

IBR-DRAGON®

**Microbiota-boosting
superfruit to reveal a
healthy skin glow!**

LUCASMEYER
COSMETICS

by IFF

SKIN MICROBIOTA – INTEGRAL COMPONENT OF THE SKIN BARRIER

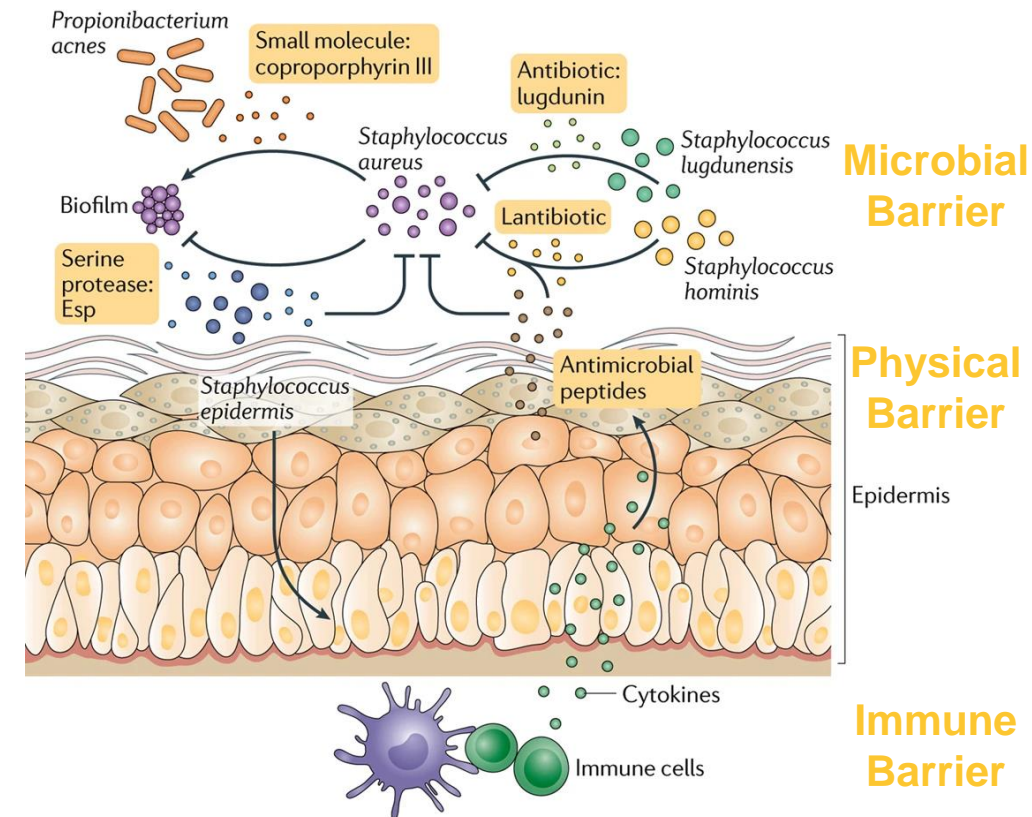
Our skin is home to trillions of bacteria, fungi and viruses that make up the skin microbiota

Contributes to the barrier function of the skin and ensures skin homeostasis.

Protects against potential pathogenic microorganisms by competition, pH regulation and antibiotics production (**microbial barrier**).

Regulates the desquamation process and stratum corneum renewal and free fatty acid production (**physical barrier**).

Keeps close relationship with host immune cells, and skin resident T cells are thus trained to respond to potential pathogenic bacteria (**immune barrier**).



Byrd et al., 2018

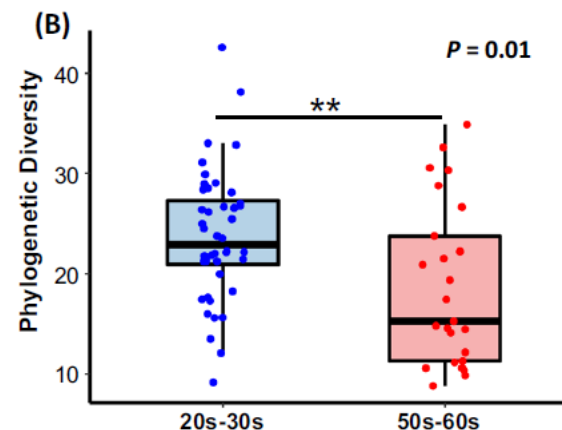
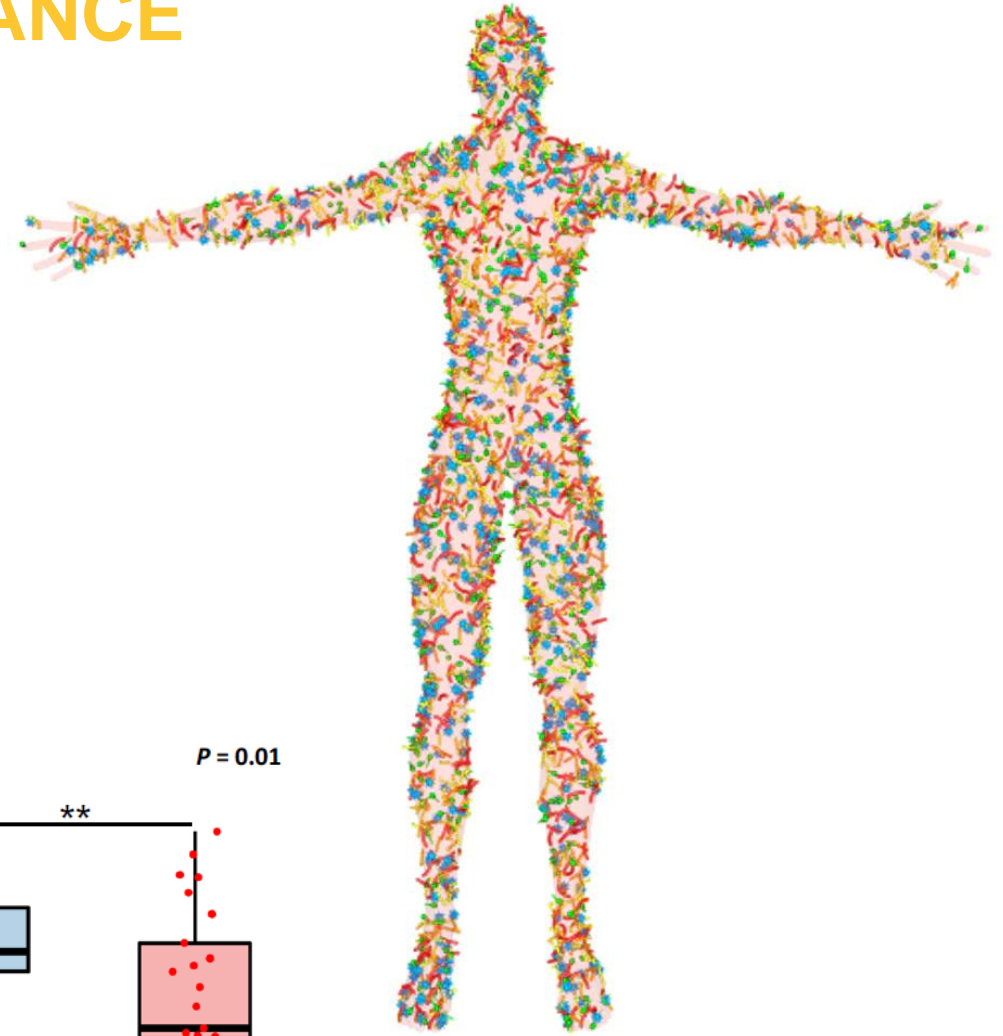
Nature Reviews | Microbiology



IT'S ALL ABOUT KEEPING THE BALANCE

Diverse skin microbiota = healthy skin

- Skin microbiota biodiversity is an indicator of skin health.
- Particularly the balance between the beneficial (commensal) and detrimental (pathogen) bacteria.
- In healthy skin, the balance is tipped towards beneficial bacteria species / strains, limiting the growth of detrimental ones.
- Skin microbiota dysbiosis causes dermal conditions and related symptoms by triggering inflammatory responses through ROS accumulation.
- As we age our skin microbiota diversity decreases.

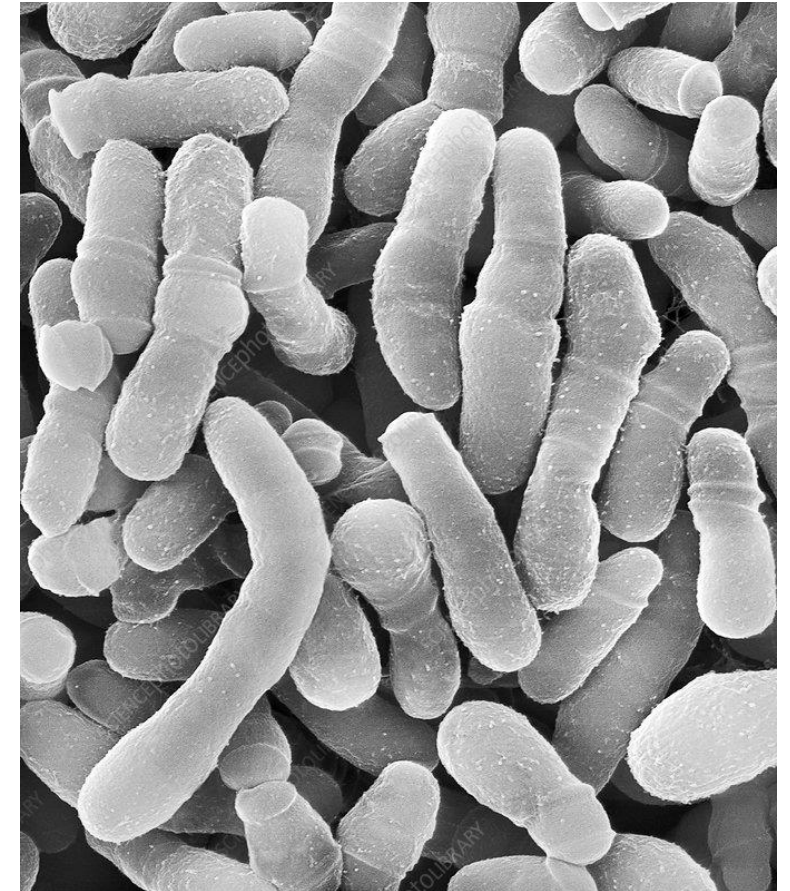


Kim et al., 2019

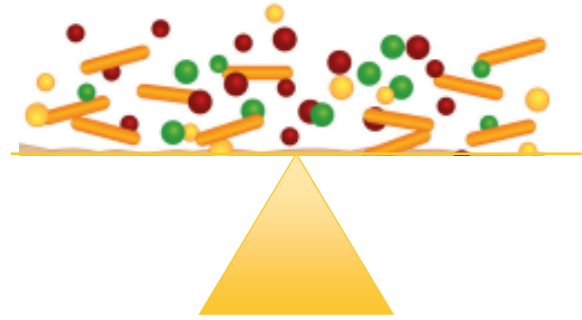
CORYNEBACTERIUM TUBERCULOSTEARICUM

Opportunistic pathogen, ubiquitous skin colonizer involved in skin inflammation

- Bacteria of the genus *Corynebacterium* account for 30% of the total bacterial inhabitants of human skin.
- Some *Corynebacterium* species are opportunistic pathogens and coexist among healthy skin flora.
- The species *C. tuberculostearicum* is a major component of the bacterial species that colonize a variety of skin environments.
- Several studies have associated *C. tuberculostearicum* with disease states.
- In keratinocytes culture, *C. tuberculostearicum* was reported as triggering inflammation through canonical NF- κ B pathway activation.
- *C. tuberculostearicum* represents the dominant *Corynebacterium* species on axillary skin and is reported as causal agent of axillary odor.



SKIN MICROBIOTA & SKIN APPEARANCE



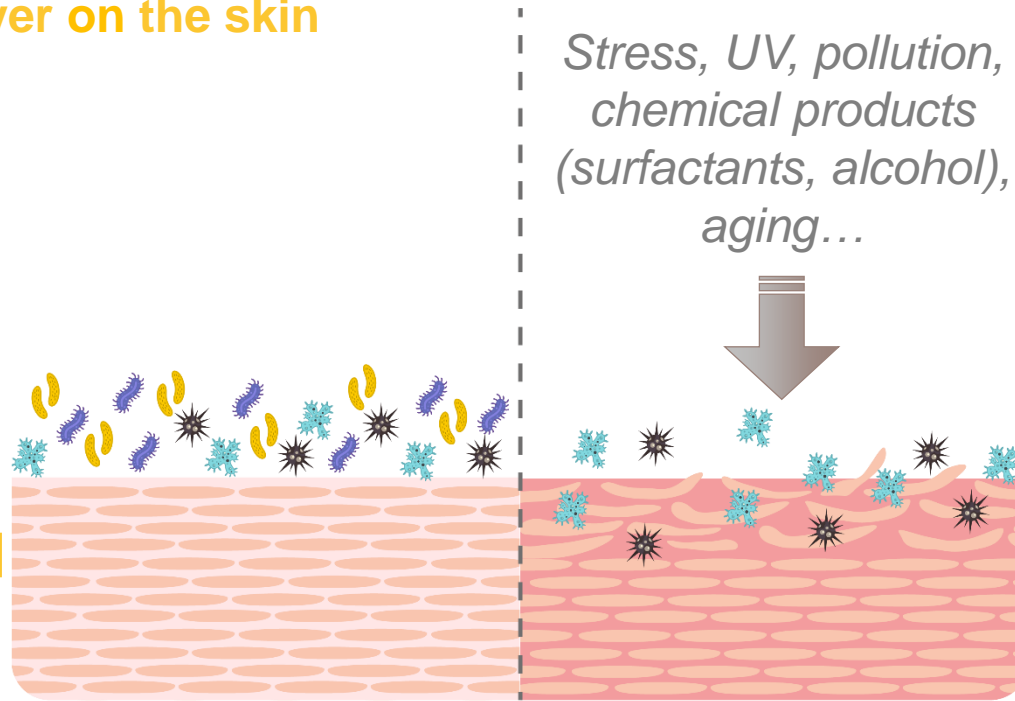
Balanced skin microbiota = additional protective layer on the skin

Optimal quantity and ratio of beneficial / detrimental strains

HEALTHY SKIN

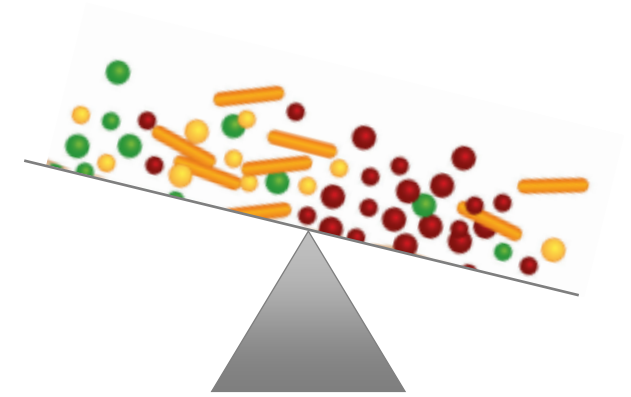
Preserved skin barrier

- ✓ Radiant skin
- ✓ Even skin tone
- ✓ Calm skin
- ✓ Moisturized skin



Unbalanced skin microbiota = dysbiosis

Stress, UV, pollution, chemical products (surfactants, alcohol), aging...



Disturbed ratio:
↑ detrimental strains
VS ↓ beneficial strains

UNHEALTHY SKIN

Weakened skin barrier

- ✓ Dull skin
- ✓ Hyperpigmentation
- ✓ Inflamed & irritated skin
- ✓ Dry skin



STRATEGIES TO ADDRESS THE SKIN MICROBIOTA

“---biotic” trends = take care of our skin microbiota to improve our skin health

Prebiotics

Nutrients that induce microorganism growth, such as carbohydrates, fibers...



Probiotics

Live microorganisms known to provide health benefits when applied



Postbiotics

Beneficial microorganism-derived ingredients including antimicrobial peptides, polysaccharides, etc.



Synbiotics

Mixture of probiotics and prebiotics that improves survival and activity of beneficial microorganisms



Microbiota friendly

Ingredients that do not harm bacteria on skin to maintain the microbiota balance



PREBIOTIC SOLUTIONS RESONATES WELL WITH MARKET DEMAND

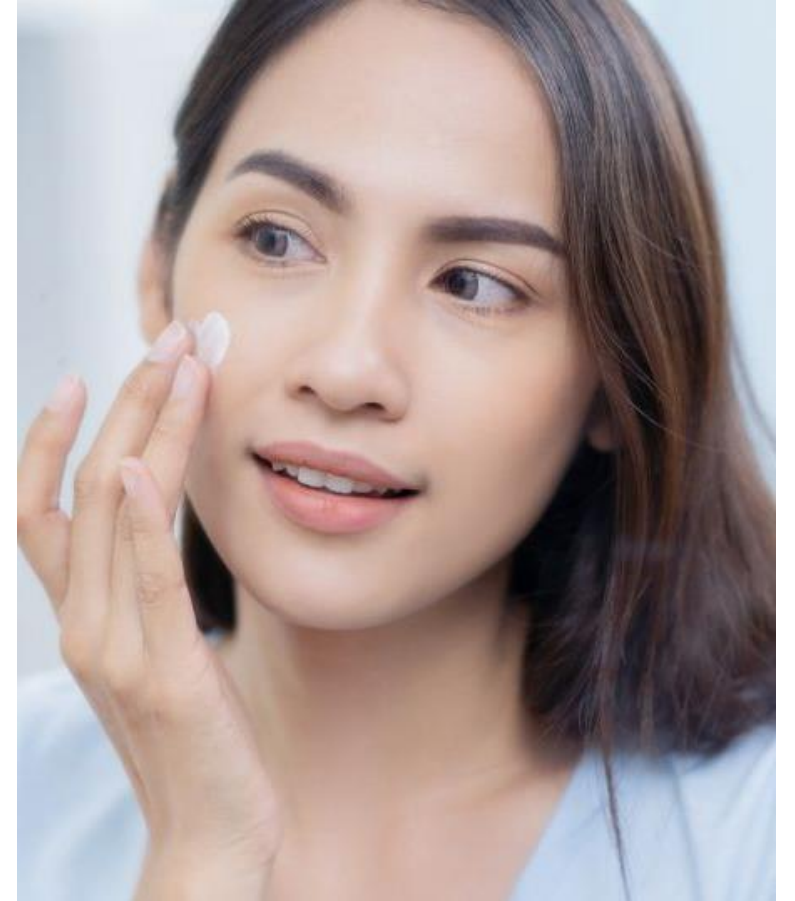
The concept of prebiotics for a healthy skin microbiome is gaining momentum in the modern skincare routine

What consumers want?

Consumers demand healthy, skin-microbiome-restoring ingredients, giving brands an opportunity to incorporate prebiotics as skin-microbiome-balancing ingredients in skincare and cosmetic formulations.

The patent landscape

Research in recent years has revealed the beneficial role of the skin microbiota to obtain healthy, glowing skin. Recent patent activity shows a growing trend of prebiotic-infused skincare and cosmetic products.



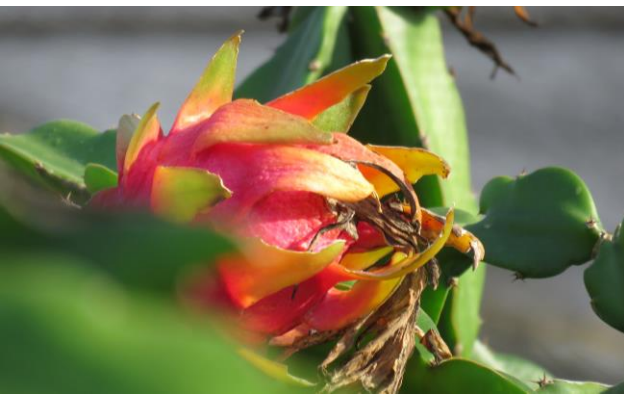


**Nature holds
the solution**



DRAGON FRUIT

Unique look with superfood powers



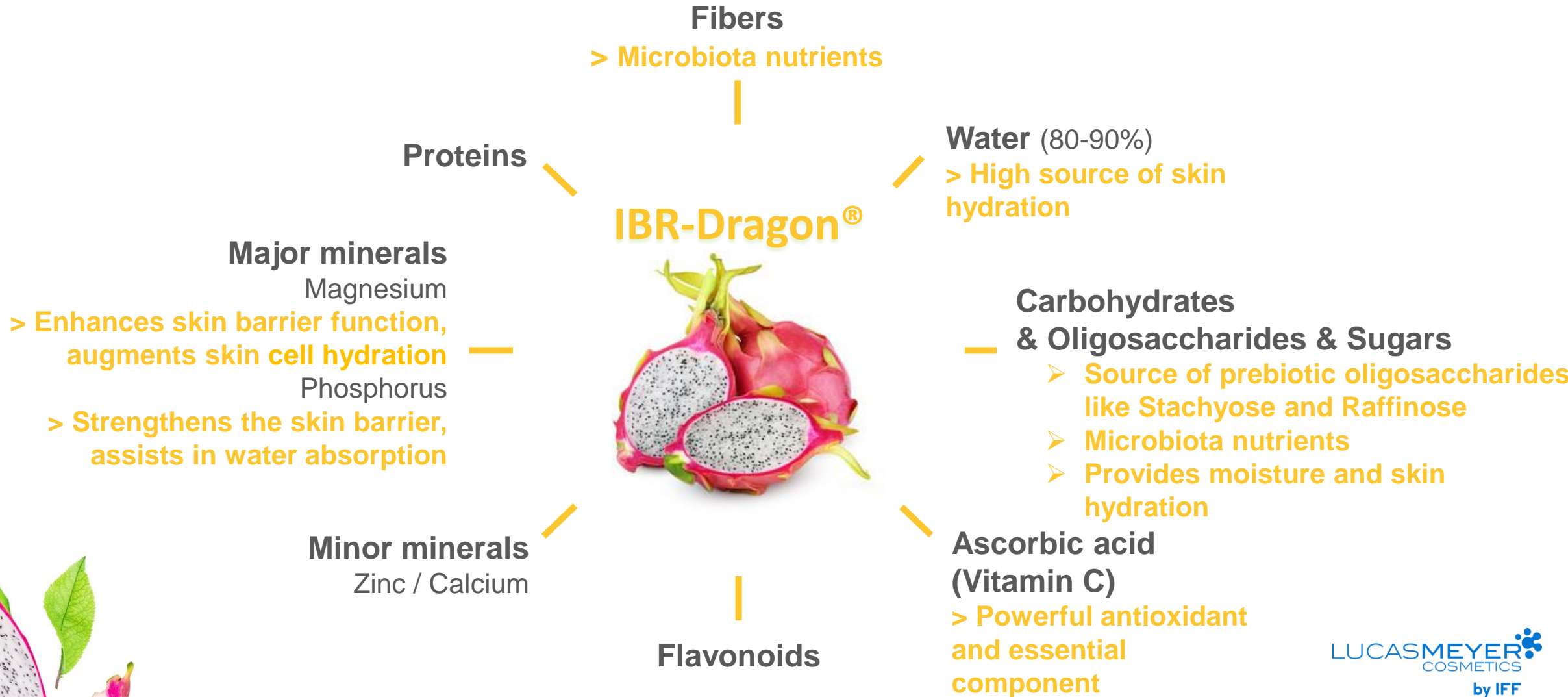
Plant ID

- Botanical name: *Hylocereus undatus*
- Family: Cactaceae
- Origin: Israel (unique varieties developed locally for their taste traits – sweeter and tangier than the popular varieties from Southeast Asia)
- Flowers: night blooming
- Fruit: pitaya, also called “dragon fruit”, white edible flesh
- Uses: ornamental vine and fruit crop
- Unique agricultural aspects: our growers grow the vine disconnected from the ground for better pest control. The root system is submerged in inert media; together with a micro irrigation system, the result is a highly sustainable crop
- Legend: *The fruit was created thousands of years ago by fire-breathing dragons. During battles against brave knights, when a dragon discharged its fire the last thing to come out of its mouth was the dragon fruit. As a proof of his victory, the knight collected the fruit and presented it to the Emperor. It was believed that those who fed on the fruit’s flesh would be gifted with the strength of the dragon*



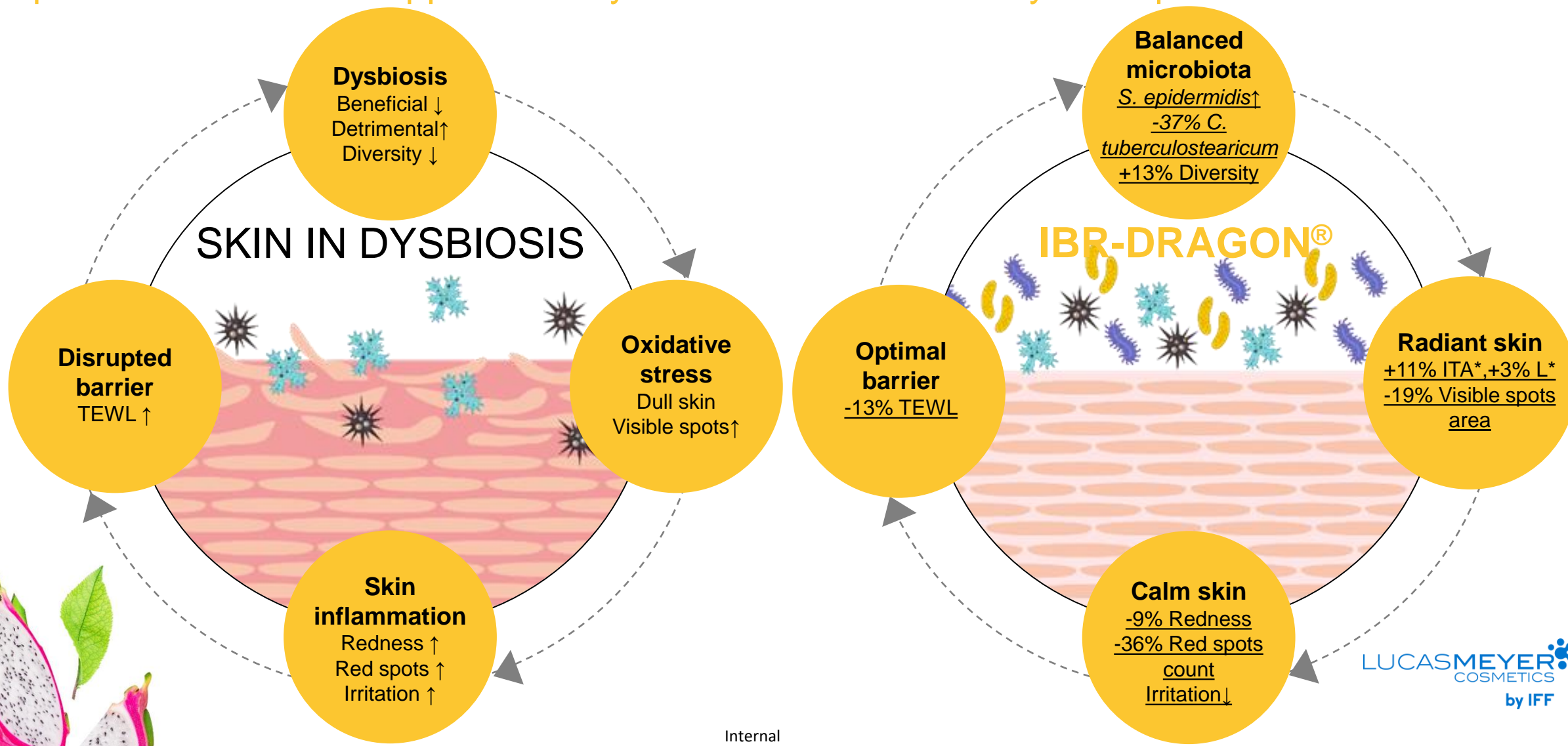


UNIQUE SUPERFRUIT PHYTOCHEMICAL COMPOSITION



IBR-DRAGON® MODE OF ACTION

Superfruit nutrients to support healthy skin microbiota diversity and optimal barrier function



IN VITRO STUDIES

Effect on modulation of skin microbiota growth

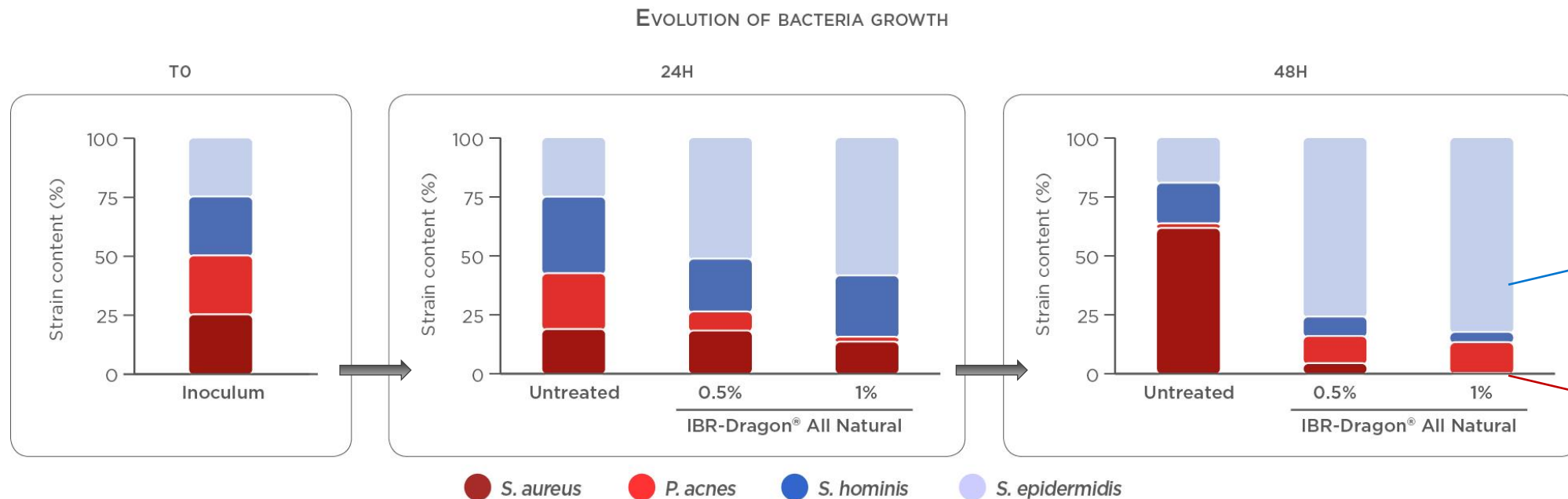
1



EVALUATION ON SKIN MICROBIOTA GROWTH

In-vitro protocol

- IBR-Dragon® All Natural diluted to 0.5% and 1% in minimal culture medium
- Inoculation with four strains at equivalent proportions in the medium providing a co-culture model composed of two beneficial strains (*S. hominis* and *S. epidermidis*) and two detrimental strains (*S. aureus* and *P. acnes*)
- Collection of a culture medium sample after 24h and 48h following by a count of each strain



Increase in beneficial strain ratio

Decrease in detrimental strain ratio

IBR-Dragon® shows prebiotic activity supporting the growth of beneficial bacteria and allowing them to better compete with detrimental ones

CLINICAL STUDIES

1

Effect on skin microbiota diversity and skin resilience

- Evaluation of phylogenetic diversity
- Evaluation of *C. tuberculostearicum* abundance
- Evaluation of anti-inflammatory effect
- Evaluation of skin resilience
- Evaluation of visible spots appearance



2

Effect on skin barrier function, skin radiance and youthfulness

- Evaluation of TEWL
- Evaluation of a* parameter
- Evaluation of L* parameter and ITA
- Evaluation of wrinkle appearance

Tested formula

| Ingredient | Active formula (%) | Placebo (%) |
|-------------------------|--------------------|----------------------|
| Water | 84.35 | 85.35 |
| Butylene glycol | 4.00 | 4.00 |
| Dipropylene glycol | 1.00 | 1.00 |
| Hexylene glycol | 1.00 | 1.00 |
| Polysorbate 20 | 1.00 | 1.00 |
| Hydrogenated polydecene | 1.50 | 1.50 |
| Cyclomethicone | 4.00 | 4.00 |
| IBR-Dragon® | 1.00 | - |
| Carbomer | 0.80 | 0.80 |
| Triethanolamine | 0.70 | 0.70 |
| Methylparaben | 0.40 | 0.40 |
| EDTA | 0.15 | 0.15 |
| FD&C Red 4 | - | 3 10 ⁻⁶ |
| FD&C Yellow 5 | - | 1.5 10 ⁻⁵ |

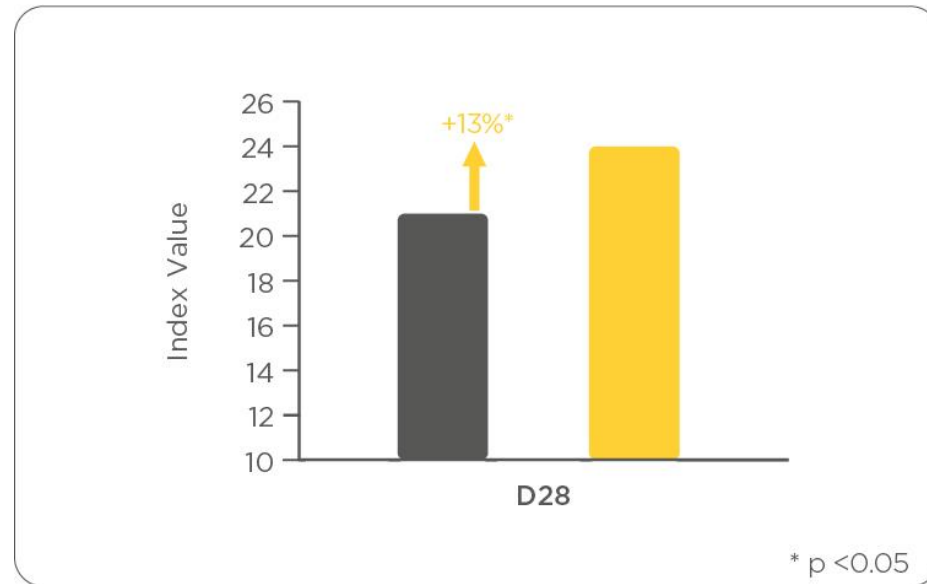


EFFECT ON SKIN MICROBIOTA DIVERSITY

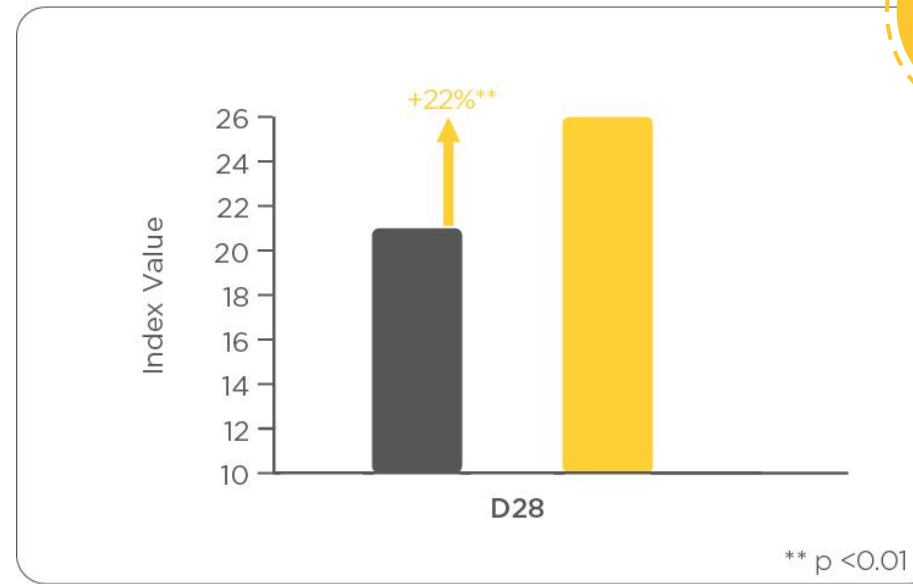
In-vivo protocol

- 33 Caucasian and Brazilian women, 30 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. placebo for 28 days
- Measurement of skin microbiome diversity (Faith's index) by sequencing skin surface microbiota samplings at D28

EVALUATION OF MICROBIOTA DIVERSITY - FAITH'S INDEX



EVALUATION OF MICROBIOTA DIVERSITY - FAITH'S INDEX
(>45 YEARS OLD) N=13



85%
positive
response

Microbiota
diversity

1



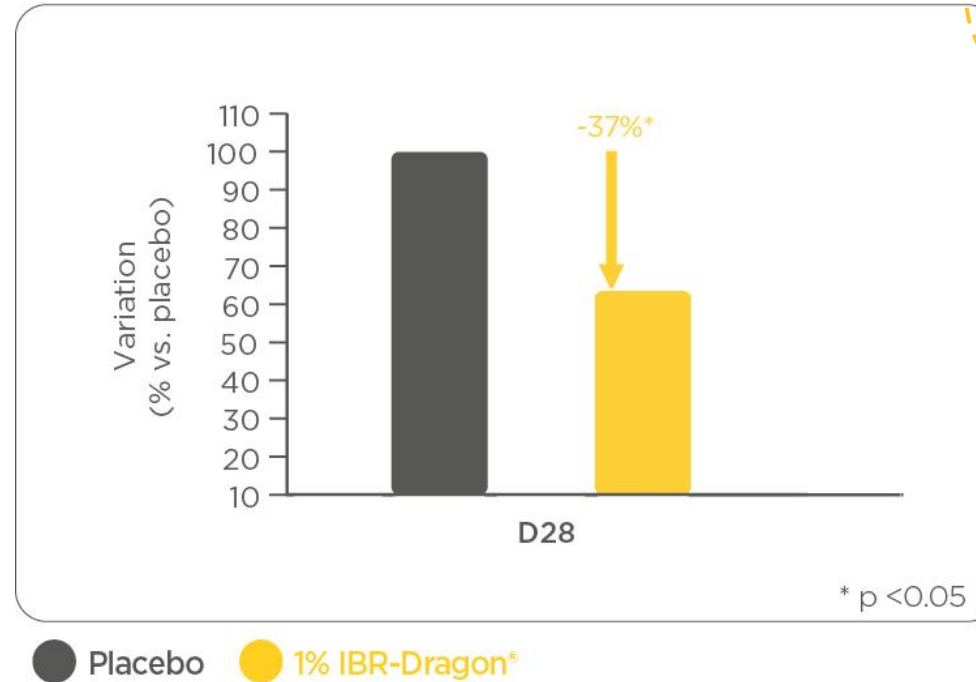
IBR-Dragon® increases skin microbiota diversity, especially in mature skin (above 45 years old)

EFFECT ON *C. TUBERCULOSTEARICUM* ABUNDANCE

In-vivo protocol

- 33 Caucasian and Brazilian women, 35 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Measurement of *C. tuberculostearicum* abundance by sequencing skin surface microbiota samplings at D28

EVALUATION OF *C. TUBERCULOSTEARICUM* ABUNDANCE



Microbiota
abundance

1



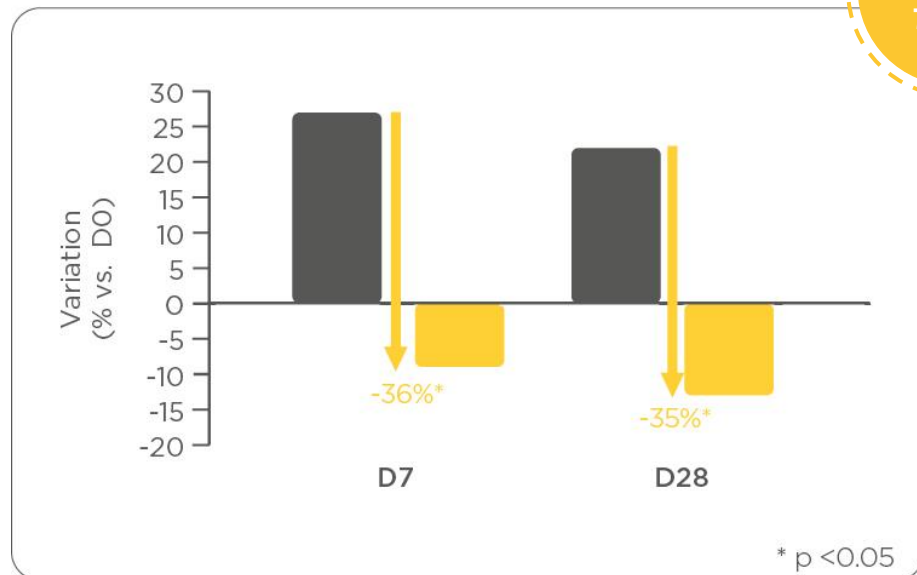
IBR-Dragon® reduces *C. tuberculostearicum* abundance for more protected skin

EFFECTS ON SKIN INFLAMMATION

In-vivo protocol

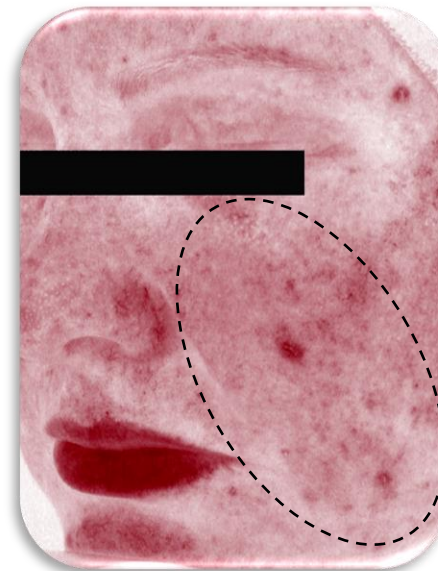
- 33 Caucasian and Brazilian women, 30 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Measurement of red spot count by VISIA imaging on D7 and D28

EVALUATION OF RED SPOT COUNT

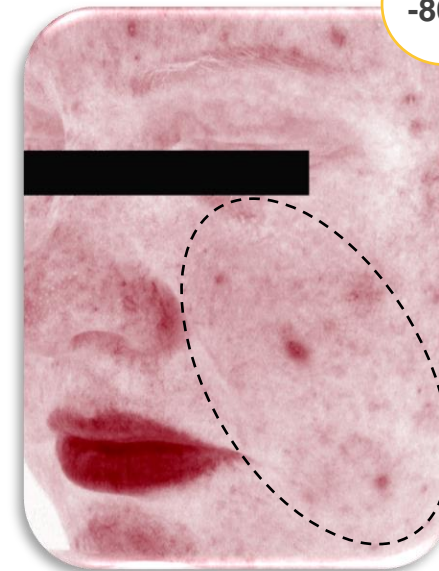


Potent results in 7 days

Vol. #14, age 35, Caucasian, skin phototype III



D0



D7

Red spots count
-80%

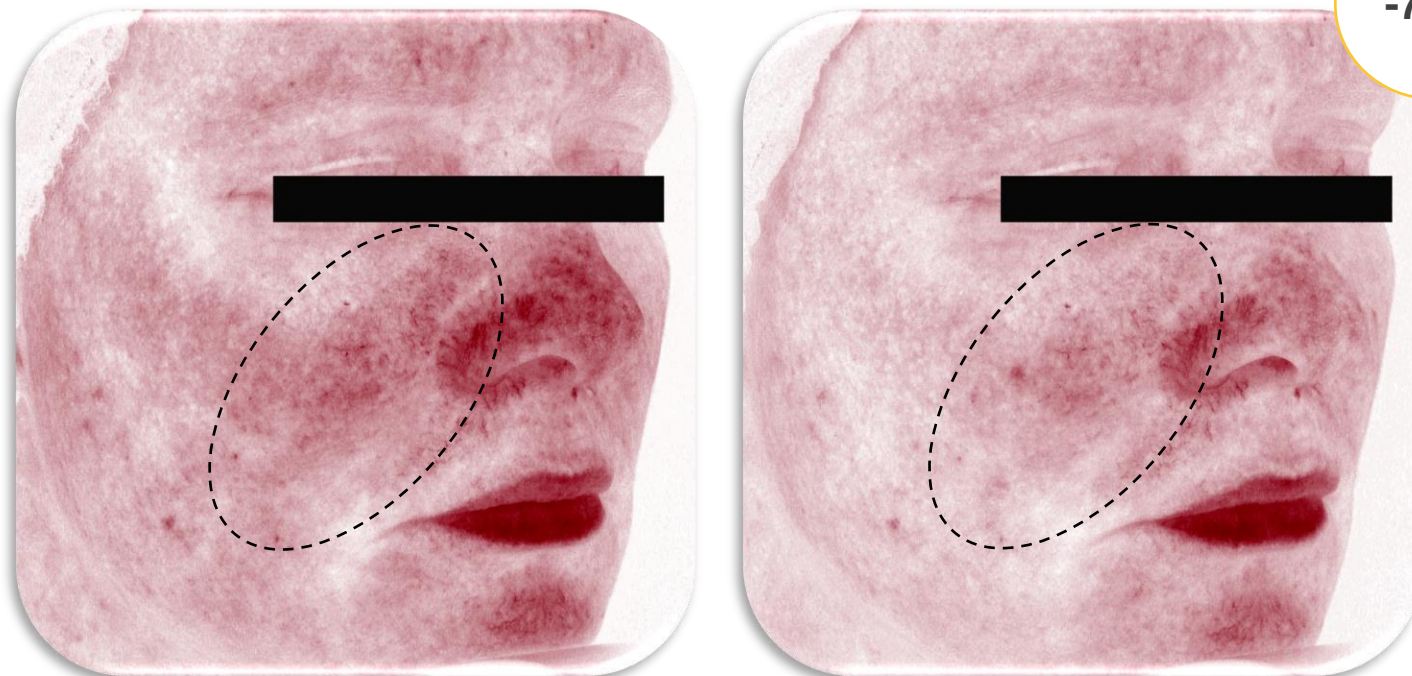
Anti-inflammatory

1

IBR-Dragon® reduces signs of skin inflammation for calm skin

EFFECT ON SKIN INFLAMMATION

Vol. #21, age 40, Caucasian, skin phototype II



D0

D28

Red spots count
-71%

Anti-inflammatory

1



IBR-Dragon® reduces signs of skin inflammation for calm skin

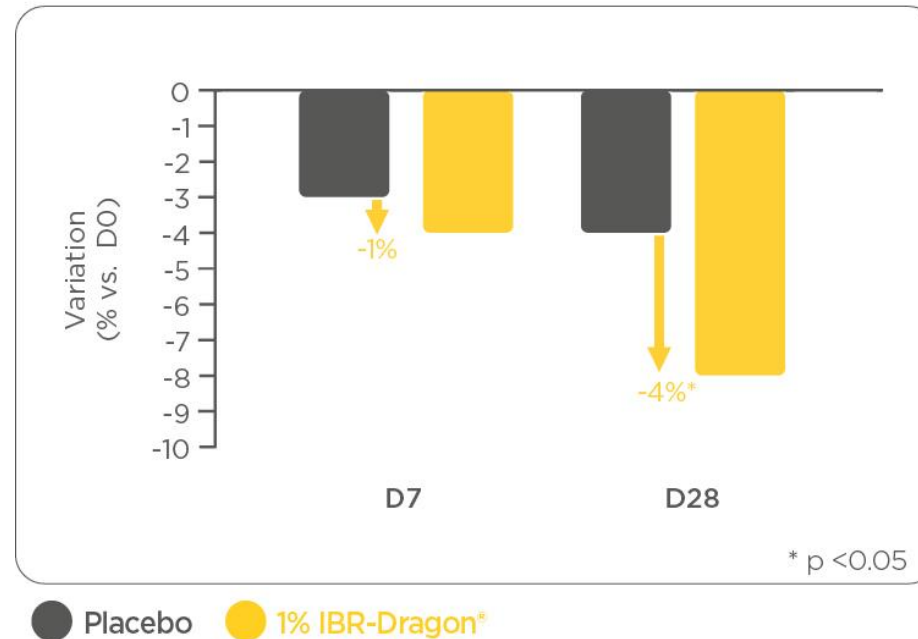


EFFECT ON SKIN REDNESS AND IRRITATION

In-vivo protocol

- 33 Caucasian and Brazilian women, 30 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Assessment of skin redness and irritation by dermatologist grading on D7 and D28

EVALUATION OF SKIN REDNESS AND IRRITATION SCORE
(DERMATOLOGIST GRADING)



IBR-Dragon® soothes irritated skin

Anti-inflammatory

1

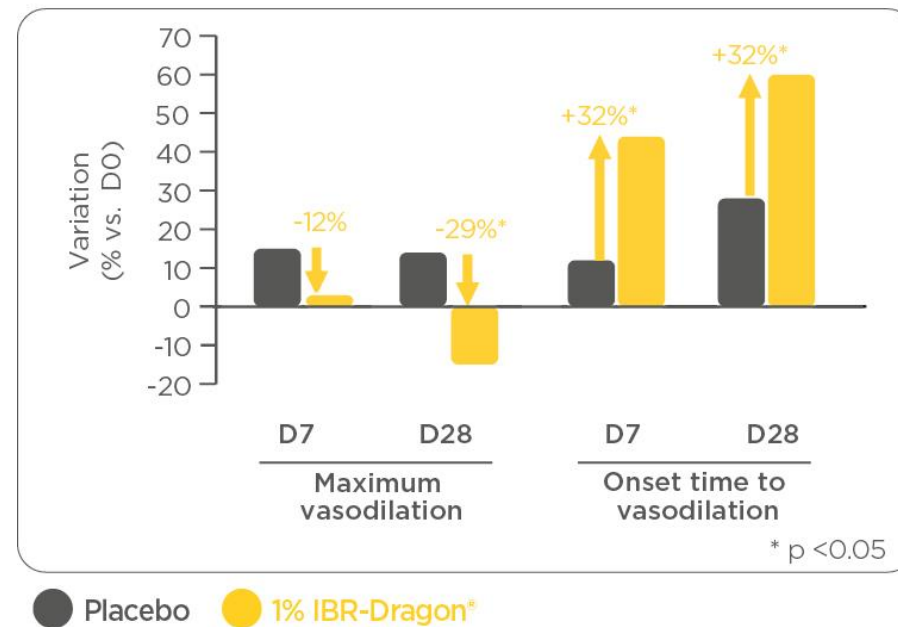


EFFECT ON SKIN RESILIENCE

In-vivo protocol

- 33 Caucasian and Brazilian women, 30 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split body (forearms) vs. placebo for 28 days
- Evaluation of skin microcirculation by Laser Doppler after histamine insult at D0, D7, D28

EVALUATION OF SKIN SENSITIVITY (HISTAMINE CHALLENGE)



IBR-Dragon® improves skin resilience to histamine challenge for calmer skin

Skin resilience

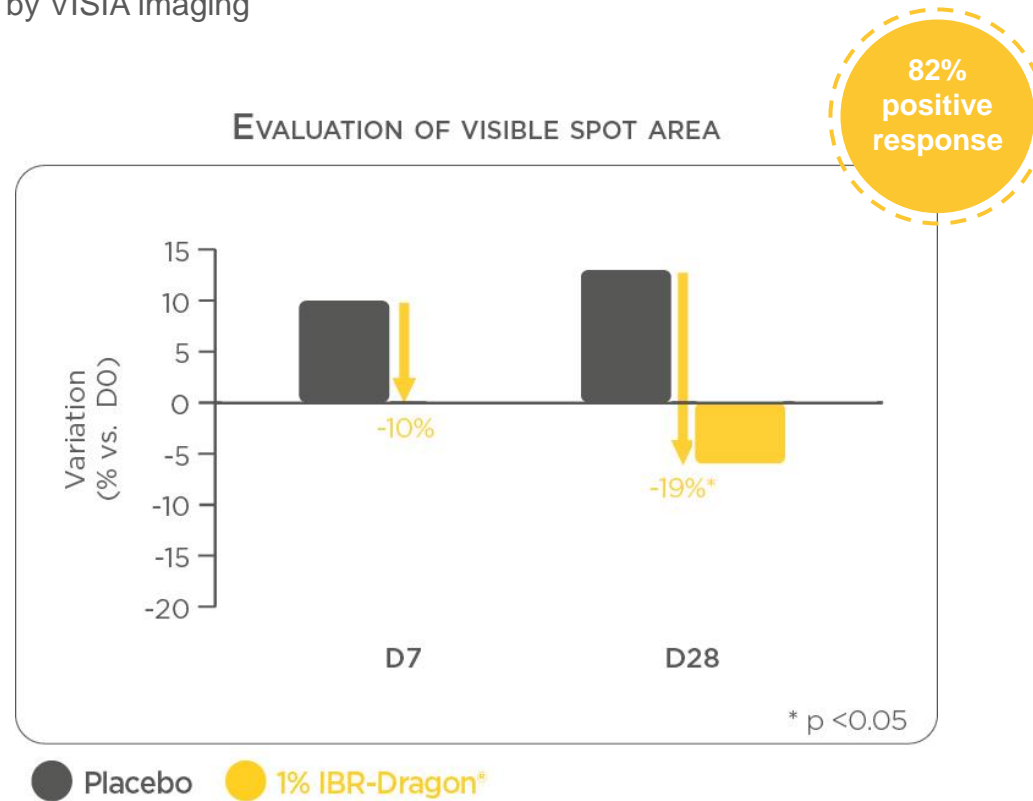
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EFFECT ON SKIN PIGMENTATION

In-vivo protocol

- 33 Caucasian and Brazilian women, 30 to 55 years old, all skin types, phototype II to IV
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split body (forearms) vs. placebo for 28 days
- Measurement of visible spots area by VISIA imaging



Visible spots

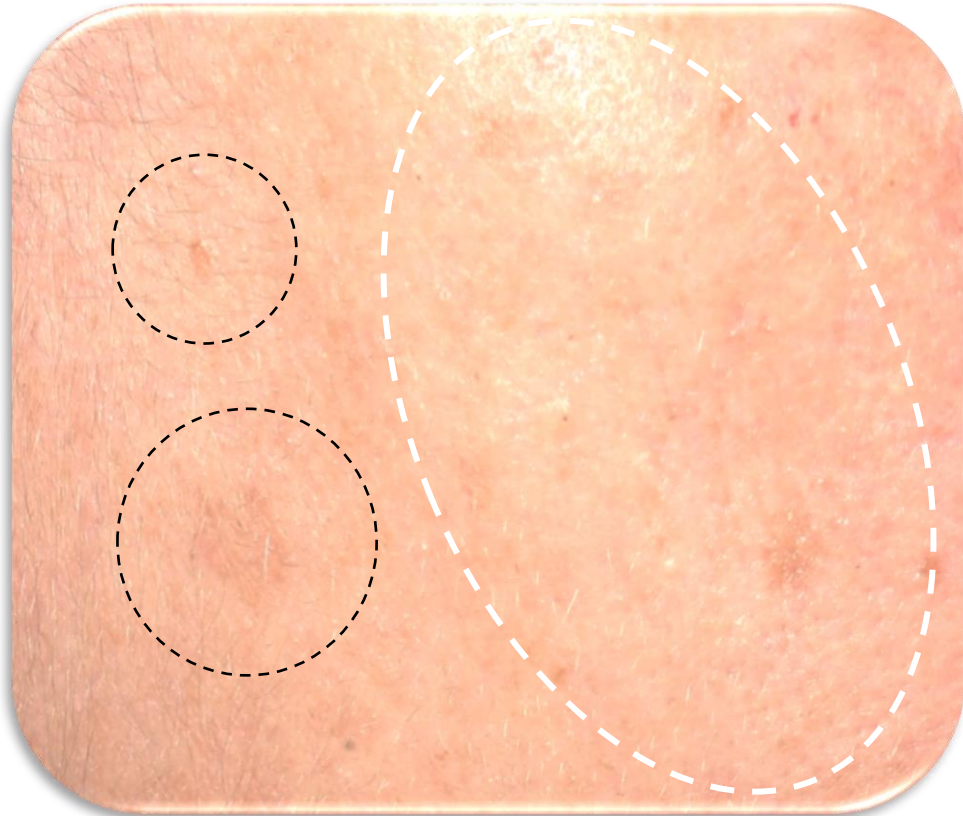
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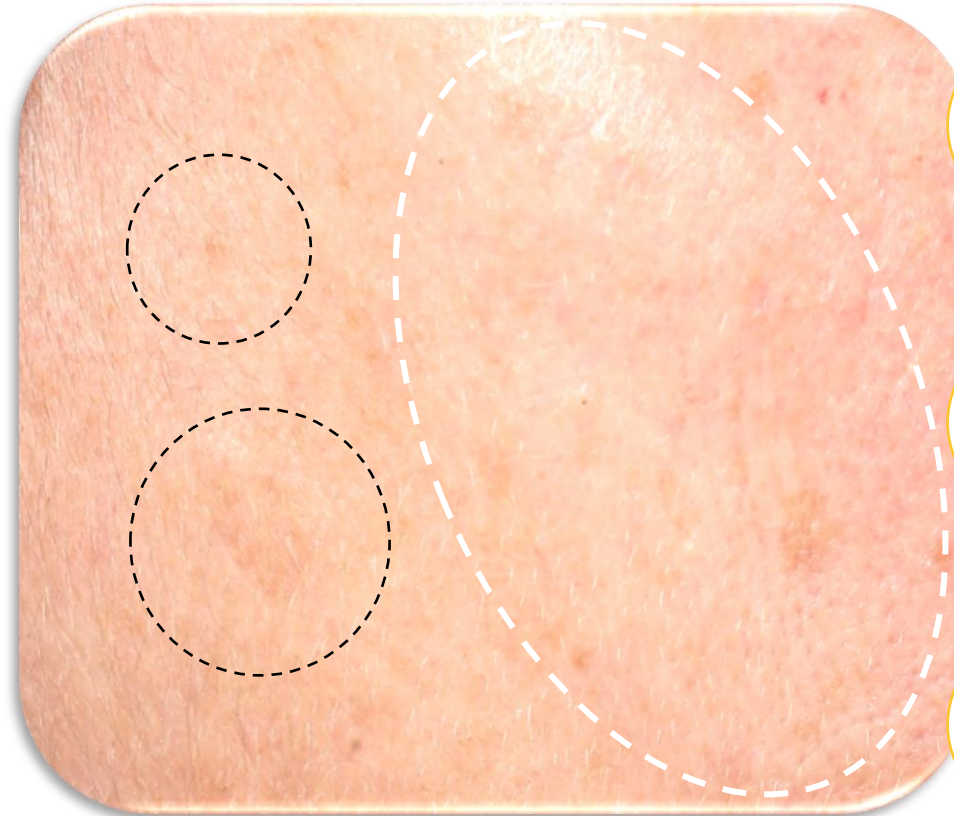
IBR-Dragon® reduces the appearance of visible spots for a more even skin tone

EFFECT ON SKIN PIGMENTATION

Vol. #35, age 49, Caucasian, skin phototype III



D0



D28

Visible spots

1

Visible spots area
-15%

ITA parameter
+6%

L* parameter
+1%



IBR-Dragon[®] reduces the appearance of visible spots for a more even skin tone

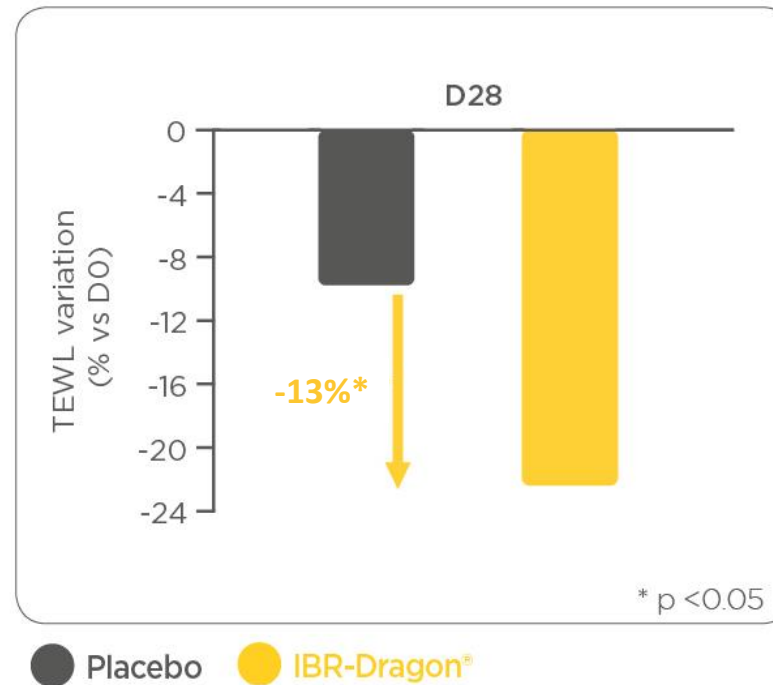


EFFECT ON SKIN BARRIER FUNCTION

In-vivo protocol

- 26 Caucasian women, 35 to 55 years old, all skin types, phototype II to III
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Measurement of skin barrier function as TEWL

EVALUATION OF SKIN BARRIER FUNCTION



UP TO
-76%

vs D0

UP TO
X 5

vs placebo

Barrier

2



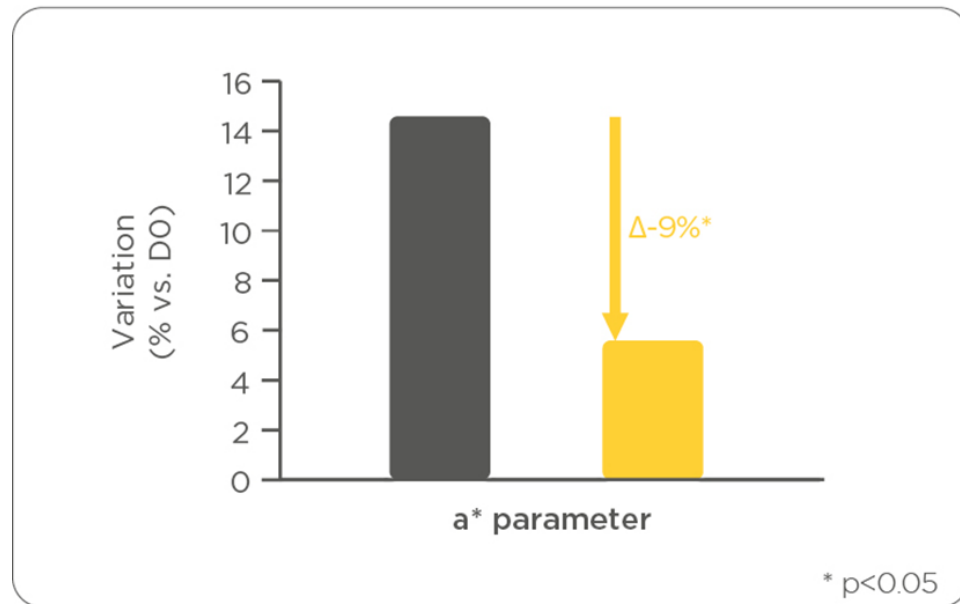
IBR-Dragon® reinforces the skin barrier function for more protected and hydrated skin

EFFECT ON SKIN REDNESS

In-vivo protocol

- 26 Caucasian women, 35 to 55 years old, all skin types, phototype II to III
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Measurement of skin redness (a* parameter) by chromameter analysis

EVALUATION OF SKIN REDNESS



Vol. #36, age 42, skin phototype II



D0



D28

Skin Redness

2

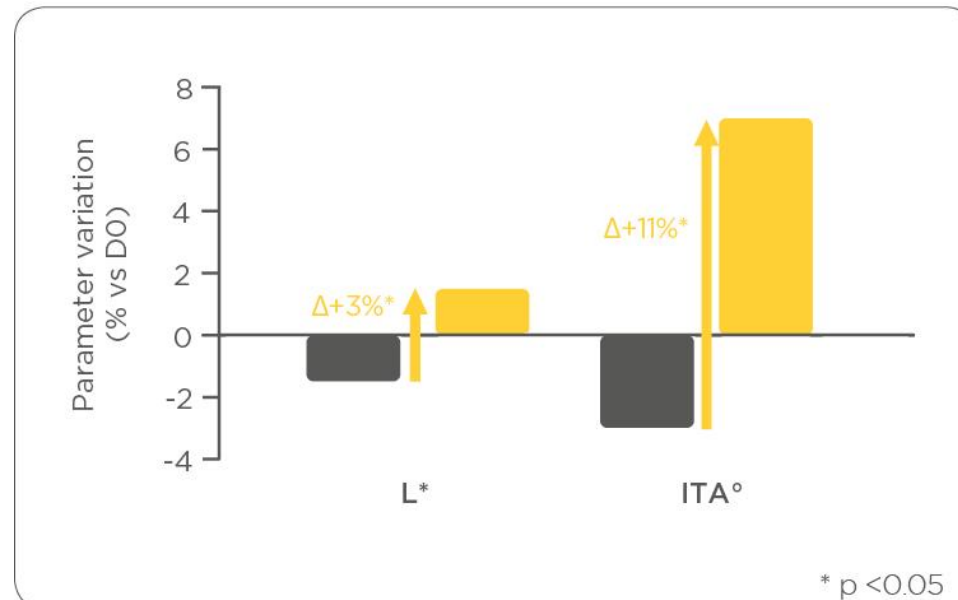
IBR-Dragon® decreases the appearance of skin redness (inflammation)

EFFECT ON SKIN RADIANCE

In-vivo protocol

- 26 Caucasian women, 35 to 55 years old, all skin types, phototype II to III
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Chromameter® analysis of L* (luminance) and ITA° (skin lightening) parameters

EVALUATION OF SKIN COMPLEXION



L*

UP TO
+9%
vs placebo

ITA°

UP TO
+75%
vs placebo

Radiance

2



IBR-Dragon® delivers lighter and more luminous skin leading to a more radiant look

EFFECT ON SKIN RADIANCE

Vol. #22, age 45, skin phototype II



D0



D28

ITA* parameter
+18%



IBR-Dragon® delivers lighter and more luminous skin leading to a more radiant look

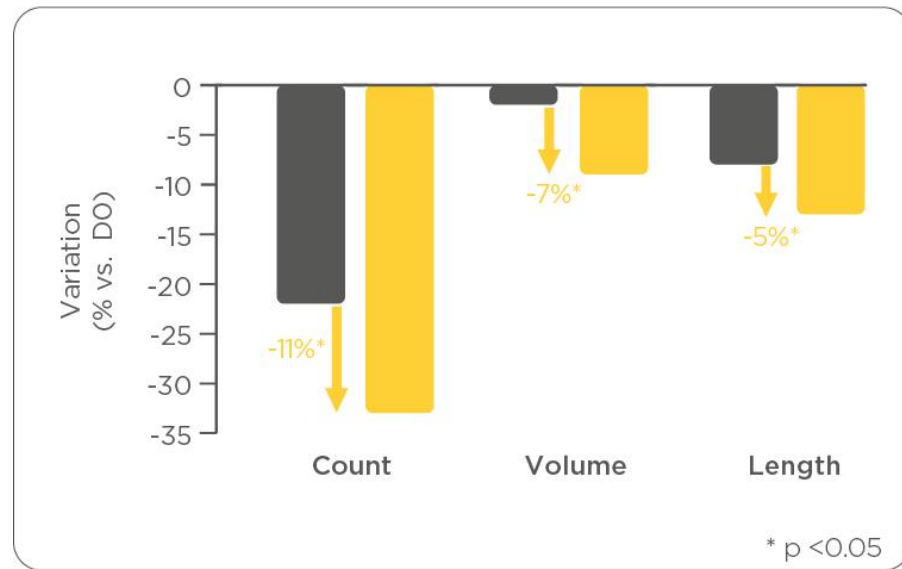


EFFECT ON WRINKLE APPEARANCE

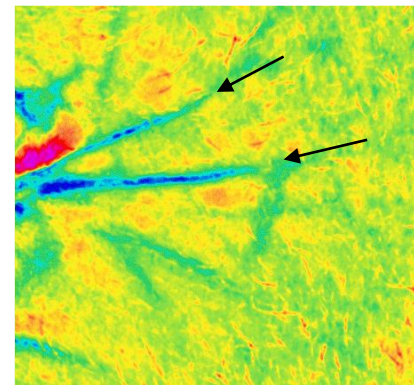
In-vivo protocol

- 26 Caucasian women, 35 to 55 years old, all skin types, phototype II to III
- Application of a 1% IBR-Dragon® cream-gel 2x/D on split face vs. a placebo for 28 days
- Evaluation of wrinkle appearance (count, volume and length) by PRIMOS-3D analysis

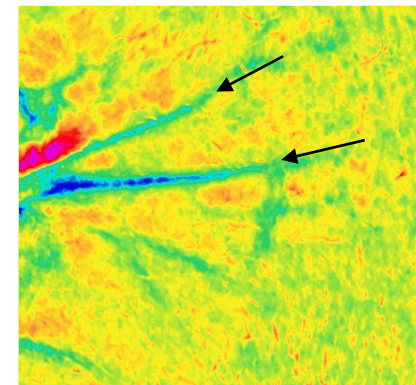
EVALUATION OF WRINKLE APPEARANCE



Vol. #16, age 42, skin phototype II



D0



D28



Wrinkle
appearance

2



IBR-Dragon® decreases the appearance of wrinkles for a youthful look

IBR-Dragon®

Microbiota-boosting superfruit to reveal a healthy skin glow!

MODE OF ACTION/CONCEPT

- Supports the growth of beneficial bacteria, allowing them to better compete with detrimental ones
- Boosts natural skin protection
- Helps rebalance skin microbiota diversity

CLINICAL RESULTS

- Increases skin microbiota diversity and decreases *C. tuberculostearicum* abundance (**microbial barrier**)
- Decreases TEWL & reinforces barrier function (**physical barrier**)
- Reduces skin inflammation & strengthens skin resilience (**immune barrier**)

CONSUMER BENEFITS

- Delivers brighter, healthy-looking skin
- Illuminates skin complexion
- Helps recover a natural glow
- Maintains healthy, resilient skin for youthful look

ORIGIN

- Natural superfruit extract rich in sugars and fibers
- Dragon fruits locally sourced in Israel and hand-harvested
- Solvent-free green extraction process



MANUFACTURER BENEFITS

- Fits perfectly with microbiota hot trend
- Aligned with 'glow' super trend
- Green & sustainable solution
- Full traceability
- Superfruit attractive story
- Easy to formulate



*Please request our "vegan information statement" to decide if the product meets with your own requirements

SUSTAINABILITY SUMMARY

Carbon
renewableVegan
compatible

Naturalness

- Paraben free
- >98.35% Carbon renewable
- >98.35% Natural Origin Content (ISO 16128)
- COSMOS approved**
- Vegan compatible*

Local
partnershipResponsibly
sourced

Sourcing

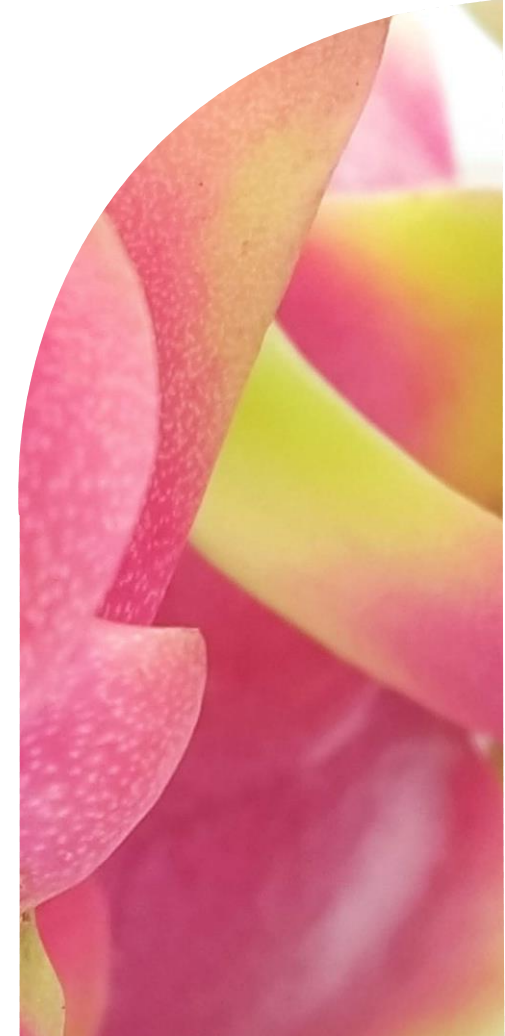
- Pitaya (*Hylocereus undatus*)
 - Traceability: high visibility on supply chain
 - Locally sourced in Israel
 - Part used: fruit pulp
 - Non-GMO
 - Hand-pollinated & hand-harvested
- Plant-based, palm free & non-GMO glycerin
- Nagoya: Sourced in compliance with applicable biodiversity laws



Eco-friendly

Environmental Footprint

- *Hylocereus undatus* Fruit Extract
 - Fruit extracted in its own water
 - No use of petrochemical solvent
 - Waste repurposed for compost
- Energy efficiency: Solvent & water-free process
- Ecotoxicological data
 - Aquatic ecosystem friendly



*Please request our "vegan information statement" to decide if the product meets with your own requirements

**Version available

PRODUCT INFORMATION

IBR-Dragon[®] all-natural

| | | |
|---------------------|---|---|
| INCI NAME | Glycerin (and) Hylocereus Undatus Fruit Extract | |
| ADDITIVE | Benzyl alcohol & Benzoic acid | |
| APPEARANCE | Aqueous light-yellow liquid | |
| FORMULATION | Should be incorporated at the end of the formulation at a temperature below 40°C | |
| DOSAGE | 1-2% | |
| OPTIMUM pH | 3-9 | |
| APPLICATIONS | <ul style="list-style-type: none"> • Radiance/Brightening care • Moisturizing care • Prebiotic skin care | <ul style="list-style-type: none"> • Protective/Defense skin care • Day care • Make up |

*Please request our "vegan information statement" to decide if the product meets with your own requirements



TOXICOLOGICAL STUDIES

- Eye Irritation (Neutral Red Release) - pure IBR-Dragon® tested
- Skin tolerance (48-h patch test) - pure IBR-Dragon® tested
- Skin sensitization (HRIPT) - 30% dilution IBR-Dragon® tested
- Mutagenicity (Ames, OECD 471) - pure IBR-Dragon® tested
- Phototoxicity (OECD 432) - pure IBR-Dragon® tested

ECOTOXICOLOGICAL STUDIES

- Aquatic toxicity on Daphnia (OECD 202) - pure IBR-Dragon® tested
- Aquatic toxicity on Freshwater Alga and Cyanobacteria, Growth Inhibition Test (OECD 201) - pure IBR-Dragon® tested



Excellent safety profile

Thank you!



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