EMOTHION®
HEALTH TOUR
S-Acetyl Glutathione

Glutathione & SKIN condition

Gnosis by Lesaffre

SKIN CONCERNS IN THE WORLD

Skin accounts for the largest organ in the body. It is crucial for sensing and vitamin D synthesis. It also provides a major barrier for protecting the body against external attacks and pathogens while regulating melanin production & water loss.

SUN EXPOSURE & SKIN AGING

One of the worst enemies of the skin is sun. High exposure to sunlight radiations can lead to oxidative stress, production of dark melanin, loss of moisture, formation of wrinkles and overall early skin aging. [1,2] The higher the UVI, the greater the danger for skin.
In countries around the equator, the Global Solar UV Index (UVI) can reach 20.

ACNE PREVALENCE IN THE WORLD

Beyond its biological & protective functions, skin is above all seen from a beauty point of view . Then many young people but also women around the world keep fighting against acne.

- 80% in average in teenagers
- 12% for women between 25 and 58yo [3]

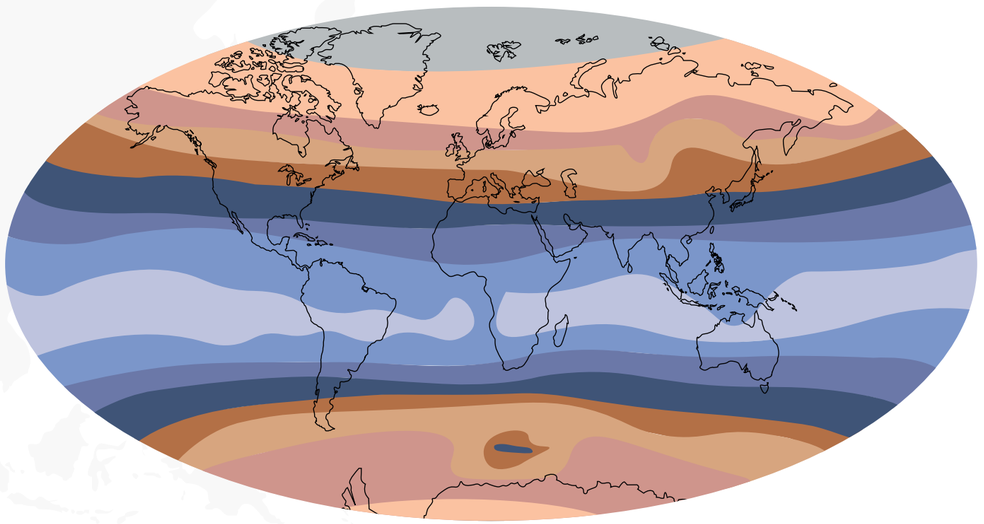
SKIN LIGHTENING

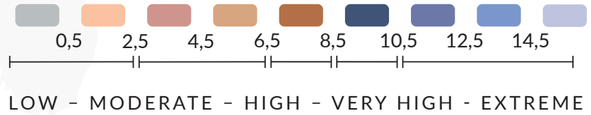
Another skin topic has been rising especially in Asian countries and is related to skin color. [4]

- 40% of women in Asian countries* use products for skin lightening
- In India, whitening products among the global skincare market account for 60%

*China, Malaysia, Philippines, and South Korea

GLOBAL SOLAR UVI WORDMAP

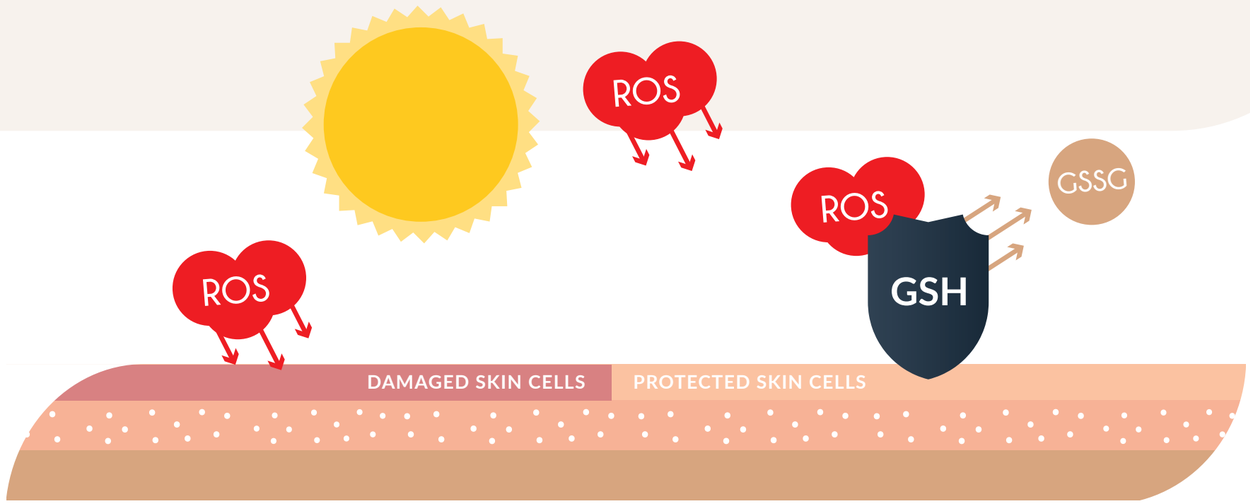




GLUTATHIONE IN PHOTOAGING PREVENTION

Human skin can experience both chronological (time-dependent) and photoaging. The latter occurs as a result of sun-induced photodamage such as the **production of reactive oxygen species (ROS).**

Photoaging may be premature depending on the frequency and duration of **sun exposure throughout the life of individuals.**[1,5]



Reduced glutathione (GSH) is the **most powerful antioxidant** found in the human body.
It acts as a free radical scavenger and a detoxifying agent.

A key mechanism with GSH is the **protection of skin cells** from **irreversible oxidation induced by ROS.**
GSH either acts as a **shield** or as a **detoxifier of skin proteins.**

Once GSH has played its role, it turns into glutathione disulfide (GSSG, the oxidized form), and is either recycled or eliminated from the cell. [7,8]

UVB activates melanin production to protect the skin from sunburns. Melanocytes reduction with time can be associated with:

- Uneven pigmentation
- Thick epidermis
- Leathery skin texture [6]

UVA significantly promotes:

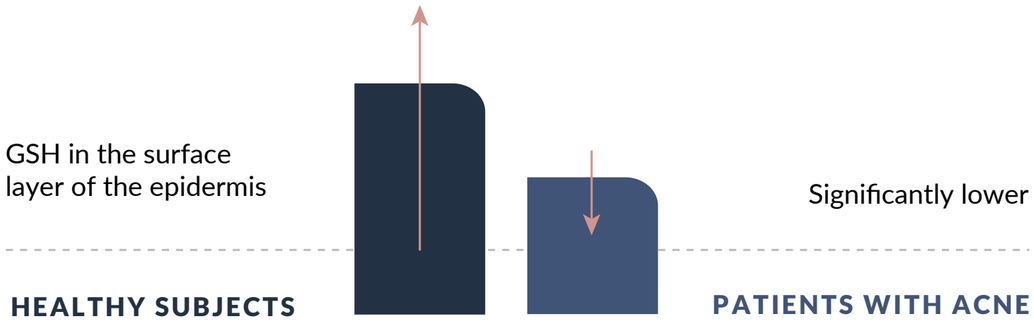
- Oxidative damage in DNA
- Breakdown of collagen fiber
- Strength and elasticity reduction
- Skin dryness
- Wrinkles formation

GLUTATHIONE IN ACNE VULGARIS THERAPY

Studies have reported that oxidative stress components such as ROS or lipid peroxide (LPO) are also involved in the **pathogenesis and progression of acne vulgaris.**[9,10,11]

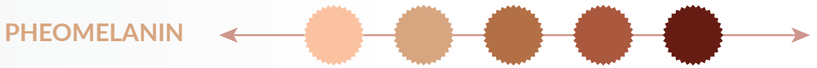
As the major antioxidant, **GSH protects cells from damage** caused by free radicals and peroxides. For this function, GSH has been measured in the skin epidermis to determine its role in the evolution of acne. [12]

Results show higher level of GSH in the surface layer of epidermis of healthy subjects compared with patients with acne.

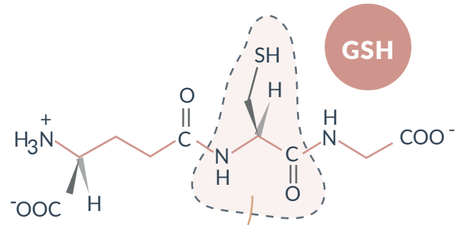


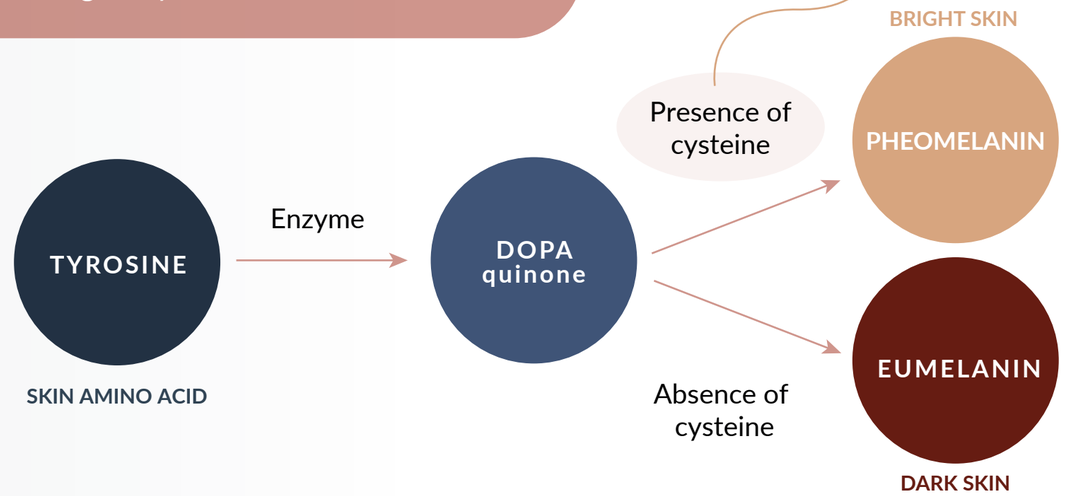
SKIN-LIGHTENING PROPERTIES OF GLUTATHIONE

There are **two types of melanin in skin**, black-brown **eumelanin** and yellow-red **pheomelanin.** The ratio of eumelanin and pheomelanin determines skin color. Higher levels of **pheomelanin are associated with lighter skin color** and higher levels of **eumelanin cause darker skin color.** [13]



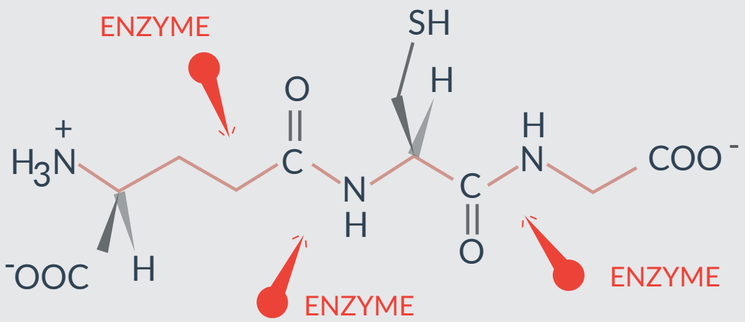
The presence of cysteine shift the reaction toward pheomelanin production. Thus GSH promotes a lighter skin color by providing its cysteine.





Compared with other ingredients for skin anti-aging, acne improvement and skin lightening, GSH is safe. For this reason, the treatment of skin with GSH has become popular, especially in Africa, India, and Southeast Asia. However, scientific evidence state the poor absorption of oral GSH by cells.

LIMITS DUE TO THE POOR BIOAVAILABILITY OF ORAL GSH



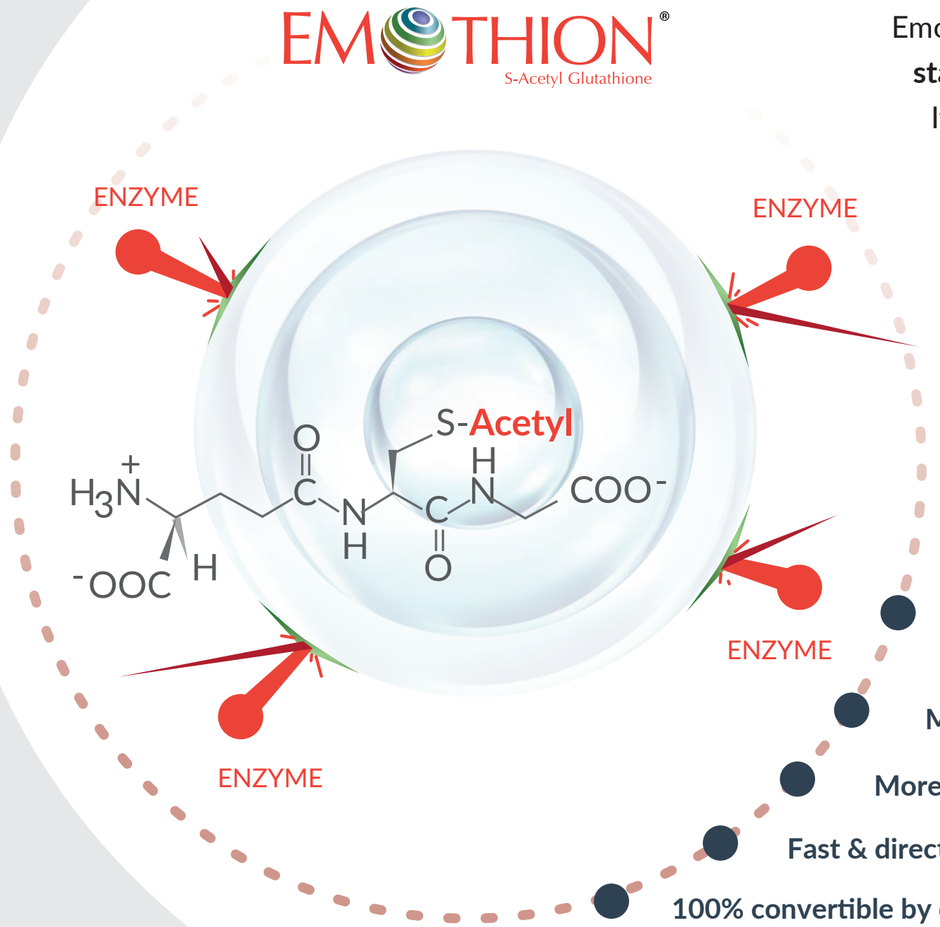
Orally administered GSH is hydrolyzed by the enzyme γ-glutamyltransferase, resulting in **poor absorption from the gastrointestinal tract and loss of function.**

This leads to low serum levels of GSH. Even oral intake of high doses of glutathione does not lead to high enough serum levels for achieving therapeutic effects.

This fact limits the expected health benefits of oral glutathione in its standard reduced form. [14,15,16]

EMOTHION® THE EFFECTIVE IN-BODY FORM OF GLUTATHIONE

Emothion® is the **crystalline form of S-Acetyl-Glutathione.**
It is clinically studied, orally stable, and patented.



Emothion® is a precursor of GSH and is **more stable** than GSH itself in plasma.

It is **taken up directly by cells,** releases the active compound after biological activation directly in our cells, and is eventually converted to GSH to work **as a GSH-replenisher.**

The acetylation of the sulfur atom prevents the decomposition of the molecule and facilitates its absorption through the intestinal wall.

Protection by the "-Acetyl" group from enzyme decomposition

More prone to cross the gastrointestinal barrier

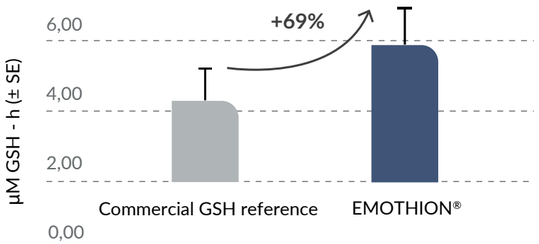
More stable in plasma

Fast & direct absorption in cells

100% convertible by cells into active glutathione (GSH)

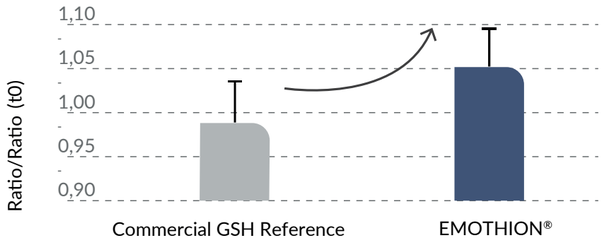
Emothion® was evaluated in single dose, randomised, open-label, two-sequence, two-period, cross-over bioavailability study compared to GSH (3.5g of each), in 18 healthy volunteers. Plasma levels of Emothion® and GSH were determined at different time intervals within 24 hours of oral administration.

EMOTHION® induced an $AUC_{0\text{-}24h}$ 69% higher than reduced GSH



Emothion® raises glutathione levels better than the commercial GSH reference after one administration, thus promoting an enhanced bioavailability.[17]

GSH/Gtot ratio in RBC 24h after EMOTHION® or GSH treatment



EMOTHION® induced a ratio reduced/total glutathione (GSH/Gtot) in red blood cells (RBC) that is significantly **higher than the commercial GSH.** This ratio is considered as a pharmacodynamic endpoint indicating the-long term GSH status and the anti-oxidizing power of individuals under stressful conditions such as sun exposure.[17]

Emothion® as an active bioavailable GSH replenisher efficiently overcomes the absorption limits of conventional oral GSH supplements and may thus promote multiple benefits in skin health.

EMOTHION®, THE RIGHT GLUTATHIONE FORM FOR A FLAWLESS SKIN

- Clinically proven highest bioavailability
- Patented crystalline form of S-Acetyl-Glutathione[18]
- Effective GSH replenishment in cells
- Controlled process & high quality
- Overcome GSH oral supplementation limits
- Suitable for caps, tabs, oral strips and other supplement galenic

References

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8. Liu R-M et al. Oxidative stress and glutathione in TGF-beta-mediated fibrogenesis. Free Radic Biol Med 2010; 48(1):1–15. **9.** Sarici G et al. Oxidative stress in acne vulgaris. J Eur Acad Dermatol Venereol 2010; 24(7):763–7. **10.** Bowe WP et al. Acne vulgaris: the role of oxidative stress and the potential therapeutic value of local and systemic antioxidants. J Drugs Dermatol 2012; **11**(6):742–6. 11. Al-Shobaili HA et al. Biochemical markers of oxidative and nitrosative stress in acne vulgaris: correlation with disease activity. J Clin Lab Anal 2013; 27(1):45–52. **12.** Ikeno H et al. Decrease in glutathione may be involved in pathogenesis of acne vulgaris. J Cosmet Dermatol 2011; 10(3):240–4. **13.** Sharma DK et al. Augmented Glutathione Absorption from Oral Mucosa and its Effect on Skin Pigmentation: A Clinical Review. Clin Cosmet Investig Dermatol 2022; 15:1853–62. **14.** Buonocore D et al. Bioavailability Study of an Innovative Orobuccal Formulation of Glutathione. Oxid Med Cell Longev 2016; 2016:3286365. **15.** Bruggeman BK et al. The absorptive effects of orobuccal non-liposomal nano-sized glutathione on blood glutathione parameters in healthy individuals: A pilot study. PLoS One 2019; 14(4):e0215815. **16.** Campolo J et al. Medium-term effect of sublingual l-glutathione supplementation on flow-mediated dilation in subjects with cardiovascular risk factors. Nutrition 2017; 38:41–7. **17.** Fanelli S et al. Oral Administration of S-acetyl-glutathione: Impact on the Levels of Glutathione in Plasma and in Erythrocytes of Healthy Volunteers. International Journal of Clinical Nutrition & Dietetics 2018. **18.** Bianchi D et al. Process for the preparation of different crystalline forms of s-acetyl glutathione, and their uses in pharmaceutical and nutraceutical formulations: Patent. US-2016272677-A1. September 22nd, 2016.

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