

Vitamin B12

The Biotech pink vitamin for sensitive and stressed skin



June 2025

Vitamins | Healthy foundations



dsm-firmenich 

Vitamin B12

Product features

Soothes and regenerates sensitive skin, making it look more vibrant

- Cobalamin: one of the **most complex vitamin**, with Cobalt structure
- Cyanocobalamin is converted into **adenosyl-cobalamin and methylcobalamin**, which are the forms that have physiological activity
- **Red-pink color**
- **Water soluble B vitamin**
- **Not synthesized** by the human body
- **Natural source:** liver, egg, dairy products, fish, meat, algae (nori),...

Quali-B®

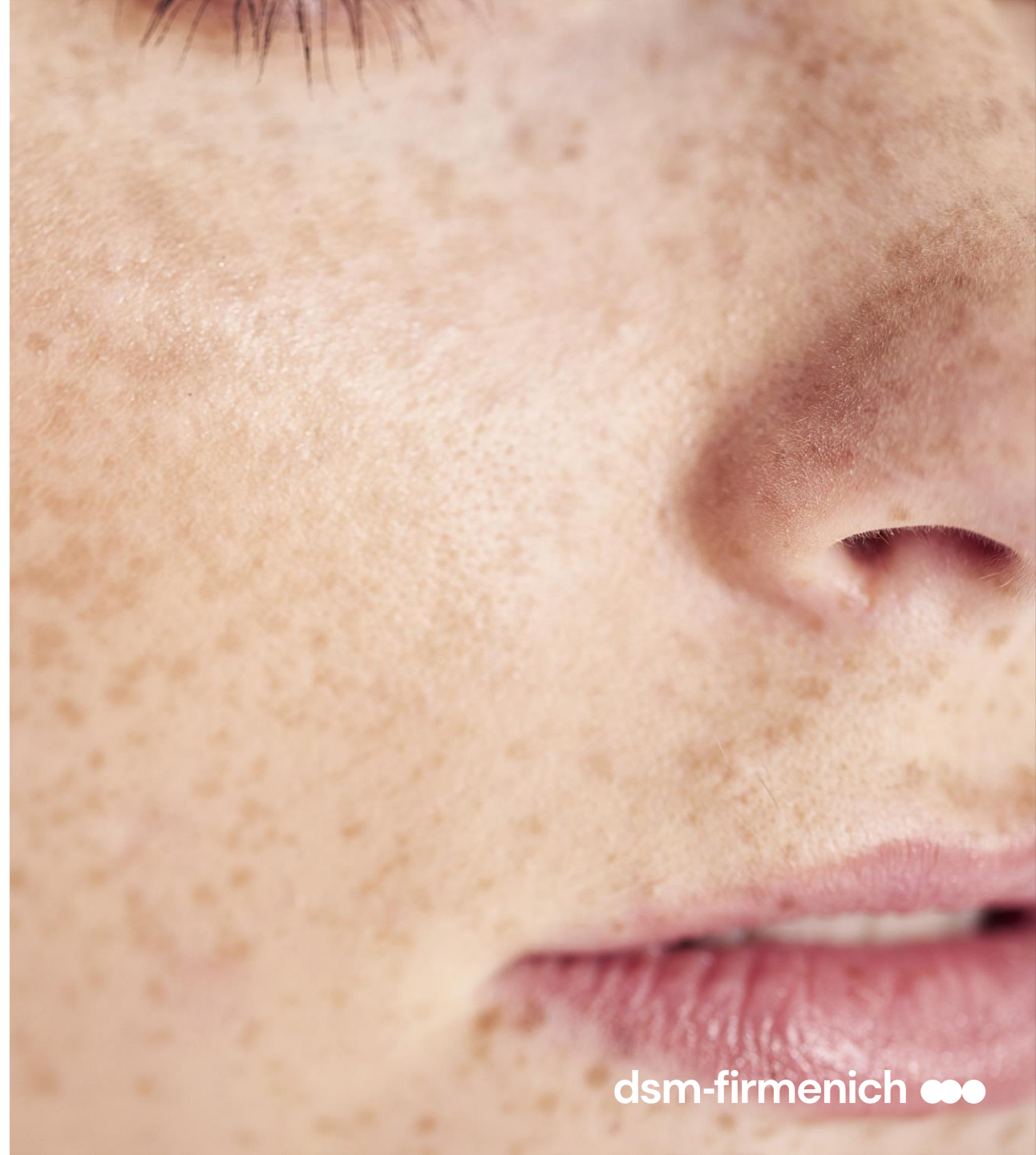


Vitamin B12

Consumer benefits

Soothes and regenerates sensitive skin, making it look more vibrant

- Vitamin **B12** **relieves sensitive and stressed skin**
- Dermatological treatments for skin conditions **like itchy, dry, inflamed, red and cracked skin**
- Helps **prevent photo-damaged skin**
- **Protects the skin barrier damage** induced by inflammation
- Plays an important part in **speeding up cell recovery and regeneration**
- Skin looks **more vibrant**
- **Nice pink color** of the formulations



Vitamin B12 cryst & Vitamin B12 0.1% WS

ID Card

Vitamin B12: the biotech pink vitamin for sensitive and stressed skin

Key benefit:	- Relieves sensitive and stressed skin - Helps prevent photo-damaged skin - Skin looks more vibrant - Maintains healthy skin microbiome - Protects the skin barrier damage induced by inflammation		
INCI name:	50-16420 Cyanocobalamin 50-16402 Cyanocobalamin, Maltodextrin, Sodium citrate, Citric Acid		
Technology:	50-16420 Vitamin B12 is made by non-GMO bacterial fermentation 50-16402 Vitamin B12 is made by non-GMO bacterial fermentation, followed by dispersion in maltodextrin and drying		
Technical:	Form: Powder Use level: 0.001–0.1% (50-1642-0) 1–10% (50-1640-2)	pH of use: 3.5–7.5 Solubility: in water	Naturality: 67.8% natural origin* (50-1642-0) 100% natural origin** (50-1640-2)

Registration certification



50-1642-0



50-1640-2

*Renewable carbon according to ISO 16128
** According to ISO 16128

Vitamin B12: the new trendy ingredient

Particularly in Asia



Korea

Missha Vitamin B12 double hydrop set: skin hydration. Vitamin B12 for replenishing moisture and energy for the skin, with multi-vitamins cocktail B3, B5, A, C and E



China

HomeFacialPro Adenosine serum& cream. Vitamin B12 accelerates renewal and revitalizing, relieves skin fatigue, dull, dry and other problems



Korea

Amore Pacific IOPE brand. Anti-aging red ampoule with Vitamin C 30%, Vitamin B12 and Vitamin B3



Japan

Derma QII Mild Peeling Gel. An exfoliation gel that gently removes built-up dead skin cells, leaving your skin soft and smooth

Vitamin B12: the new trendy ingredient

As well as in Western countries



France

Filorga Global repair.
Nutri-restorative multi
revitalizing cream



France

Filorga skin unify intensive.
To provide unifying, illuminating,
anti-dark spot effects



UK

Unilever Tre Semmé brand
hair conditioner. Repairs seven
types of damage in 1 use:
blow-drying, straightening,
coloring, curling, bleaching,
brushing and braiding



Switzerland

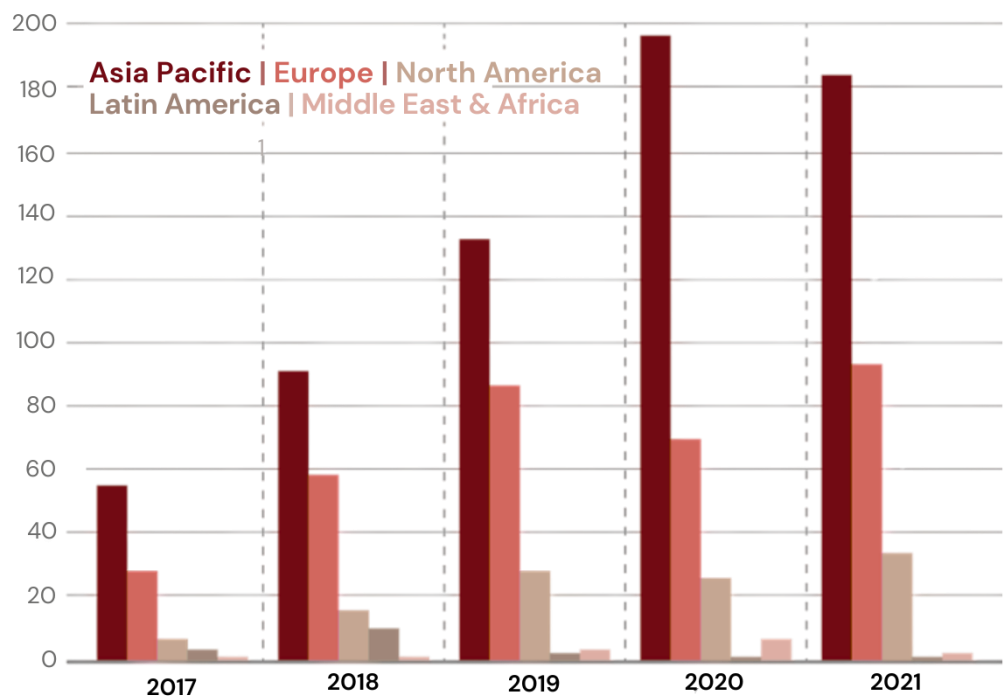
Darvidis Vitacreme B12
regenerative cream. Prevents
and fights effectively against
signs of aging

Vitamin B12: the new trendy ingredient

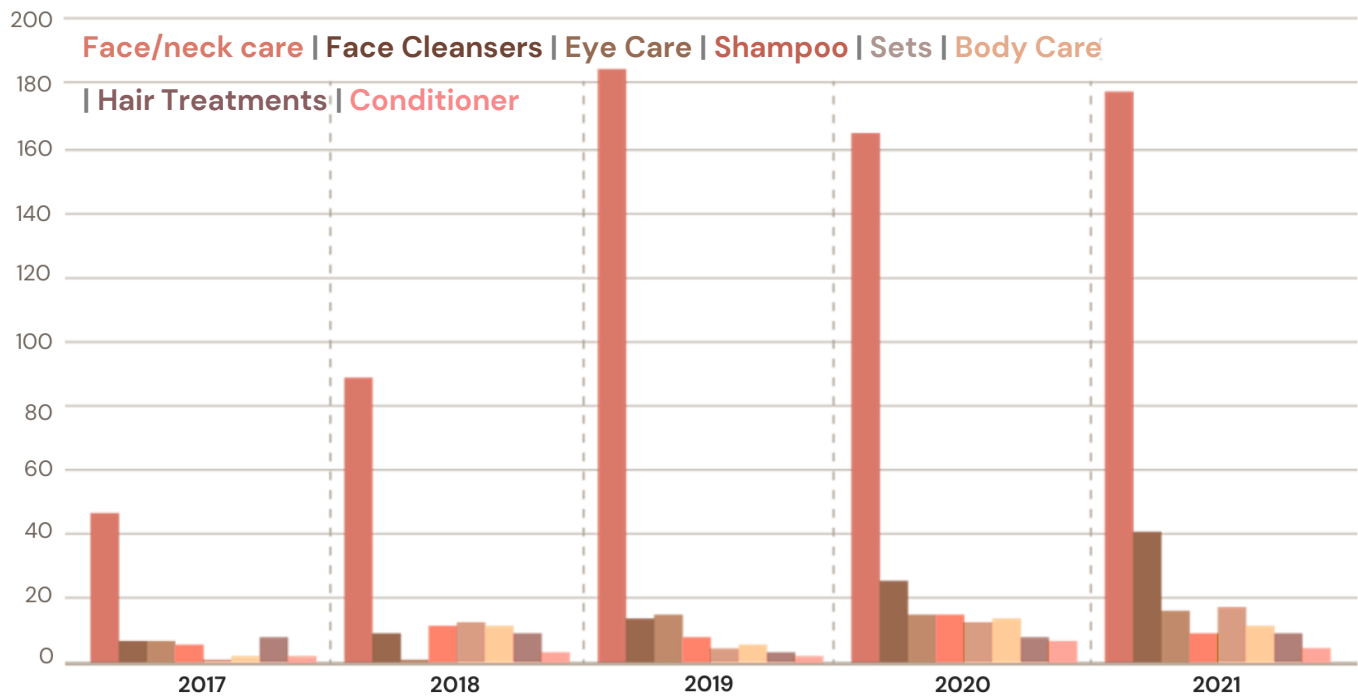
Still a fairly low number of launches with Vitamin B12, but it gains traction

Total BPC launches with Cyanocobalamin as ingredient:

Per region



Per category



Continuous growth of total of launches within BPC where Asia is the leading region followed by Europe. The application most used is face care, far ahead of hair and body care

Vitamin B12 is used as naturally derived colorant

Pink is a trendy color in cosmetics/skin care

23 ideas how to use a pink color in your life:
from image ...



14 dreamy pink makeup looks
for every skin tone



Pink is a universally flattering color — it works to bring out the natural flush in your cheeks and warms up the face

Source: www.pinterest.com, www.goodhousekeeping.com

Pink/purple

The third preferred color

The Top 5 Most Loved Colors:

Purple came 3rd with 19% of preferences – just behind green (34%) and blue (35%)¹

Pantone released its color trend report for spring / summer 2022: Bubble gum

It sends a message of playfulness and positivity²



PANTONE
17-1928 TCX
Bubblegum

Influence of pink color on emotions:

- Pink is a color with many positive virtues: a nurturing pink hue can both soothe & calm the mind & body
- Pink naturally cleanses the body's blood and cleanses the mind of impure thoughts
- Edwin Babbitt, pioneer of the modern chromotherapy, identified violet as soothing to all systems and as having anti-inflammatory properties³

Perfect match between the influence of pink color on the body and the scientific evidences of Vitamin B12 as skin soothing



Violet / purple relates to the crown chakra which is at the top of the head and considered the seventh primary chakra in some yoga traditions.

1. <https://medium.com/illumination/the-top-5-most-loved-colors>

2. <https://www.pantone.com/articles/fashion-color-trend-report/london-fashion-week-spring-summer-2022>

3. Principles of Light and Color. MT, USA: Kessinger Publishing; 1942. Evid Based Complement Alternat Med > v.2(4); 2005 Dec

Vitamin B12

Already efficient known biological activities

Involved in cell metabolism, **cofactor in DNA synthesis**

Coenzyme for isomerase, methyltransferase and dehalogenase
involved in protein and lipids synthesis

Vitamin B12 deficiency causes: **skin hyperpigmentation; atopic dermatitis**; Erythema nodosum; vitiligo, glossitis;
hair and nail changes

- **Hyperpigmentation:** first sign of vitamin B12 deficiency, shows **increased melanin** in the basal layer of the epidermis (in melanocytes and surrounding keratinocytes)
- **Atopic dermatitis:** *in vitro*, vitamin B12 is able to **suppress the cytokine production of T lymphocytes**, which may initiate the inflammatory events of atopic dermatitis.

Vitamin B12 is effective as nitric oxide scavenger, and NO in excessive amount is known to cause **itching and redness in eczema**



Vitamin B12

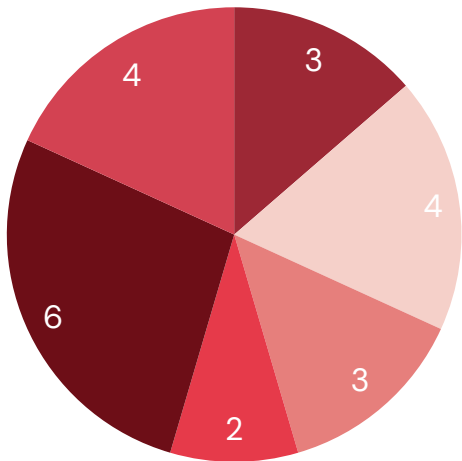
New dsm-firmenich
scientific discoveries
on anti-inflammatory
properties and healthy
Microbiome

Vitamin B12 cryst: epigenetic screening

Epigenetic regulators (miRNA) modulated by Vitamin B12 on primary human keratinocytes: especially on anti-inflammatory activity



miRNAs modulated by Vitamin B12



- Antioxidant response / inflammation
- UV (UVA or UVB) response
- SunSenescence / cell cycle / cell survival
- Pigmentation / whitening / melanogenesis
- Wound healing / proliferation / angiogenesis
- Senescence / cell cycle / cell survival

With a screening on qPCR-based gene expression panel of 105 miRNAs, we have identified 22 miRNAs significantly modulated by 0.004% Vitamin B12, in particular miR-22-3p

miR-22-3p plays a role in:

- Inhibiting messenger RNA and protein expression of NLRP3 and thus reduce inflammasome activity
- Inhibiting the NRLP-mediated activation of Caspase 1 (enzyme that cleaves pro-IL-1 β and pro-IL-18 into active forms, initiating an inflammatory cascade)

Vitamin B12 produced a statistically significant increase in expression in microRNAs

microRNA	Fold-change value
miR-22-3p	2.02-fold increase

NLRP3: Nucleotide-binding domain, Leucine-rich Repeat family Pyrin domain containing 3, IL1- β : Interleukin 1 β , IL18: Interleukin 18
Source: Hu Z. et al., Protective effects of microRNA-22-3-p against retinal pigment epithelial inflammatory damage by targeting NLRP3 inflammasome, J. Cell Physiol. 2019, 234:18849-18857

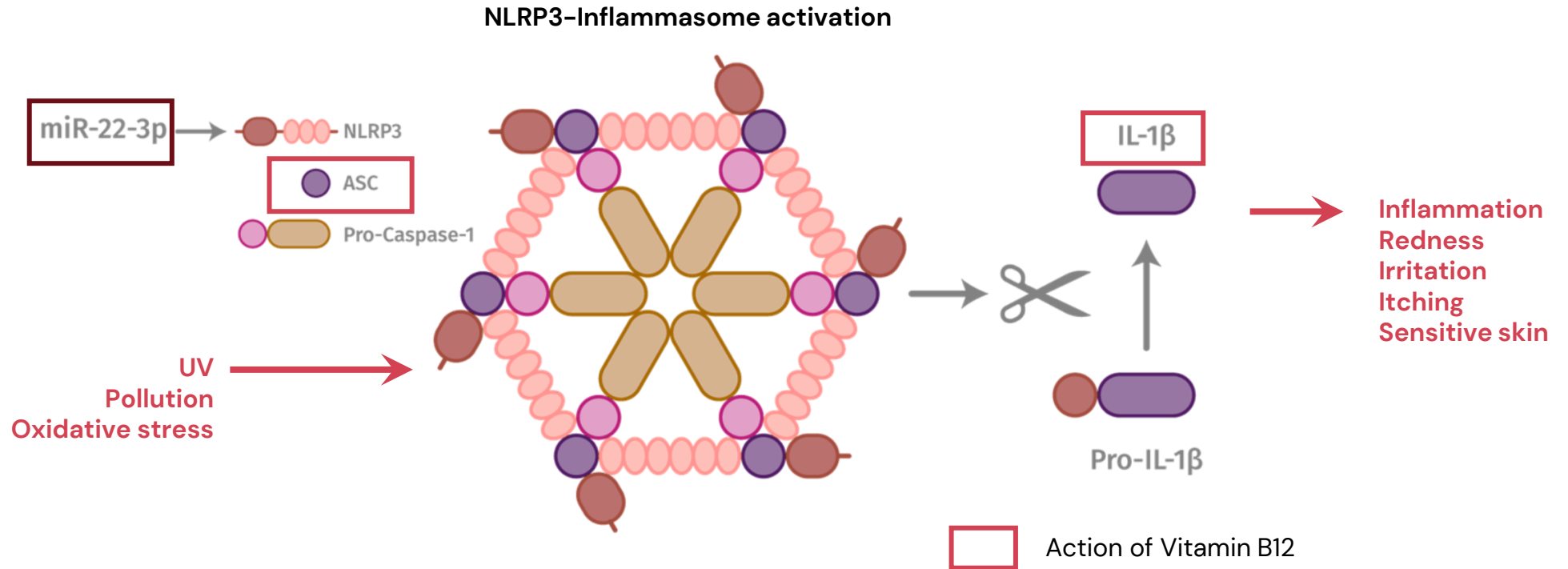
Mechanism of skin inflammatory reactions

Inflammasome in keratinocytes is a key element

miR-22-3p, as gene blocker, is the regulator of the inflammasome

ASC recruits **Caspase-1** to the complex forming the inflammasome

Inflammasome is intracellular multiprotein (NLRP3, ASC and Pro-Caspase-1) complex



UV, pollution or any oxidative stress induce the formation of the NLRP3-inflammasome, especially in keratinocytes. This inflammasome is responsible for regulating the **immunological response**, triggers the **inflammatory response by cytokines production** such as IL-1b and IL-18. If it gets chronically activated, it **causes skin irritation and premature aging**.

Vitamin B12 upregulates miR-22-3-p which is the inhibitor of the NLRP3-inflammasome, reduces the ASC complex activation and finally slows down the cleavage of pro-IL1β into active form

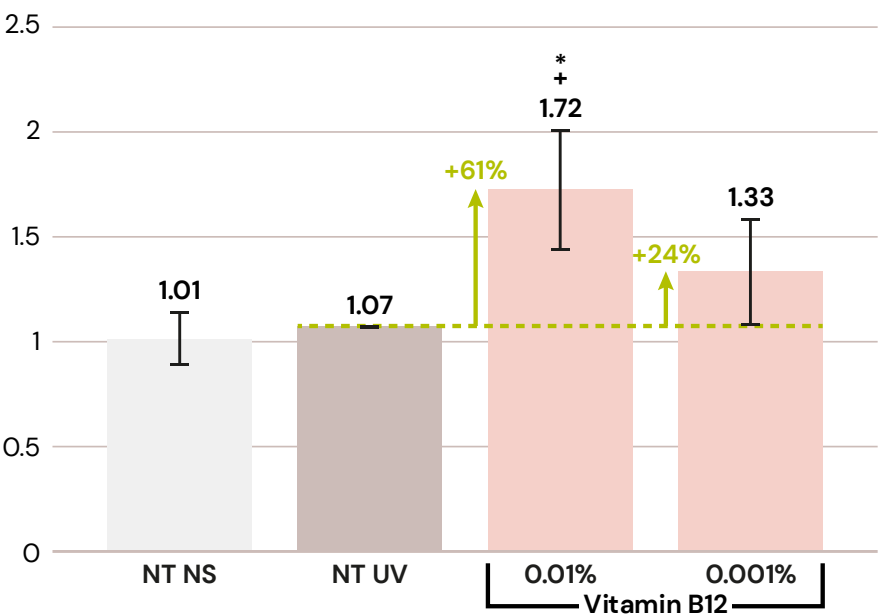
ASC: Apoptosis-associated Speck-like protein containing a Caspase recruitment domain, NLRP3: Nucleotide-binding domain, Leucine-rich Repeat family Pyrin domain containing 3
Source: Bauernfeind F. et al., NLRP3 inflammasome activity is negatively controlled by miR-223, The Journal of Immunology, 2012, 189: 4175:4181

dsm-firmenich scientists discovered the action of Vitamin B12 on the inflammasome New

Vitamin B12 reduces UV-B induced inflammasome reaction *ex vivo*

miR-22-3p expression after UV stress

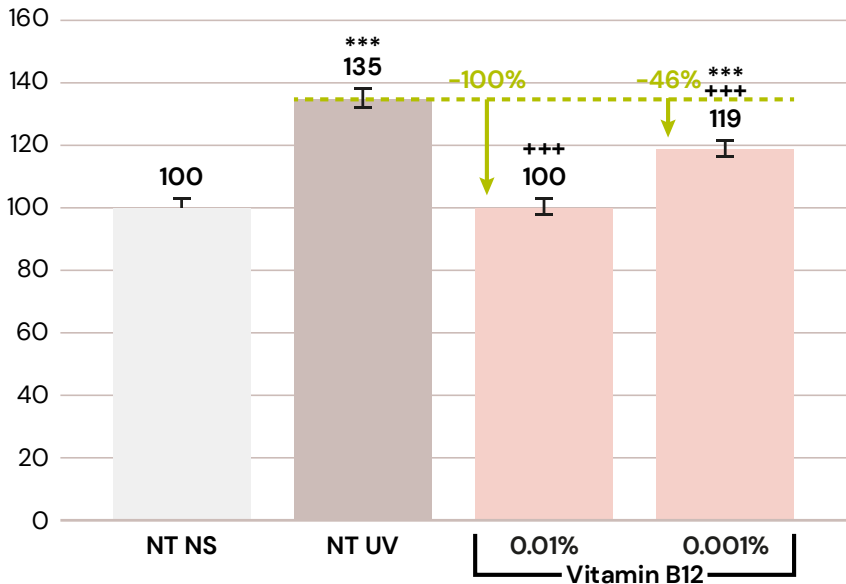
Vitamin B12 significantly up regulates by 61% miR-22-3p at 0.01%



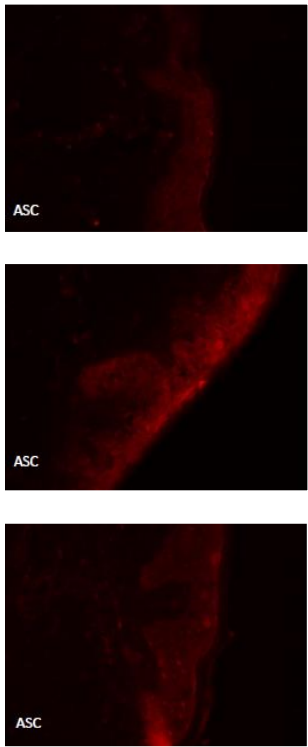
Female donor 52 yo Caucasian. Vitamin B12 before and after UV-B irradiation. Day 1: skin explant culture – Day 2: UV stress – Day 3: biomarker testing

Mean ASC intensity

Vitamin B12 significantly down regulates ASC complex activation by 100%, to the level of non-treated, at 0.01% after UV-B stress



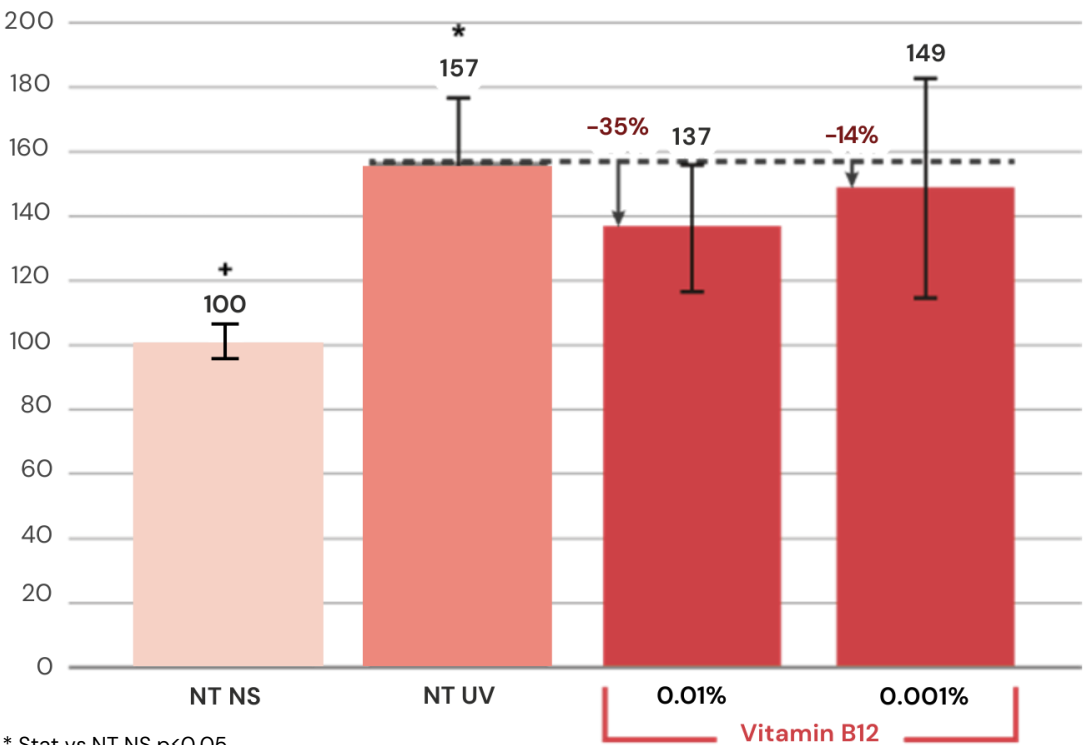
ASC: Apoptosis-associated Speck-like protein containing a Caspase recruitment domain
*** vs NT NS p<0.001
+++ vs NT UV p<0.001



Vitamin B12

Reduces the pro-inflammatory cytokine IL-1 beta after UV-B stress ex-vivo

Vitamin B12 reduces the increase of IL1-beta production after UV-B stress by 35% at 0.01%



* Stat vs NT NS $p < 0.05$

+ Stat vs NT UV $p > 0.05$

* Stat vs NT NS $p < 0.05$

+ Stat vs NT UV $p > 0.05$

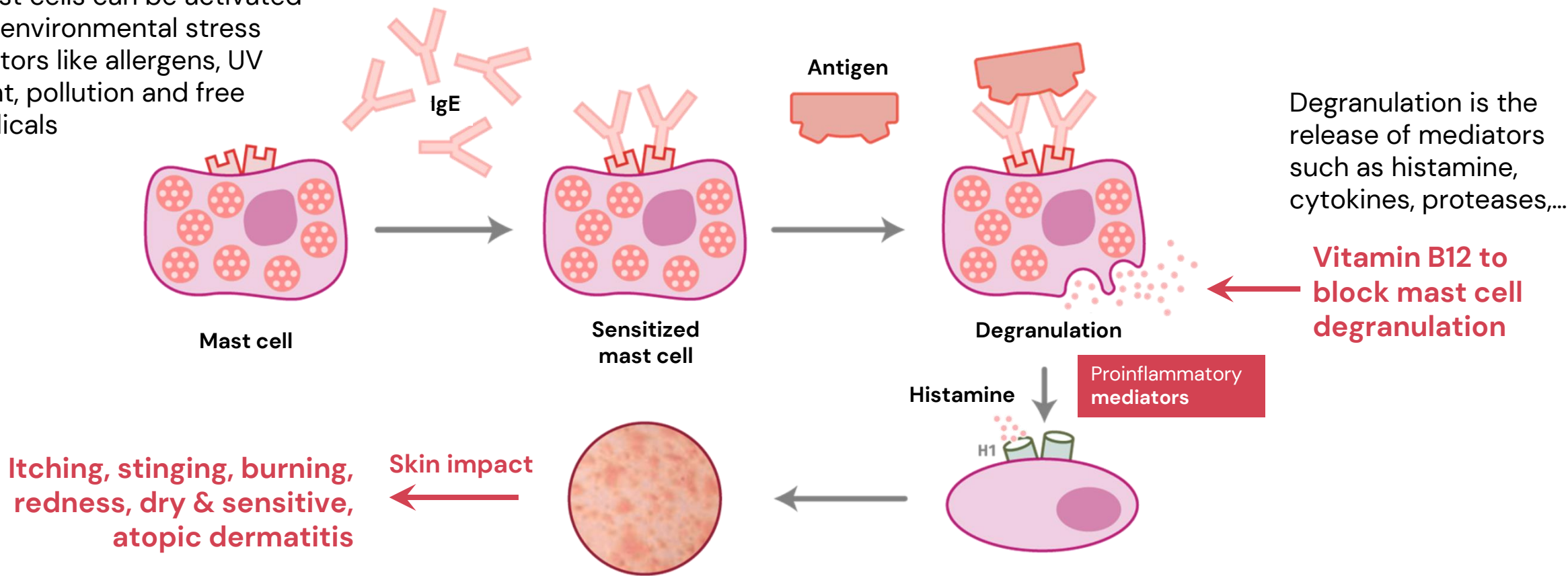


Inflammation: Mast Cell degranulation

Leads to itching, irritated, red and sensitive skin

Mechanism of action of mast cell degranulation and inhibition of histamine release

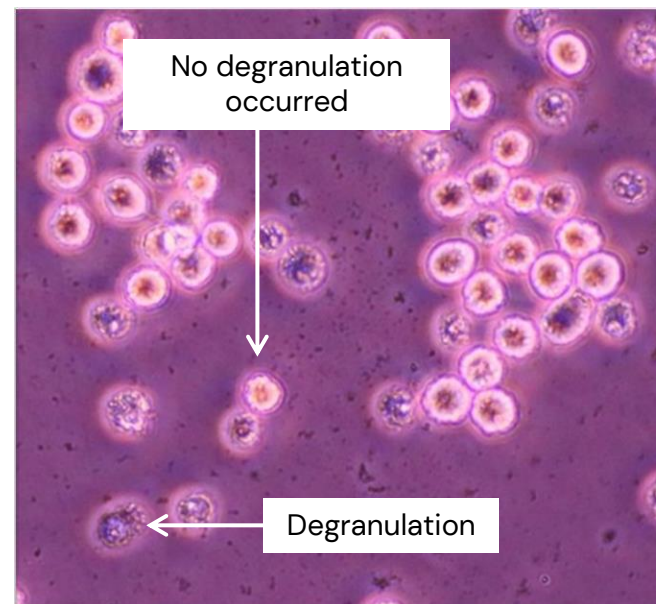
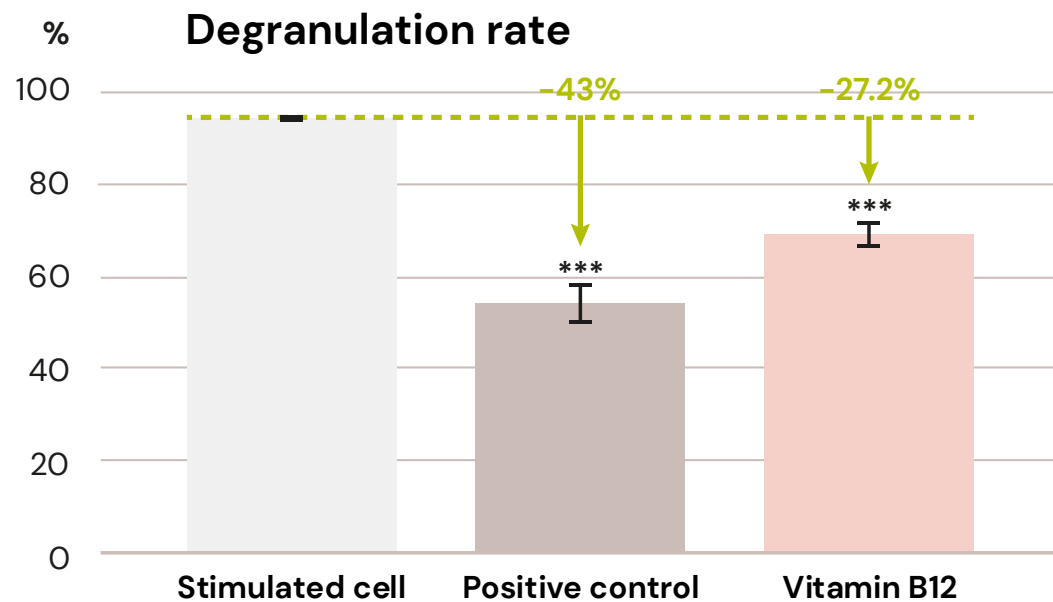
Mast cells can be activated by environmental stress factors like allergens, UV light, pollution and free radicals



ASC: Apoptosis-associated Speck-like protein containing a Caspase recruitment domain, NLRP3: Nucleotide-binding domain, Leucine-rich Repeat family Pyrin domain containing 3
Source: Bauernfeind F. et al., NLRP3 inflammasome activity is negatively controlled by miR-223, The Journal of Immunology, 2012, 189: 4175:4181

First discovery:

First discovery: Vitamin B12 reduces histamin by inhibiting mast cell degranulation *in vitro*



Vitamin B12 significantly inhibits mast cell degranulation by 31% at 0.00015%.

It helps to protect inflammation induced skin barrier damage and relieves sensitive and irritated skin.

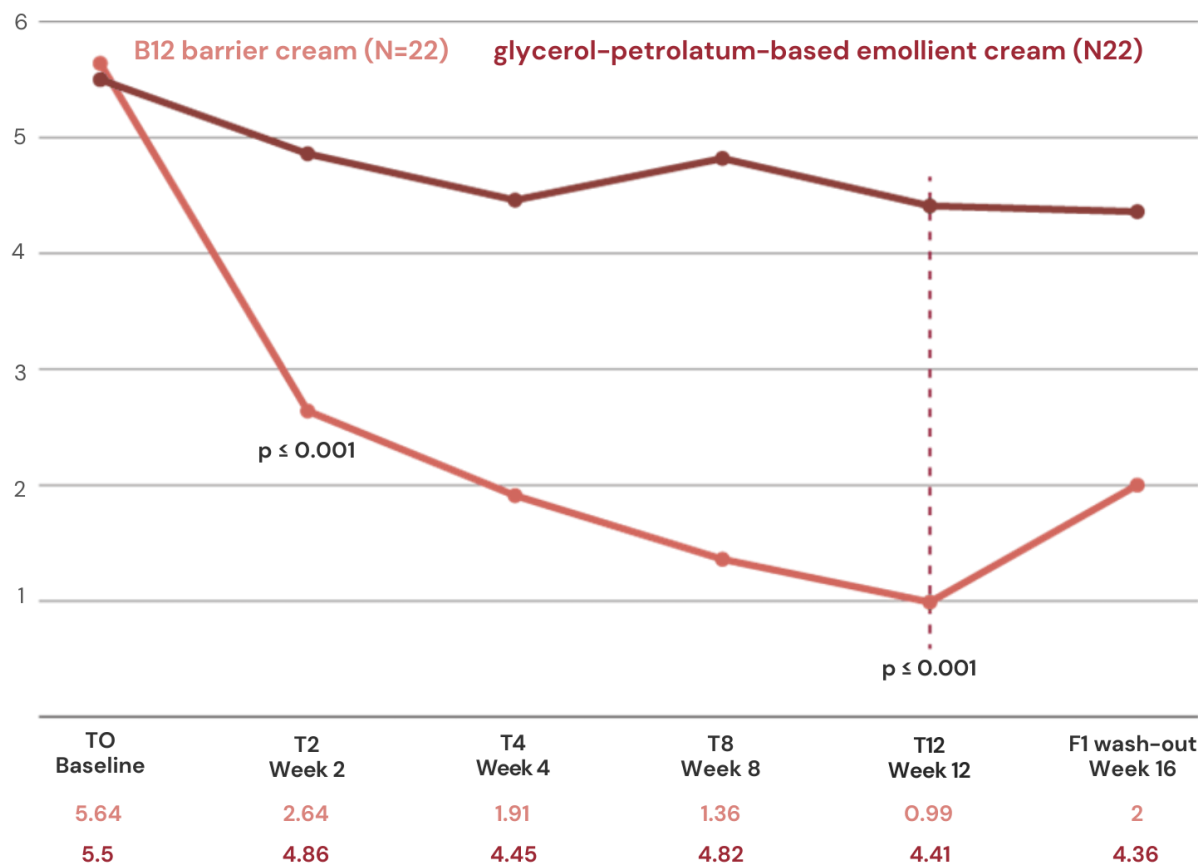
Mast cells can be activated by environmental stress factors like allergens, UV light, pollution and free radicals.

Degranulation is the release of pro-inflammatory mediators such as histamine, cytokines, proteases,...leading to itching, stinging, burning, redness, dry and sensitive skin

Vitamin B12: Atopic dermatitis

Vitamin B12 significantly reduces all symptoms related to atopic dermatitis such as pruritus *in vivo*

Absolute SCORAD



- Vitamin B12 showed in 100% of cases significant lower values of SCORAD index after 12 weeks
- Significant reduction on erythema with high level of tolerability in all patients
- Topical application is the most appropriate way of administration to reach peripheral target

- 2x 22 subjects, male and female, with mild AD
- 0.07% vitamin B12, hemi-body application, 2-3 times a day vs placebo
- 12 weeks treatment + 4 weeks

SCORAD (SCORing Atopic Dermatitis): clinical tool to assess the severity of atopic dermatitis on 3 dimensions: area, intensity (redness, swelling, scratch marks, dryness,...), subjective symptoms (itch, Sleeplessness)

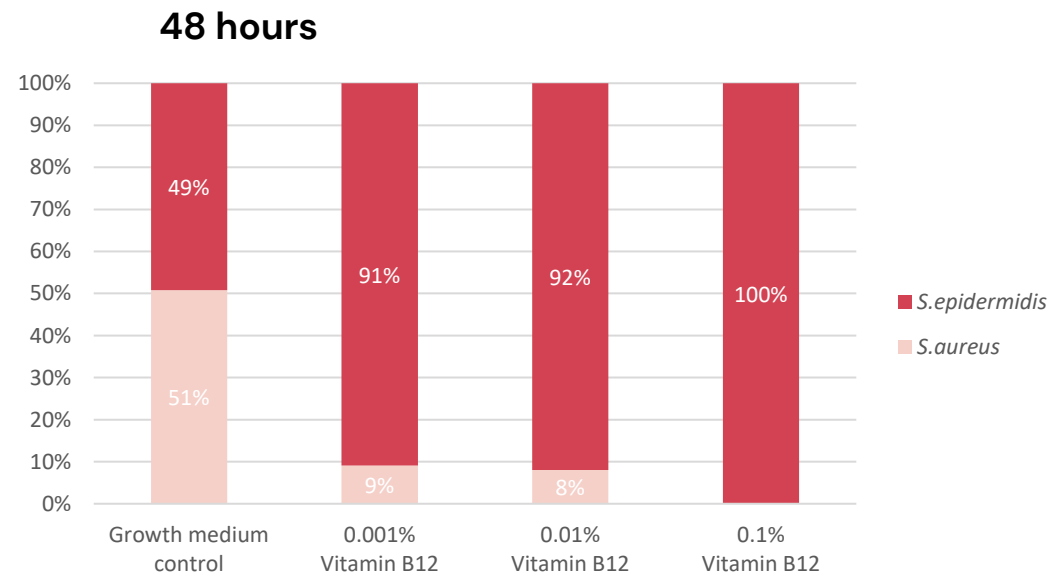
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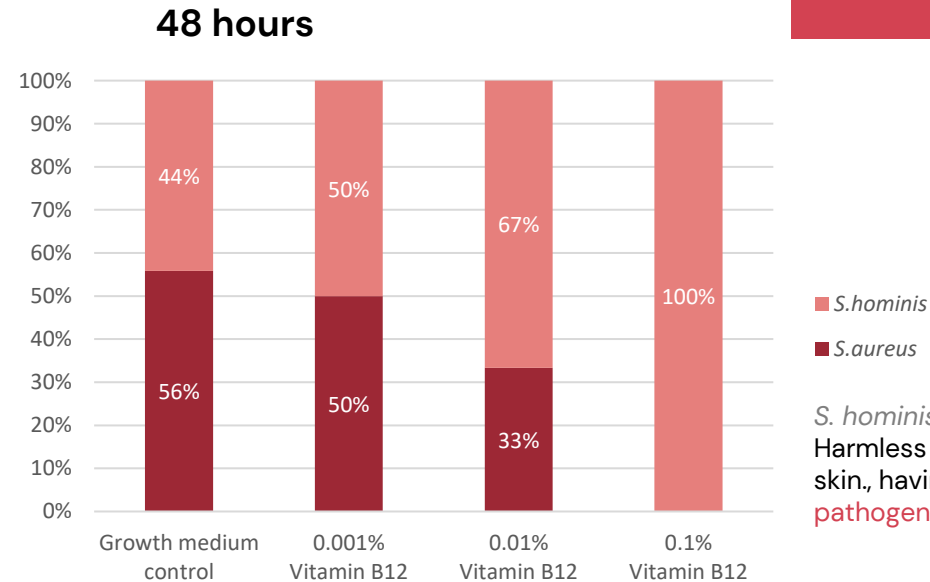
S. aureus has been drastically reduced with Vitamin B12 by 1 log at 0.001% and by 2 logs at 0.01% and completely inhibited at 0,1%, while *S. epidermidis* remains at the same level at and *S. hominis* is slightly modulated by 1 log both all Vitamin B12 concentration

Vit B12 fosters the share of beneficial bacteria over non-beneficial skin bacteria



S. epidermidis :

Commensal bacteria, typically part of healthy human skin microbiome, acts as sentinel of skin microbiota, helps limit inflammation

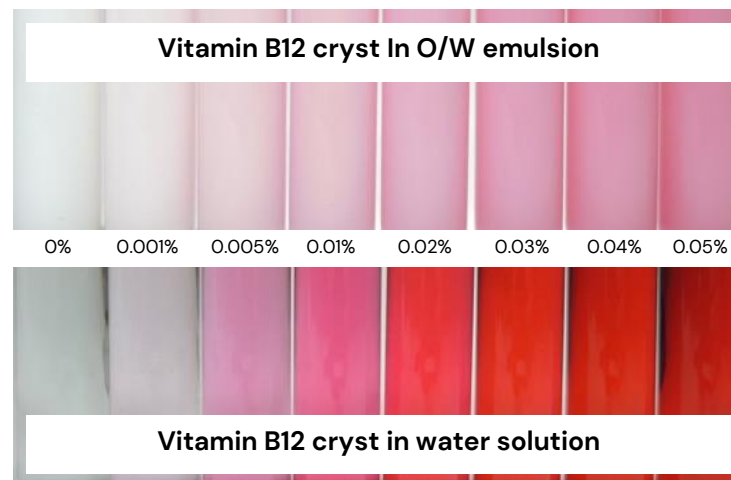


S. hominis :
Harmless commensal bacteria on human skin., having potent activity against pathogenic bacteria

Vitamin added into the medium culture, then inoculated by 10^9 microorganisms. After 48h of incubation at 37°C, microbes have been counted

Formulating Vitamin B12 cryst

- Easy-to-use
- **Sparingly soluble in water**, slightly soluble in ethanol, insoluble in lipophilic components
- **Can be used for different kinds of leave-on and rinse-off** products like O/W, W/O or W/Si formulations, cream gel, clear gel, shower gel, shampoo, body wash
- To be incorporated **into the aqueous phase** at any time (<80°C)
- Is **sensitive to high temperature storage and day light**. It is recommended to add a chelating agent (such as sodium phytate, Etidronic Acid, Disodium EDTA). For better stability at 50°C sodium gluconate or glycine could be added
- Recommended pH of the final formulation: **3.5–7.5**
- Perfectly fitting to any **natural formulations**
- Use level: **0.001–0.1%**



Vitamin B12 0.1% WS 5016402

Formulation guidelines

- Easy-to-use
- **soluble in water**, insoluble in lipophilic components
- **Can be used for different kinds of leave-on and rinse-off products like O/W, W/O or W/Si formulations, cream gel, clear gel, shower gel, shampoo, body wash**
- To be incorporated **into the aqueous phase** at any time (<80°C)
- Is **sensitive to day light**
- Perfectly fitting to any **natural formulations**
- Recommended pH of the final formulation: **3.5–7.5**
- Use level: **1%–10%**



Stability after 3 months

5% in aqueous solution, clear pink, very stable after 3 months



Left to right
4°C • RT • 40°C • 50°C • Daylight

5% in emulsion, pink cream, very slight discoloration at day light after 3 months



Left to right:
4°C • RT • 40°C • 50°C • Daylight

Vitamin B12

The biotech pink vitamin for sensitive and stressed skin

Unique Product Features

- **Biotech naturally derived pink vitamin**
- Active on **atopic dermatitis, reducing erythema and pruritus *in vivo***
- Prevents inflammation *ex vivo*: **significant and strong reduction of inflammasome and inflammatory cytokines such IL1- β .**
- **Epigenetic regulation of inflammasome: over-expression by 61% of miR-22-3p with vitamin B12 leads to a reduction of inflammasome *ex vivo***
- **Significantly reduction of Mast cell degranulation by 27%, drops the histamine release *in vitro***
- **Maintains healthy skin microbiome, by reducing pathogenic *S. aureus* vs beneficial bacteria *in vitro***

Consumer benefits

- Vitamin B12 **relieves sensitive and stressed skin**
- Helps relieve skin conditions like **itchy, irritated, inflamed, red and cracked skin**
- Helps **prevent photo-damaged skin**
- **Protects the skin barrier damage induced by inflammation**
- Plays an important part in **speeding up cell recovery and regeneration**
- **Maintain a healthy-looking skin for a more vibrant appearance**
- Provides a **nice and pleasant pink color** of the cosmetic products



dsm-firmenich vitamins promise

Today we are adding value to our trusted heritage in Vitamins

Our Vitamins that are not only of the highest quality, totally reliable and fully traceable, but have minimum impact on the planet.



Quality

Quality is the cornerstone of our delivering. You can trust DSM to bring you products that are consistent in quality and high in purity.



Reliability

Our vitamins are reliable, meaning they will consistently deliver on their intended use — whether it is your skin cream, the milk you pack in your child's lunch or the daily supplement you take to help ensure optimal nutrition.



Traceability

Our ability to track and verify the quality of our products throughout their life cycle is what makes traceability essential to answer the clean beauty.



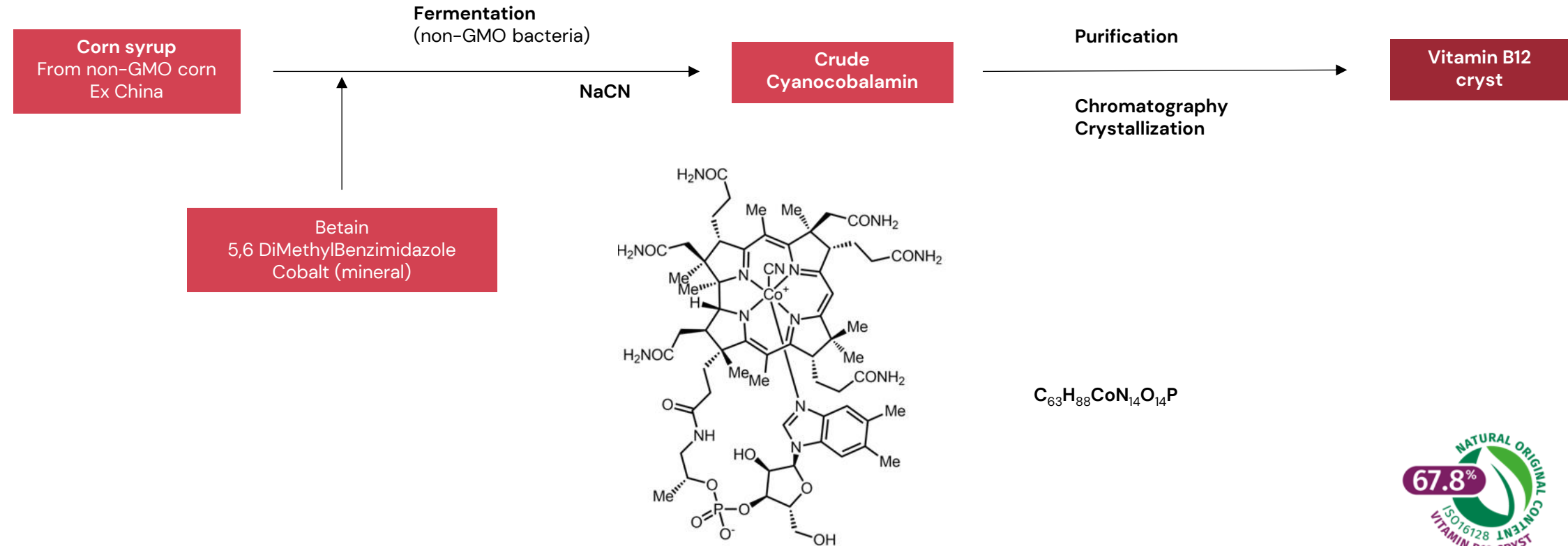
Sustainability

Quality extends beyond products and services and includes our commitment to the environment, which we show by reducing the environmental impact of our activities while simultaneously optimizing land and resource use.



Vitamin B12: one of the most complex structure

Cyanocobalamin biosynthesis 5016420



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