

ERYTHRULOSE

The natural tanning adjunct for a new dimension of sun-kissed tan

04-2022



COSMOS APPROVED



Outline

1

The power of
tanned skin

What is the fascination of tanned skin
and what is the role of the consumer ?



2

Some figures and
numbers

Opportunities to grow and to come
close to consumer expectations.



3

ERYTHRULOSE &
DHA

Facts & figures you should not miss!



4

Conclusion

10 good reasons to infuse self-tanning
formulations with ERYTHRULOSE!

A close-up photograph of a person's face and shoulder. The person has a warm complexion and is wearing red lipstick. Their hand is resting on their shoulder. In the background, there are concentric green and blue circles, suggesting a sun or a lens flare effect. A large blue circle is overlaid on the right side of the image, containing white text.

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The power of beautiful tanned skin– a long history

- “Fashion designer Coco Chanel has long been acknowledged as one source of inspiration behind the tanning trend as she helped steer the masses away from the **porcelain skin era** of the early 1900s after holidaying in St Tropez in 1923.
- But by that point people had already realized they wanted to add **a bit of color** to their lives. Along with the growing fashion trend for looser clothes and smaller bathing costumes for women, **tanned skin had become fashionable.”**



The success story of skin tanning

Self tanning is a safe alternative-

We do not have to go out in the sun to get a skin tan. A self-tanning active helps us get that sun-kissed glow in a healthy, convenient way. We feel better for boosting our beauty with a touch of bronze color. The positive reactions that stem from our perception of ourselves as a more healthy-looking person make us feel more confident.

Self tanning is hot-

The beauty industry is promoting the use of self-tanners, creating opinions and recommendations. Products are discussed and compared in publications and blogs. Word-of-mouth is becoming more and more relevant for the consumer, especially when advisors are experienced in the use of the specific tanner.

New innovations and claims in the self-tanner market



«Washes off with soap & water»



«Develops in just two hours»



«Transforms any cream into a custom self-tanner»



«Made with natural extracts and organic botanicals»



«Deep, long-lasting hydration»

Challenging current textures, product forms, and ingredients...

Factors that are currently limiting full success

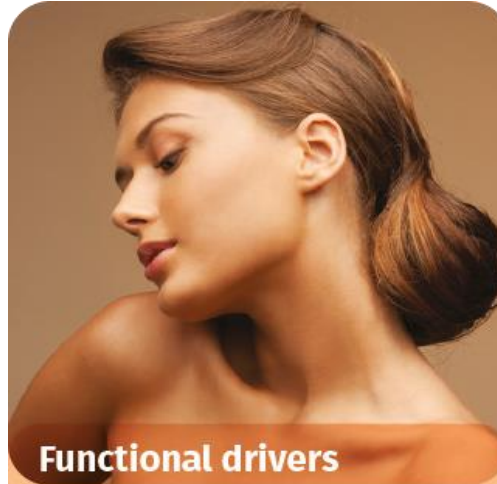
Self tanning is sensitive

Which product should we choose to achieve the best tanning results?

How can we **differentiate** between the great choices the market offers? How can we ensure that they **deliver what they promise**?

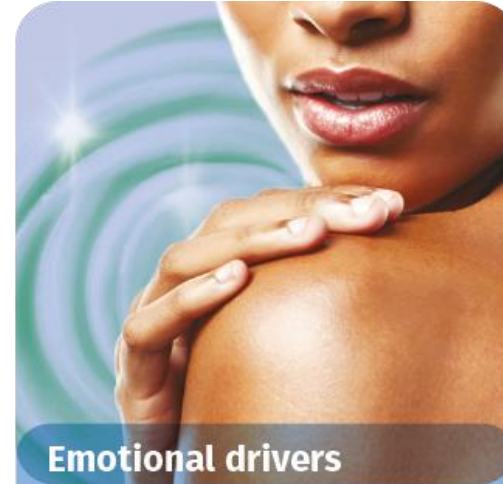


Self tanning– a mixture of sensitive expectations & drivers



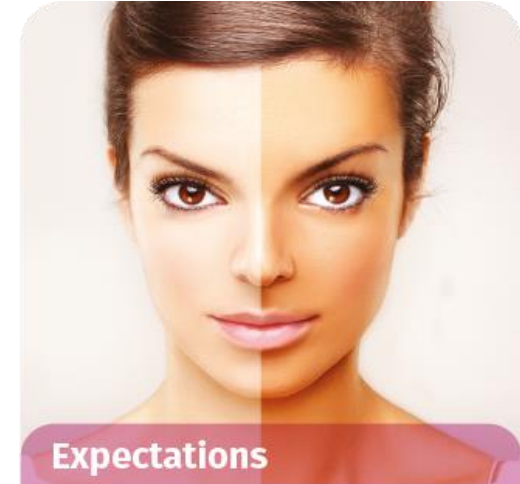
Functional drivers

- Healthy tanning with less skin drying
- Attractive appearance due to positive tanning effects
- Convenience of application



Emotional drivers

- Self confidence
- Positive reactions of the environment
- Happiness



Expectations

- Control over tan nuances
- Individual, durable effects
- Step-by-step tanning
- 2-in-1 conveniences

It's the consumers who decide
what is *HOT or NOT*...

Does the product I choose match my skin tone?

HOW EASY IS IT TO APPLY?

Does it look natural?

DOES IT SMELL?

DO I SEE FAST RESULTS?

LOOK & FEEL

HOW LONG WILL IT LAST?

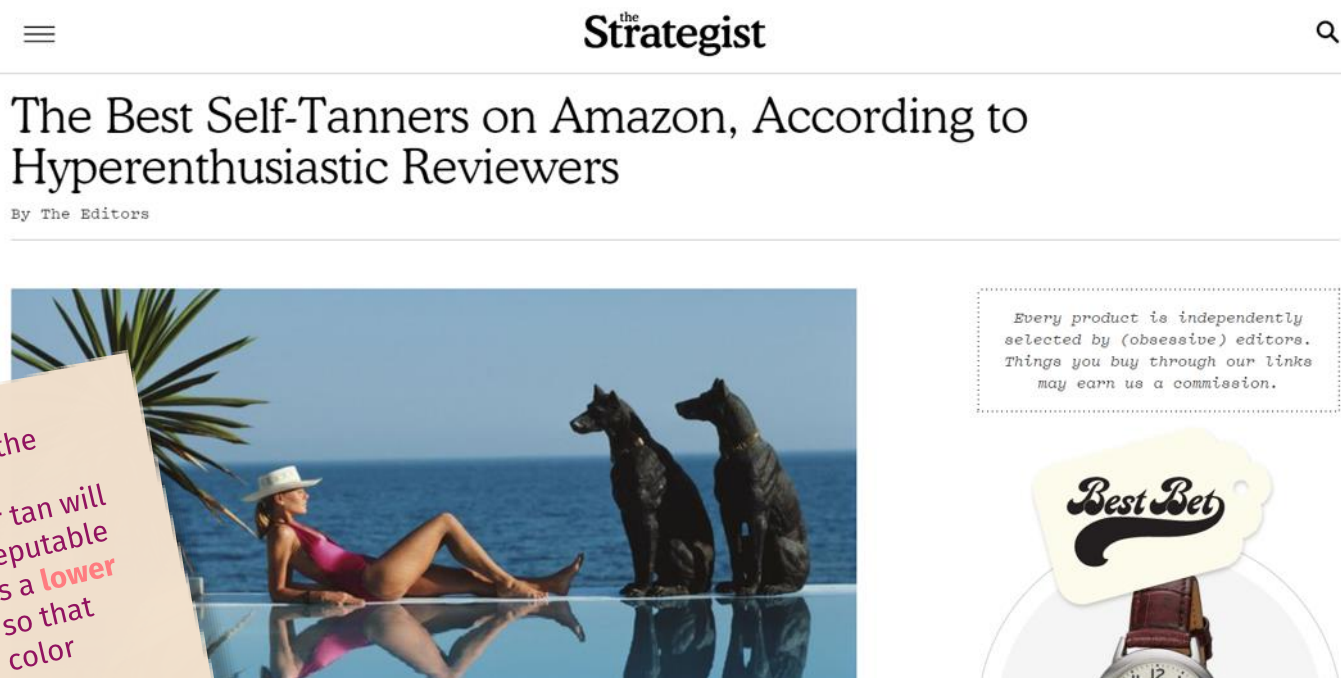
WHAT ABOUT THE DRYING TIME?

Will it leave streaks on my clothes or hands?

Will people recognize that I used self-tanner?

Is it a cream, gel, spray or a mousse?

...and they are pushing for optimization



"Locke says choosing the right formula also determines how your tan will appear. "Go with a reputable brand, one that uses a **lower percentage of DHA** so that you can build your color accordingly," she says. **Bronze-seekers should also go for products infused with ERYTHRULOSE...**"

"Most self-tanners contain **dihydroxyacetone (DHA)**, a colorless sugar that interacts with the top layer of skin to darken. According to Locke, who works with Olivia Wilde, Katharine McPhee, and the cast of Dancing with the Stars, **an orange tint is often due to an oversaturation of DHA**—which can occur when you layer on too much product or use a self-tanner with a percentage of DHA too high for your skin type."

**Using the right self-tanner is a topic.
Using the right ingredient is a must.**

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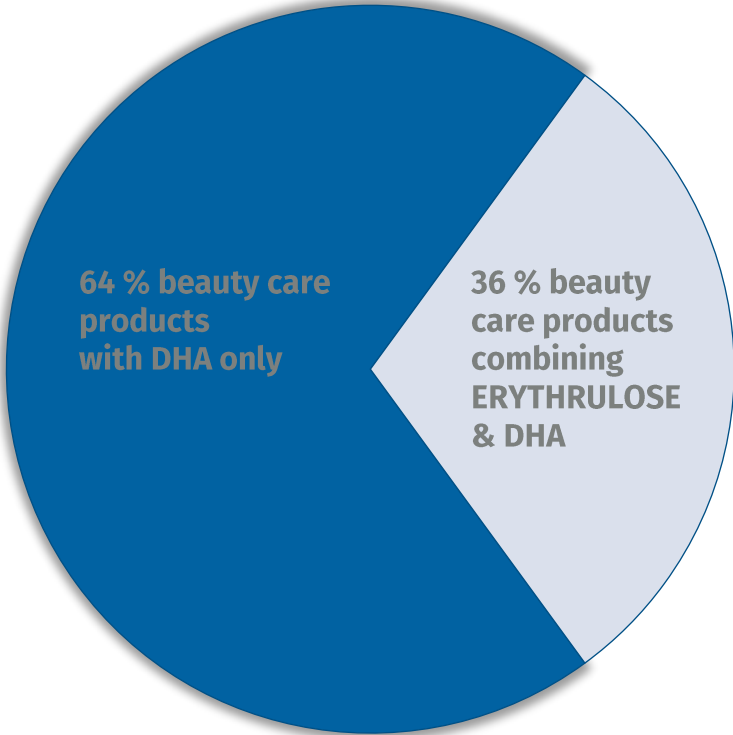


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10 good reasons to infuse self-tanning formulations with ERYTHRULOSE!

Already 36% of new innovative products use ERYTHRULOSE in their formula



ERYTHRULOSE & DHA



GNPD, 2017 – 2020, Number of variants, Beauty & Personal Care , DHA vs. ERYTHRULOSE & DHA in combination



The tanning market is ready for a change

DHA has dominated the market for many years as the traditional fast acting self tanning molecule.

However DHA has clear limitations in terms of homogenous skin tone, long lasting effects and residue of color on the palms and skin drying.

➤ **Overcoming these disadvantages would reduce consumers' reluctance and thus generate market opportunities.**



ERYTHRULOSE

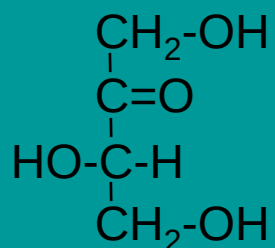
The perfect tanning adjunct

Key advantages:

- Perfectly compatible with DHA in formulations
- Long lasting color
- Homogenous skin tone
- Less streaking
- Less skin drying

ERYTHRULOSE – Tanning with Sugar

ERYTHRULOSE



(S)-1,3,4-Trihydroxy-2-butanone

Appearance: Yellow, highly viscous solution

Water content: approx. 20%

INCI name: Erythrulose

Product features

- ERYTHRULOSE is a clear, yellowish solution of a natural keto-sugar for cosmetic applications.
- ERYTHRULOSE is 100% natural origin.
- ERYTHRULOSE is produced by fermentation of natural derived erythritol.
- ERYTHRULOSE does not contain preservatives



Mode of action

- ERYTHRULOSE reacts via the Maillard reaction with free primary or secondary amino groups in the upper layers of the stratum corneum, yielding to brown polymeric products (melanoids) that are directly bound to the skin

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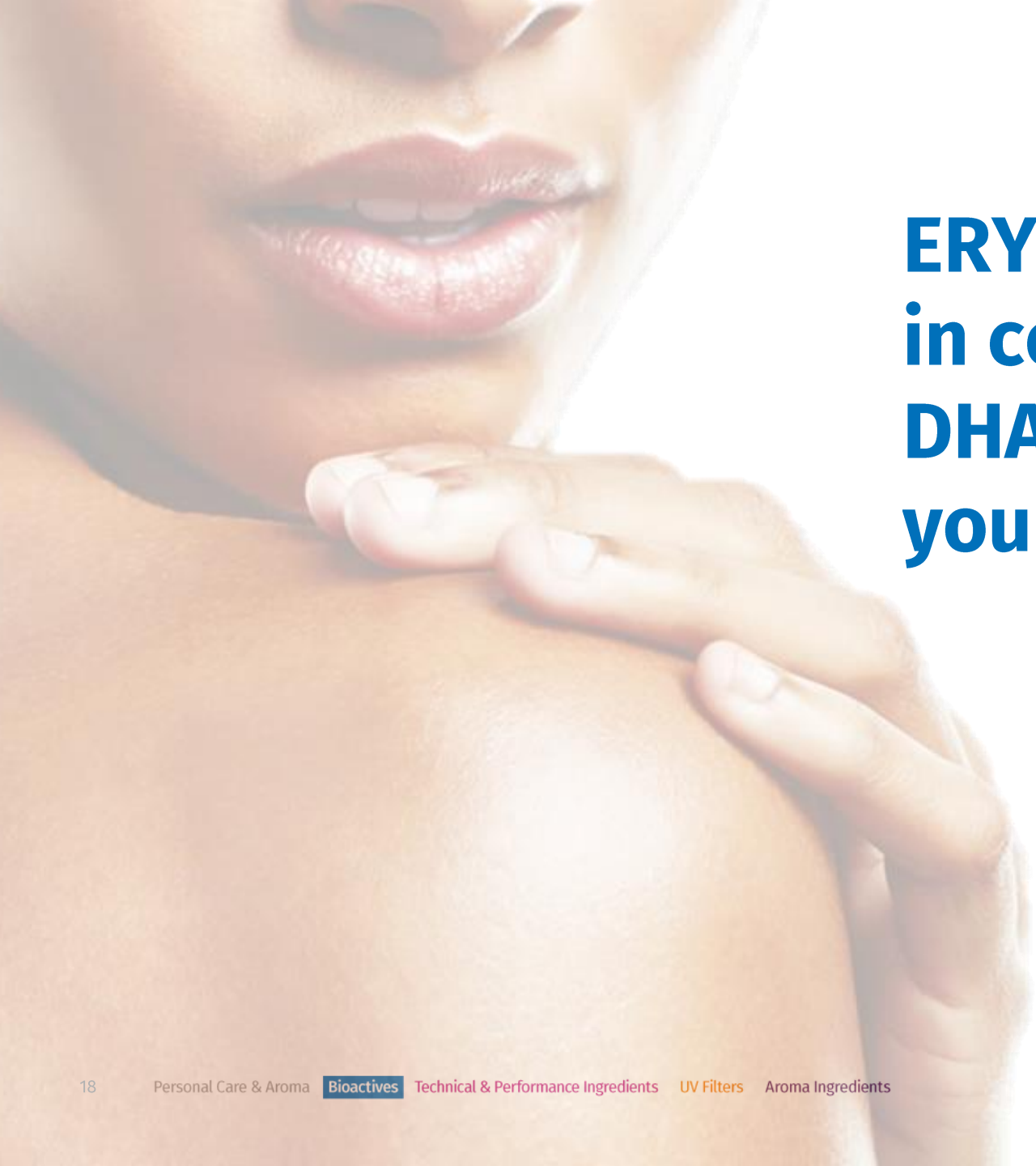
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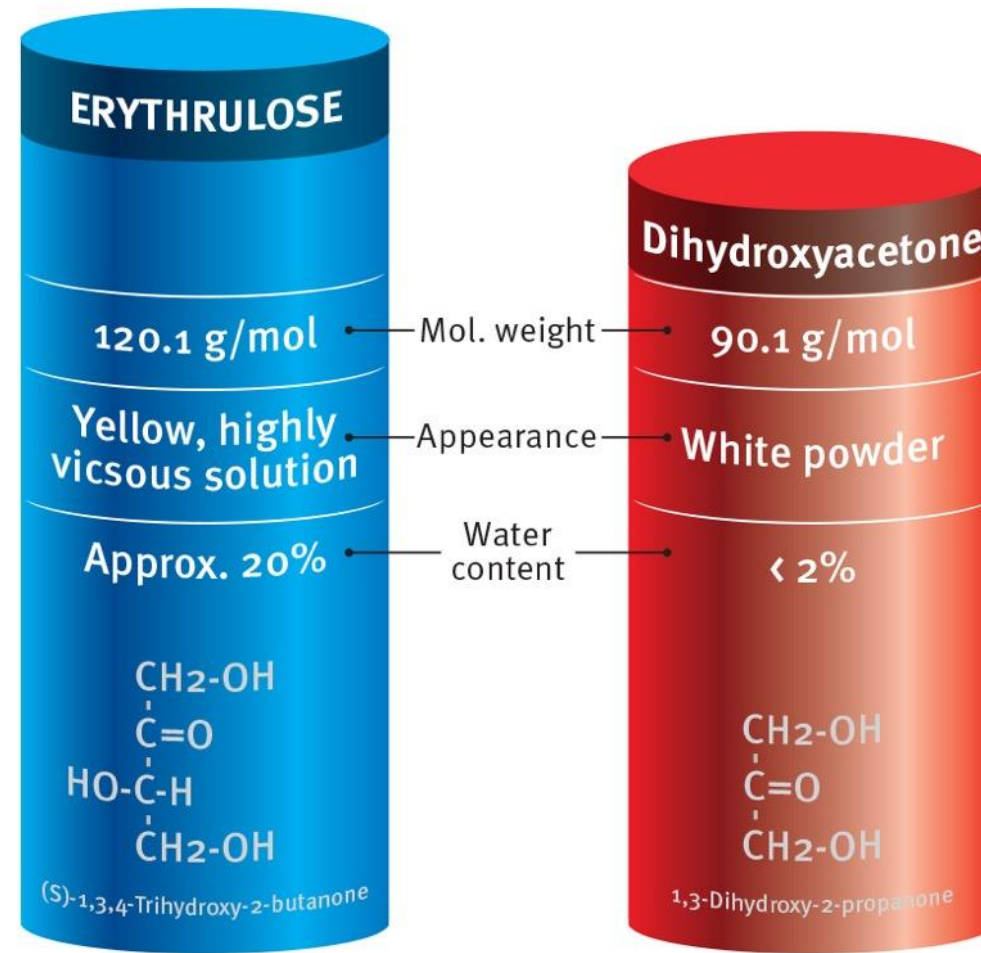
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A close-up photograph of a person's face and shoulder. The person has light skin and is wearing red lipstick. Their hand is resting on their right shoulder, which is covered in a shimmering, golden-brown tanning product. The background is a soft, out-of-focus white.

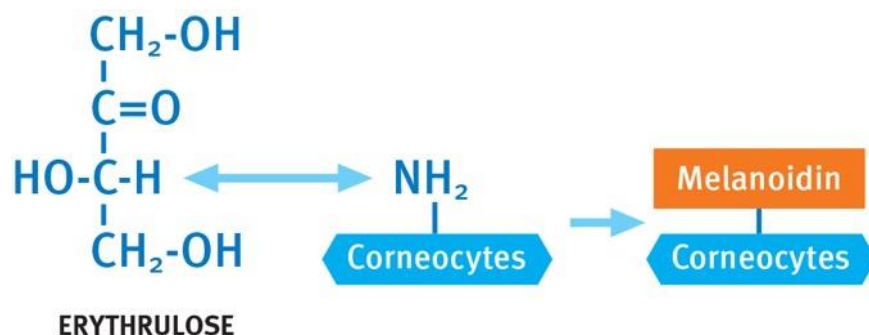
ERYTHRULOSE
in combination with
DHA offers a new dimension to
your tanning formula.

ERYTHRULOSE and DHA- a comparison



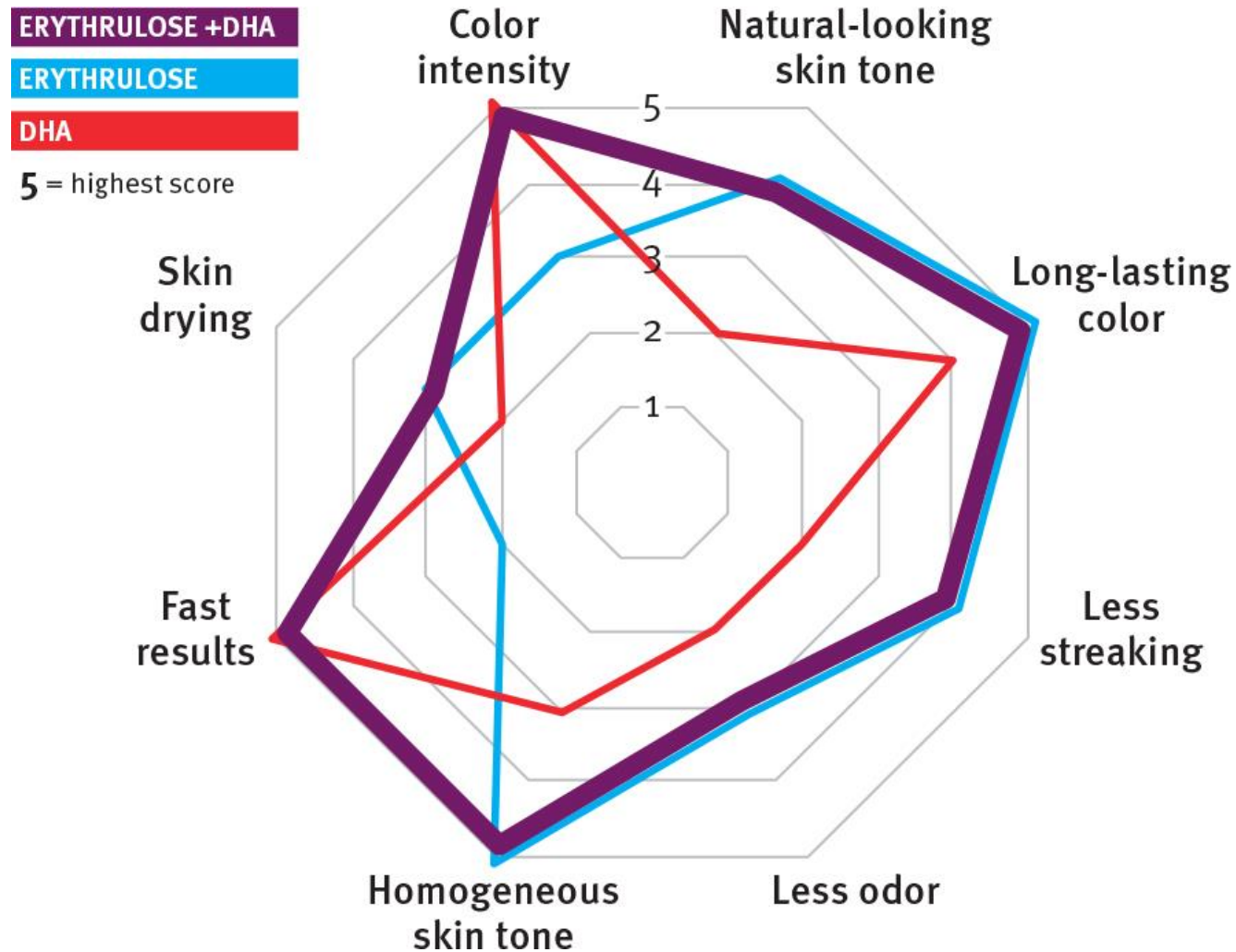
Well known mechanism provides outstanding results

- ERYTHRULOSE reacts with free primary or secondary amino groups in the upper layers of the stratum corneum.
- Melanoidins are high molecular weight polymers that are formed by this conversion of ERYTHRULOSE with amino acids, peptides or proteins.
- Melanoidins are bound to proteins of the stratum corneum mainly via lysine side-chains, their color is comparable to the appearance of natural sun tan.



➤ The reaction of **ERYTHRULOSE** with skin is slow and gentle, which makes it possible to produce a natural, long-lasting, even tan without streaks.

The powerful combination makes the difference



ERYTHRULOSE – the natural, long lasting colour enhancer

In vivo study of a self-tanning formulation containing
ERYTHRULOSE and DHA

Study Design

8 healthy female volunteers
10 days application on the back
4 days post application measurement

Formulations

O/W emulsions containing:

- 3.5% DHA and
1.5% ERYTHRULOSE
- 5% DHA

ERYTHRULOSE – the natural, long lasting colour enhancer



➤ Combination leads to visibly better results after 14 days.

ERYTHRULOSE – diminishes skin drying during tanning treatments

In vivo study of a self-tanning formulation containing ERYTHRULOSE and DHA

Study Design

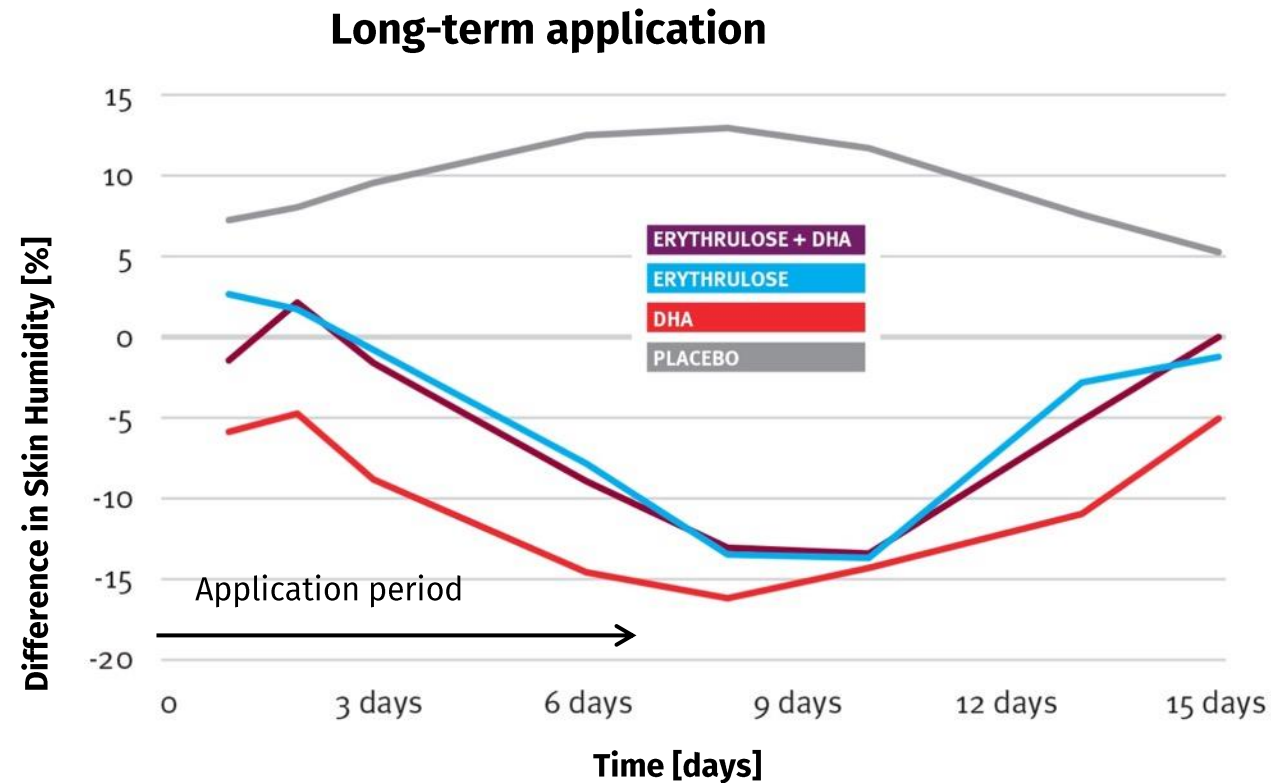
5 healthy female volunteers
7 days application on the inner forearms
15 days continuous measurement period

Formulations

gel formulations containing 0.5-molar concentration of total tanning agent:

- DHA & ERYTHRULOSE (0.5 + 0.5 mole)
- DHA (0.5 mole)
- ERYTHRULOSE (0.5 mole)
- Placebo

ERYTHRULOSE – diminishes skin drying during tanning treatments



ERYTHRULOSE improves skin hydration compared to DHA alone. Skin feels better moisturized and less dry.

ERYTHRULOSE – leads to a homogenous skin tone

In vivo study of a self-tanning formulation containing
ERYTHRULOSE and DHA

Study Design

5 healthy female volunteers
7 days application on the back
8 days post application measurement

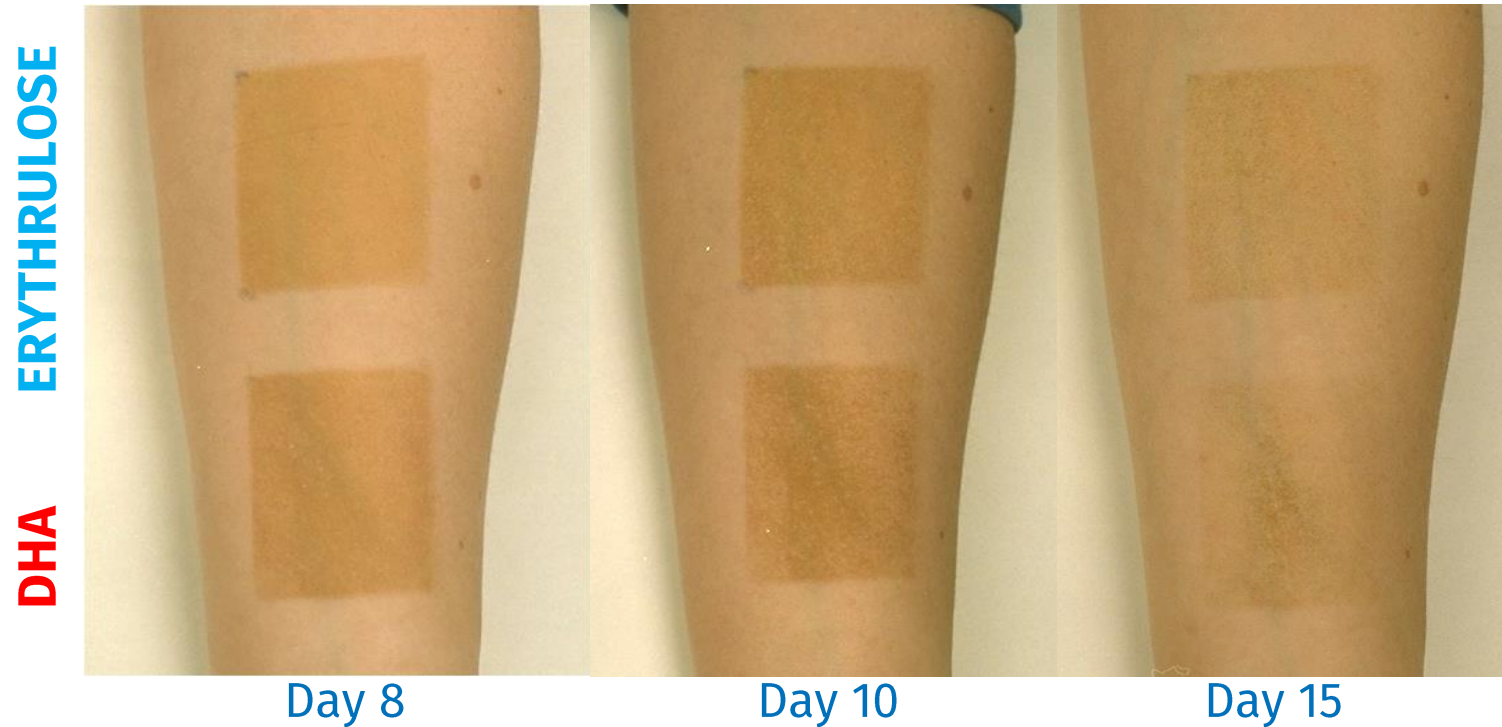
Formulations

O/W emulsions containing:

 4.5% DHA and
 6% ERYTHRULOSE

ERYTHRULOSE – leads to a homogenous skin tone

0.5 molar concentration of **ERYTHRULOSE (6%)** and **DHA (4.5%)** in a gel formulation
7 days of application, monitoring of tanning results between day 8 and 15



Adding **ERYTHRULOSE** visibly improves the long-term benefit of a tanning formulation.

ERYTHRULOSE – comparison of the staining of palms during and after application

In vivo study of a self-tanning formulation containing
ERYTHRULOSE and DHA

Study Design 6 healthy volunteers (women & men)
Palms, half side single application

Formulations O/W emulsions containing:

- 5 % ERYTHRULOSE
- 5 % DHA

ERYTHRULOSE – less coloration of palms

in vivo results

Palm coloration test: Application of a self-tanning lotion containing



➔ **ERYTHRULOSE** clearly improves the application process and reduces negative emotions caused by coloured palms.

ERYTHRULOSE – freedom to operate

- **Patent situation**
- **ERYTHRULOSE** – state of the art
- **DSM holds a combination patent (WO 98/38977) claiming ERYTHRULOSE with DHA.** Free licenses are available for our customers.

Combinations with additional ingredients

A few patent documents claiming combinations with other ingredients for specific applications need to be checked but are not considered as a hurdle

High degree of freedom for applications with **ERYTHRULOSE**



Regulatory situation

- **ERYTHRULOSE** can be used in all countries for any kind of cosmetic product
- There are no local particular restrictions known for the US the combined use together with **DHA** is mandatory
- DSM has a Reach registration for **ERYTHRULOSE**



→ Allows development of global products

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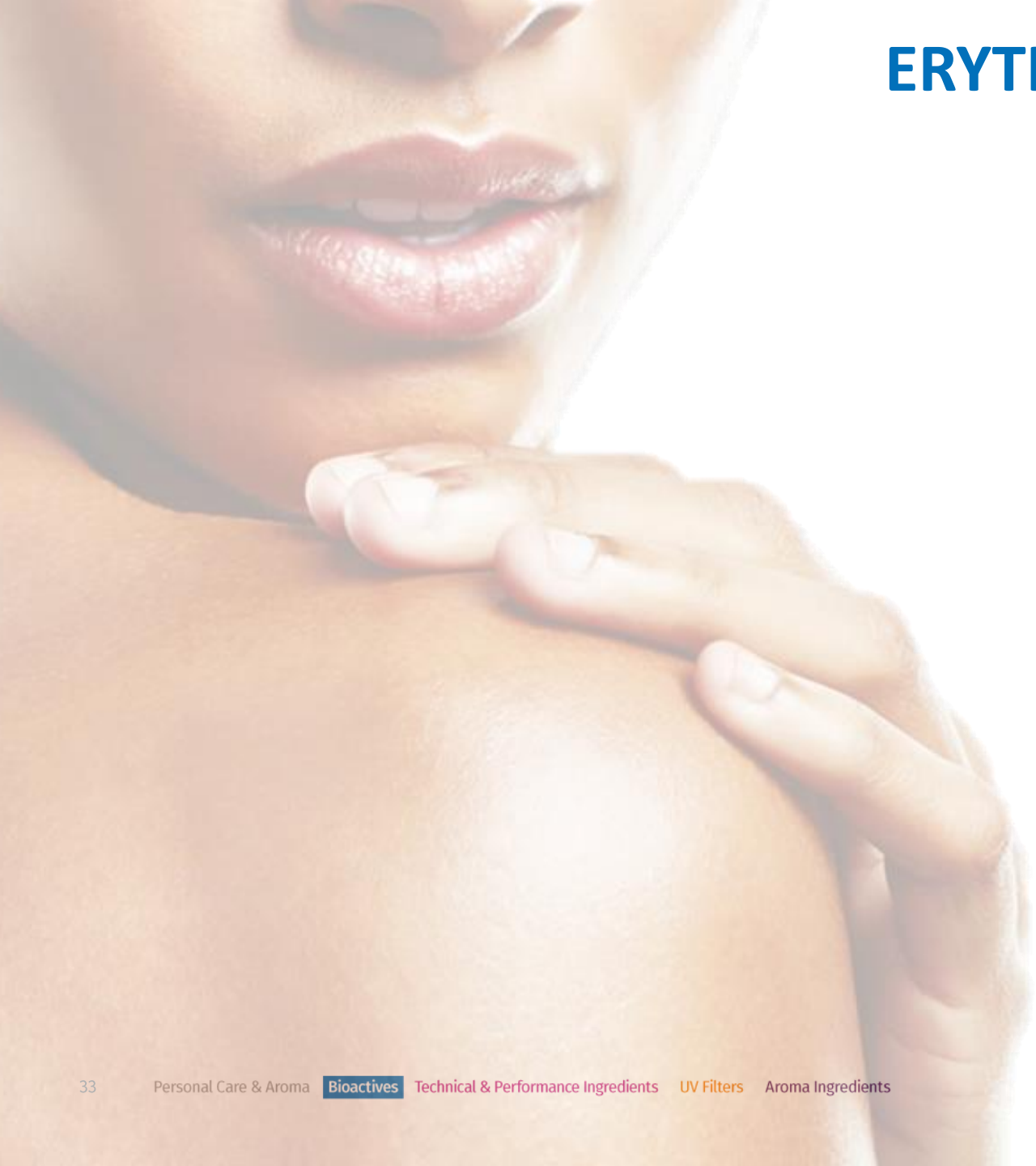
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10 reasons to use ERYTHRULOSE In combination with DHA

1. Homogenous skin tone
2. Gradual and natural- looking glow
3. Longer lasting tan
4. Less streaking
5. Moisturization
6. Easy application
7. Instant bronze glow
8. High stability
9. No bad smell
10. Patent protection



ERYTHRULOSE in a nutshell

Why should ERYTHRULOSE be your choice?

ERYTHRULOSE optimizes the efficacy of DHA by enhancing the color to give a natural, homogeneous and glowing skin tone. Due to its low level of aggressive properties it leaves less staining on the palms and clothes, making it more convenience and easy application.

What is the benefit for the end consumer?

Major customer concerns can be eliminated by combining DHA & ERYTHRULOSE leading to more reliable and promising self tanning solutions serving unmet consumer needs.

What would be the benefit for the brand?

Products enriched with ERYTHRULOSE will increase their credibility in the market and perform more convincingly on the skin.

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