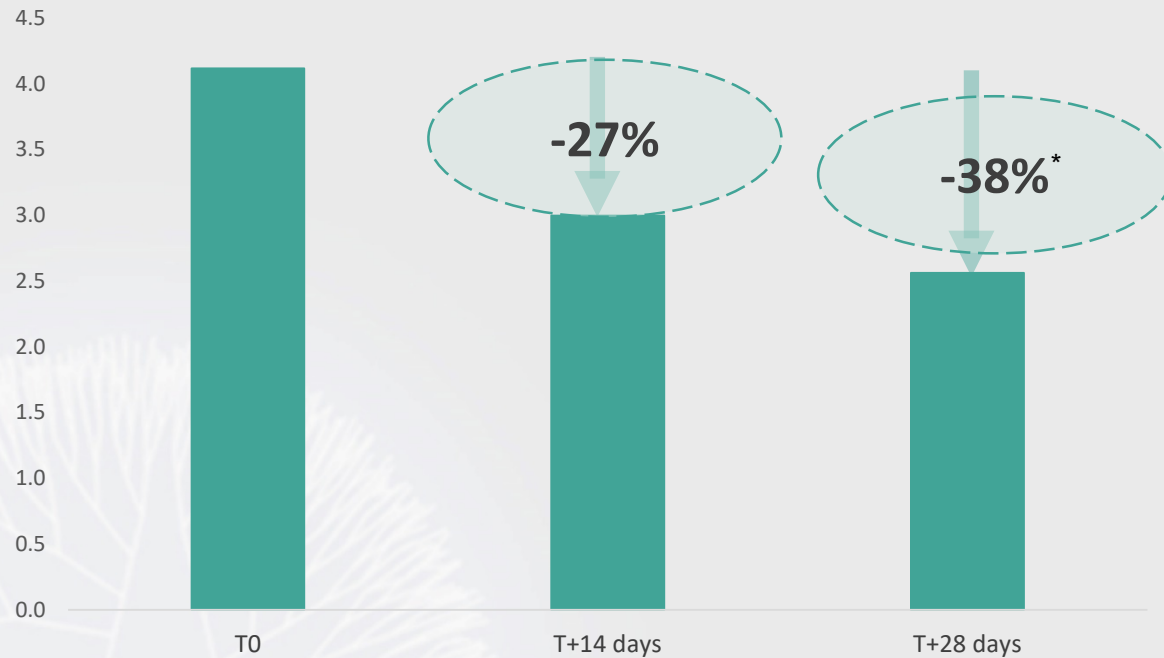


## Panel

- 20 women
- From 18 to 60 years old
- Caucasiens
- Dry to mixed dry skin type on the face
- Sensitive skin
- Test has been performed in winter

## Skin sensitivity reduction

Stinging test



Tested on sensitive  
& dry skin in winter

\*:  $p \leq 0,05$

## Protocol

- Cream with 0.1% PhytoSpherix™.
- Twice a day application for 4 weeks
- Self assessment
- Double blind test
- TEWL (Trans Epidermal Water Loss) measurement

The value of TEWL is expressed in water mass evaporated in time and using the unit of area (g/m<sup>2</sup>h). A significant decrease in the TEWL corresponds to an improvement in the skin barrier function. For normally hydrated skin, the value should be around 5 g/m<sup>2</sup>h.

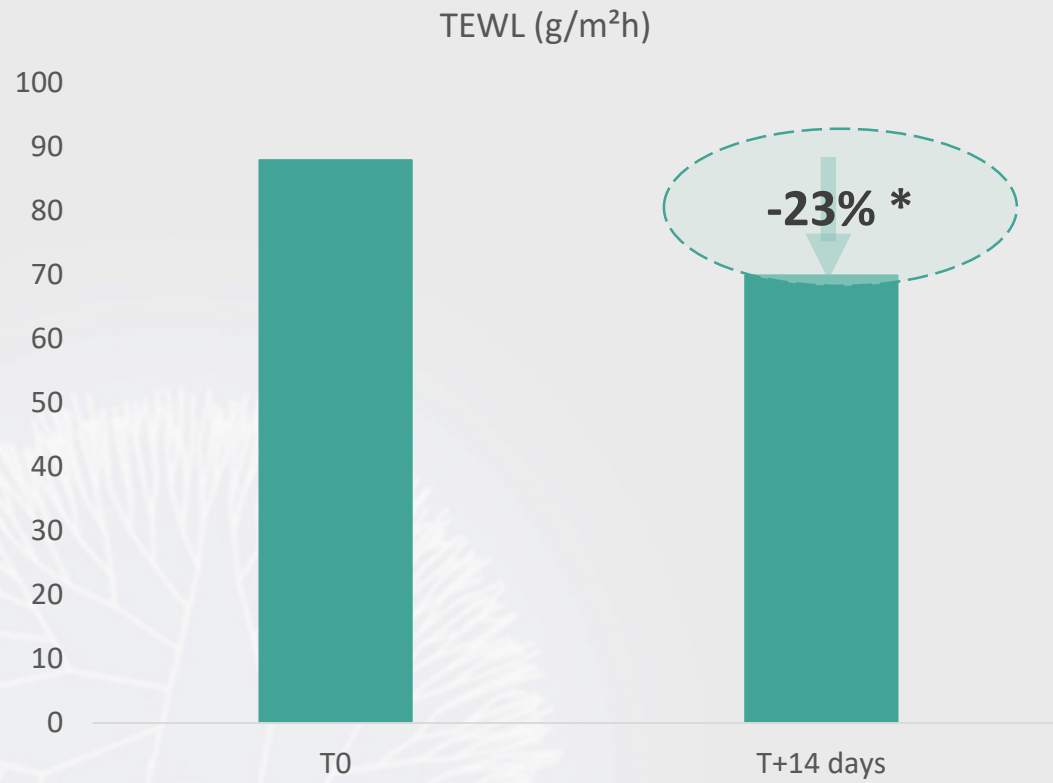


## Panel

- 20 women
- From 18 to 60 years old
- Caucasian
- Dry to mixed dry skin type on the face
- Sensitive skin
- Test has been performed in winter

# PhytoSpherix™: Hydration Booster

## Skin barrier function reinforce



Tested on sensitive  
& dry skin in winter

\*:  $p \leq 0,05$

# PhytoSpherix™:

# Hydration Booster

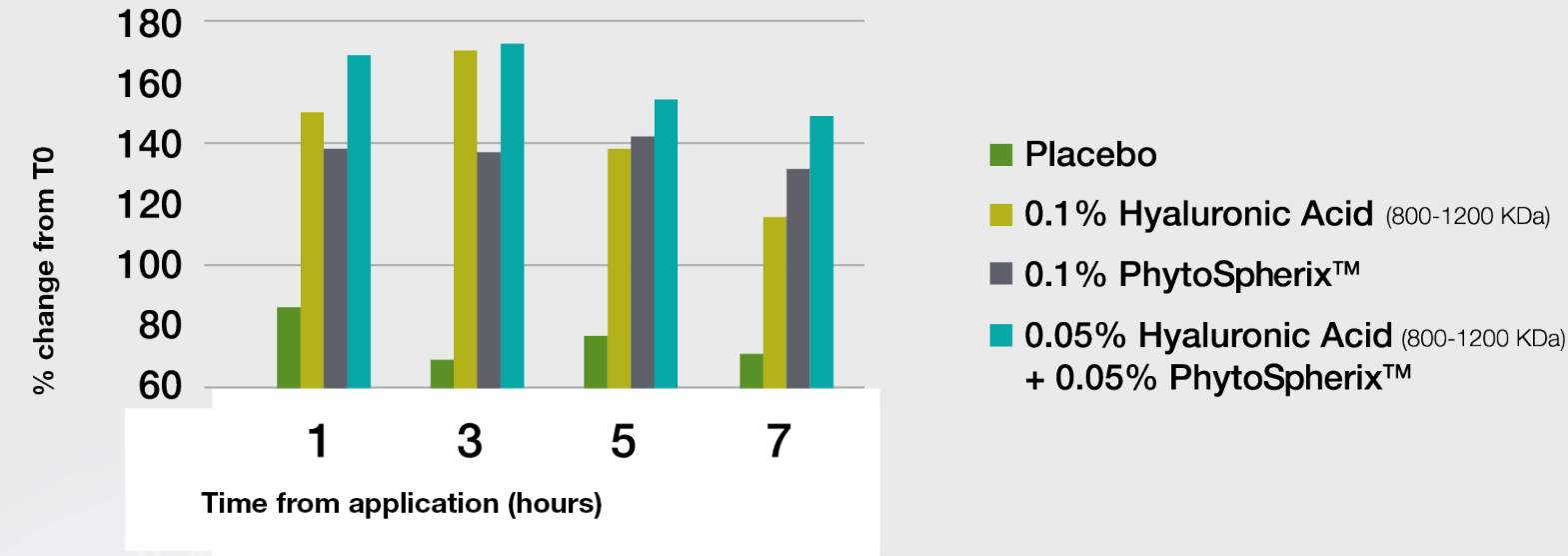


Figure 1: Skin hydration

Great hydration performance

PhytoSpherix™ improves skin hydration by  
**+60 %**  
After 7 hours versus placebo

PhytoSpherix™ booster effect

PhytoSpherix™ boosts Hyaluronic Acid moisturizing performance instantly and after 7 hours up to  
**+40%**

# PhytoSpherix™: Hydration Booster

-38 %\*

**Skin sensitivity<sup>1</sup>**

+23 %\*

**Skin barrier function reinforced<sup>2</sup>**

+130 %

**Skin hydration<sup>3</sup>**

<sup>1</sup>-*In vivo*, self-assessment study on 20 volunteers (0.1% PhytoSpherix™) results after 4 weeks with 2 applications/day vs. baseline.

<sup>2</sup>-*In vivo*, self-assessment study on 20 volunteers (0.1% PhytoSpherix™) results after 2 weeks with 2 applications/day vs. baseline.

<sup>3</sup>-*In vivo*, clinical study on 13 volunteers (0.1% PhytoSpherix™) results after 7 hours vs. baseline.

\*:  $p \leq 0,05$



# PhytoSpherix™: Hydration Booster

75 %

« My skin is soothed »<sup>1</sup>

63 %

« My skin is more comfortable »<sup>1</sup>

69 %

« My skin is hydrated »<sup>1</sup>

63 %

« My skin is less sensitive »<sup>1</sup>

Self-assessment

Tests have been  
performed in  
winter

<sup>1</sup>-In vivo, self-assessment study on 20 volunteers (0.1% PhytoSpherix™) results after 4 weeks with 2 applications/day vs. T0.

Consumer Positioning



« HydraBomb  
Cream »

High performance for highly dry skin.



« Under-eye  
ultra  
concentrate elixir »

200 cm<sup>3\*</sup> of water in a drop of elixir.  
For a rested look.



« Fast relief  
cocoon gel »

For sensitive skin needing a quick rescue



« Delivery city-  
proof shield »

Empower your skin to combat environmental  
aggressions.

\* Illustrative concept

# PhytoSpherix™: Summary

## Efficacy you can see and feel

- PhytoSpherix™ helps smooth the skin, visibly improving texture as well as discoloration.
- PhytoSpherix™ improves perception of skin feel by softening the surface, providing immediate and long lasting hydration
- PhytoSpherix™ acts as a cellular energizer to normalize skin cell functions, reducing the appearance of wrinkles and discoloration
- These properties are unique to a truly natural ingredient
  - Glycogen is a natural constituent of our skin
  - Act as a booster for cellular response

# Thank you!

## Any questions?

### Mirexus Inc

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*Director of NPD*  
***mkurylowicz@mirexus.com***

### Cargill Beauty

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Smita Fulzele  
*Applications Laboratory Leader*  
***Smita\_Fulzele@cargill.com***