

Niacinamide PC

*The multi-functional vitamin
for menopausal skin changes*



April 2025

Vitamins | Healthy foundations

dsm-firmenich 

Niacinamide PC

Art. 5016013

What is it?

Niacinamide (Vitamin B3) is a **very stable vitamin** which offers a wide range of well-documented topical benefits.

Niacinamide is a component of NAD and NADP, **essential coenzymes in ATP production**, also having a central **role in DNA repair and skin homeostasis**.

What is special about niacinamide PC?

Niacinamide PC is a special cosmetic proprietary grade of dsm-firmenich, which has a **low guaranteed level of residual nicotinic acid** to address any concerns about unpleasant skin sensations.

Fully raw material backward integrated (picoline – intermediates of niacinamide– **from natural origin**, ex tapioca)

An all-round product for my skin?

is the ideal candidate for **day care and sun care** products.

Ideal **for all skin types**, well tolerated.



dsm-firmenich: The vitamin pioneer & leader

dsm-firmenich, a pioneer in the vitamin journey

 As the longest-standing producer of vitamins in the world

dsm-firmenich, a leader in vitamins for personal care

 The 1st to explore the beauty potential of vitamins

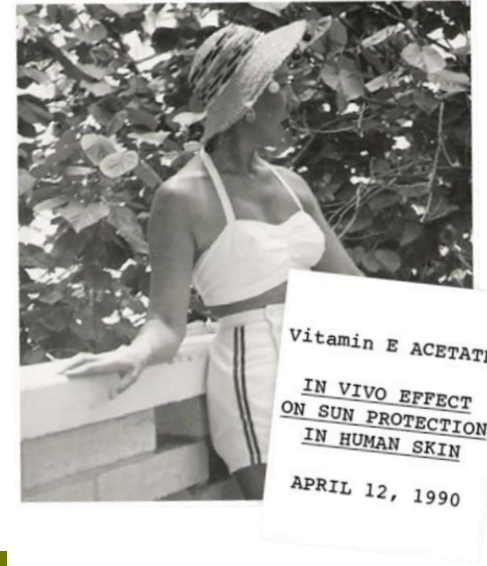
 The 1st to bring vitamins production on the industrial level

It's with no surprise that dsm-firmenich brings with Niacinamide PC...

Niacinamide PC

The **best science**: We claim efficacy – we prove/document it!

The **best product** form: a low guaranteed level of residual nicotinic acid to address any concerns about unpleasant skin sensations.

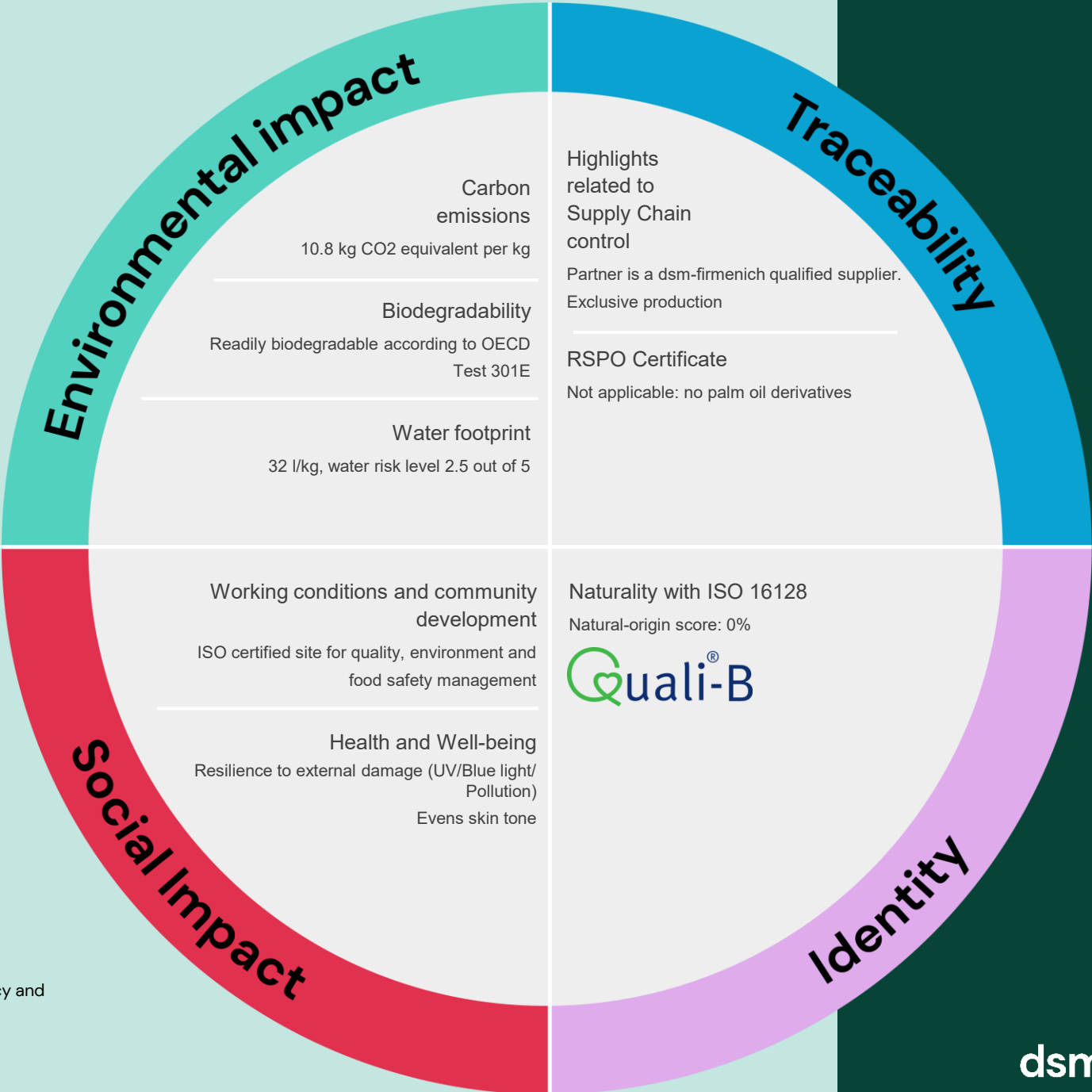


Vitamin C industrial production, Grenzach, 1936

Niacinamide PC
INCI name: Niacinamide PC
Product Codes: 5016013

Vitamin B3
Cosmetic grade
Guaranteed to contain max 100 ppm residual nicotinic acid, making it exceptionally well tolerated.

The carbon and water footprint calculations are based on internally conducted LCA according to ISO 14040/44 guidelines, DSM LCA policy and validated by an internal reviewer.
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Aligned with and contributing to the
SUSTAINABLE DEVELOPMENT GOALS



Niacinamide PC– resilient, flawless skin and a radiant complexion



CORNEOCARE® – Skin Resilience

-  Strengthens skin barrier, stimulates ceramides and lipids in stratum corneum (*in vivo* at 2 and 3%)
-  Increasing key proteins involved in skin barrier: involucrin, filaggrin, keratin (*in vitro*)



Even skin tone

-  Inhibition of melanosome transfer (*in vitro*)
-  Rebalances uneven skin tone (*ex-vivo, in vivo* at 4 and 5%)



Environmental stress protection

-  Boost cell energy production and repair (UV induced DNA damage *in vitro, ex vivo*)
-  Protection from urban pollutants damage (*in vitro, ex vivo*)



Anti-aging activities

-  Stimulates collagen synthesis (*in vitro*)
-  Improves the appearance of lines, wrinkles and skin elasticity (*in vivo* at 4 and 5%)



Blemish Care

-  Reduces the appearance of acne (*in vivo* at 4%)
-  Helps to reduce sebum level (*in vivo* at 2%)



UV and Blue light protection

-  Helps to relieve premature aging from UV and Blue light: reduces skin discoloration from blue light (*in vitro, in vivo* at 3%)

Consumer level

-  Skin well protected against oxidative stress (exposome)
-  Keeps moisturized skin



Funcitonal level

Repair

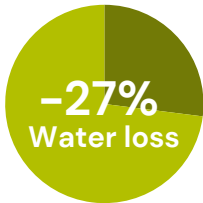
-  Stimulates lipids and ceramides production
-  Increases key proteins involved in skin barrier: involucrin, filaggrin and keratin
-  Decreases water loss (TEWL)

CORNEOCARE™

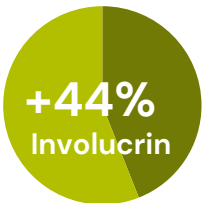
CORNEOCARE™ holistic approach with Niacinamide PC
A healthy perfect skin barrier, a key benefit of CORNEOCARE™

NIACINAMIDE PC & CORNEOCARE™

Reduction of:



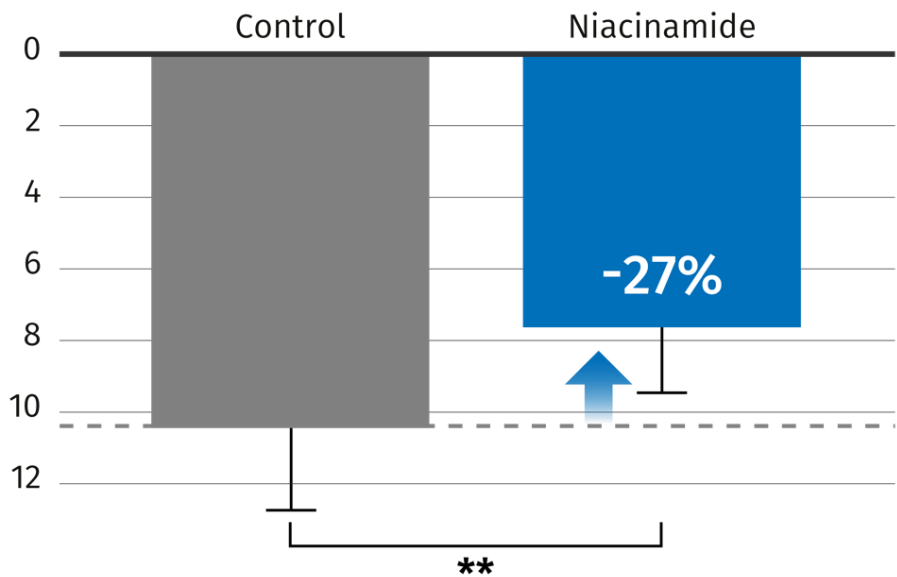
Increase of:



Niacinamide strengthens the skin barrier

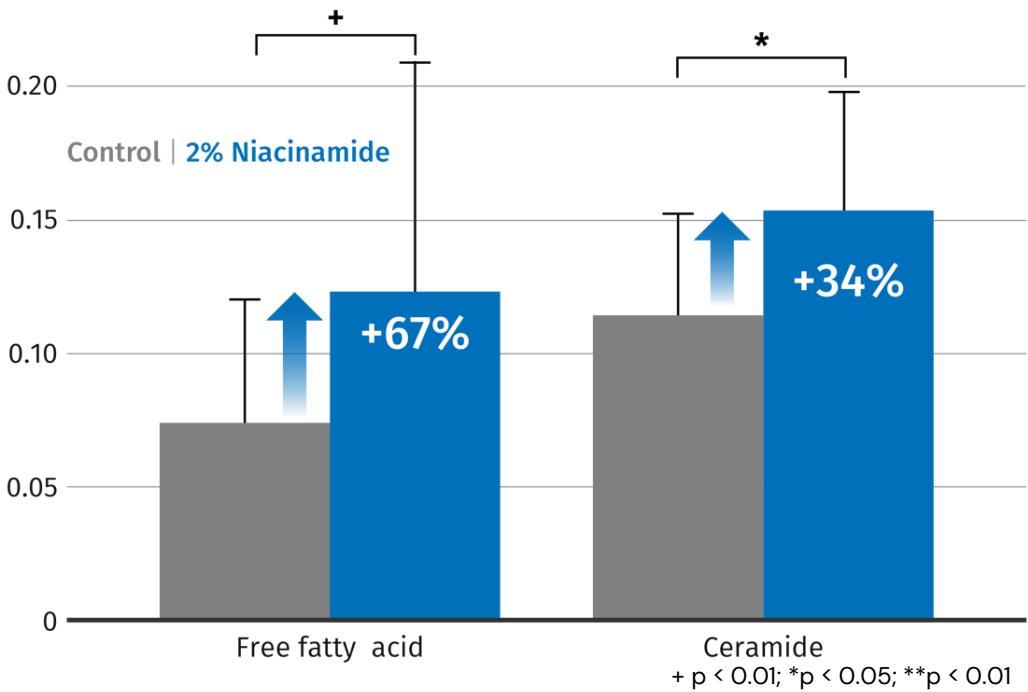
Twelve healthy men volunteers with dry skin applied Niacinamide (2%) for 4 weeks. Lipids were extracted and quantified from stripping of stratum corneum

Transepidermal water loss (mg/cm².h)



TEWL was reduced by 27% when skin was treated twice daily with 2% niacinamide for 4 weeks

Increased ceramide and free fatty acids level (µg/mg protein) in stratum corneum after Niacinamide treatment



Niacinamide PC helps to keep hydrated and normalize the skin by balancing ceramide and fatty acids in Stratum Corneum

Tanno et al, British Journal of Dermatology 2000, 143:524-531

Protection and Repair

Consumer level



Well-protected from environmental damage for beautiful and healthy skin



Functional level

Repair

- ✓ Niacinamide increases physiological DNA repair by 35% ex vivo

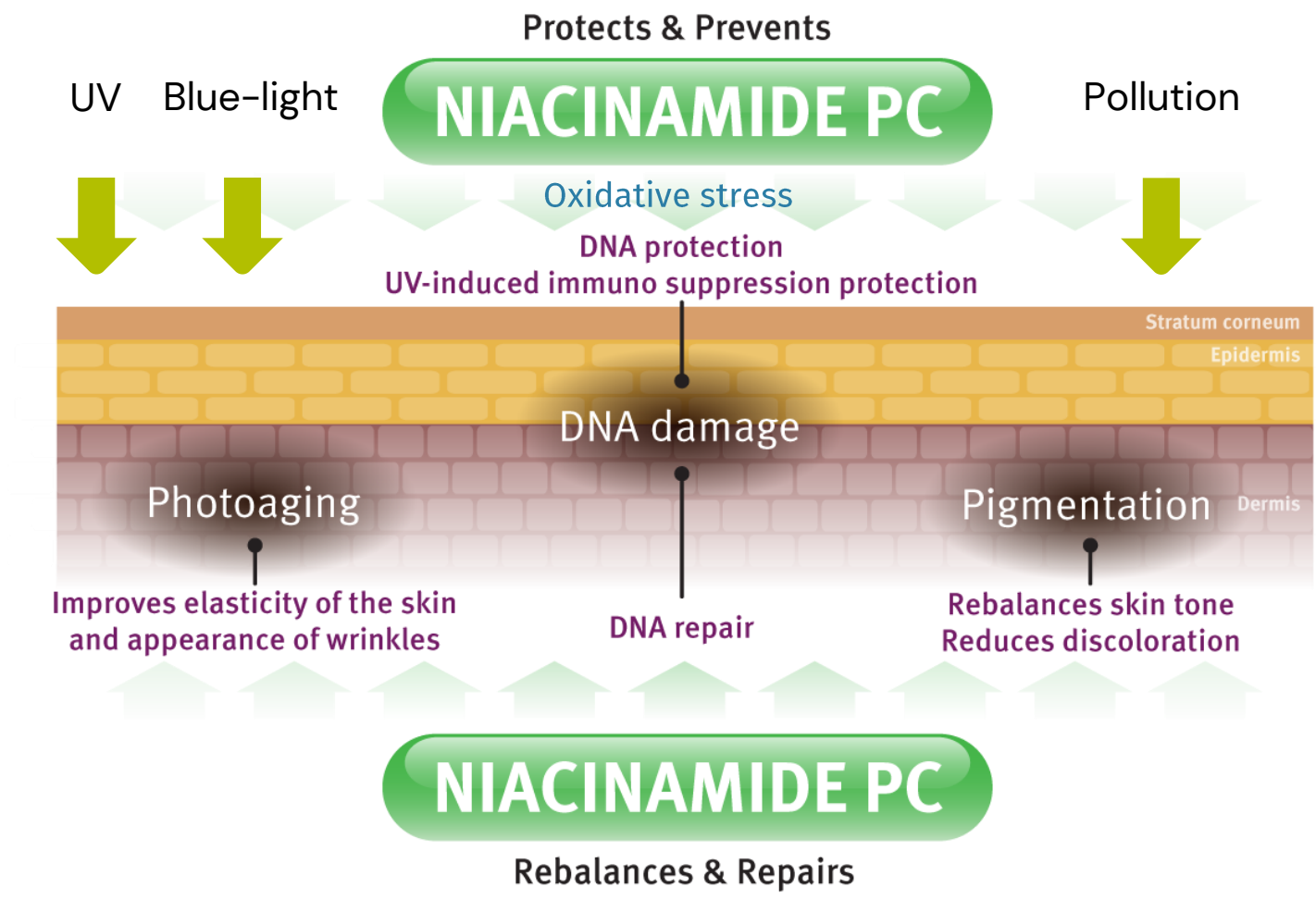
Protection

- ✓ Niacinamide prevents UV-induced ATP decline → cell energy crisis prevention
- ✓ Energy refuelling allows → significantly increased DNA repair

Environmental Stressed Skin Care

Environmental stressed Skin Care with Niacinamide

PC: Protection & Repair

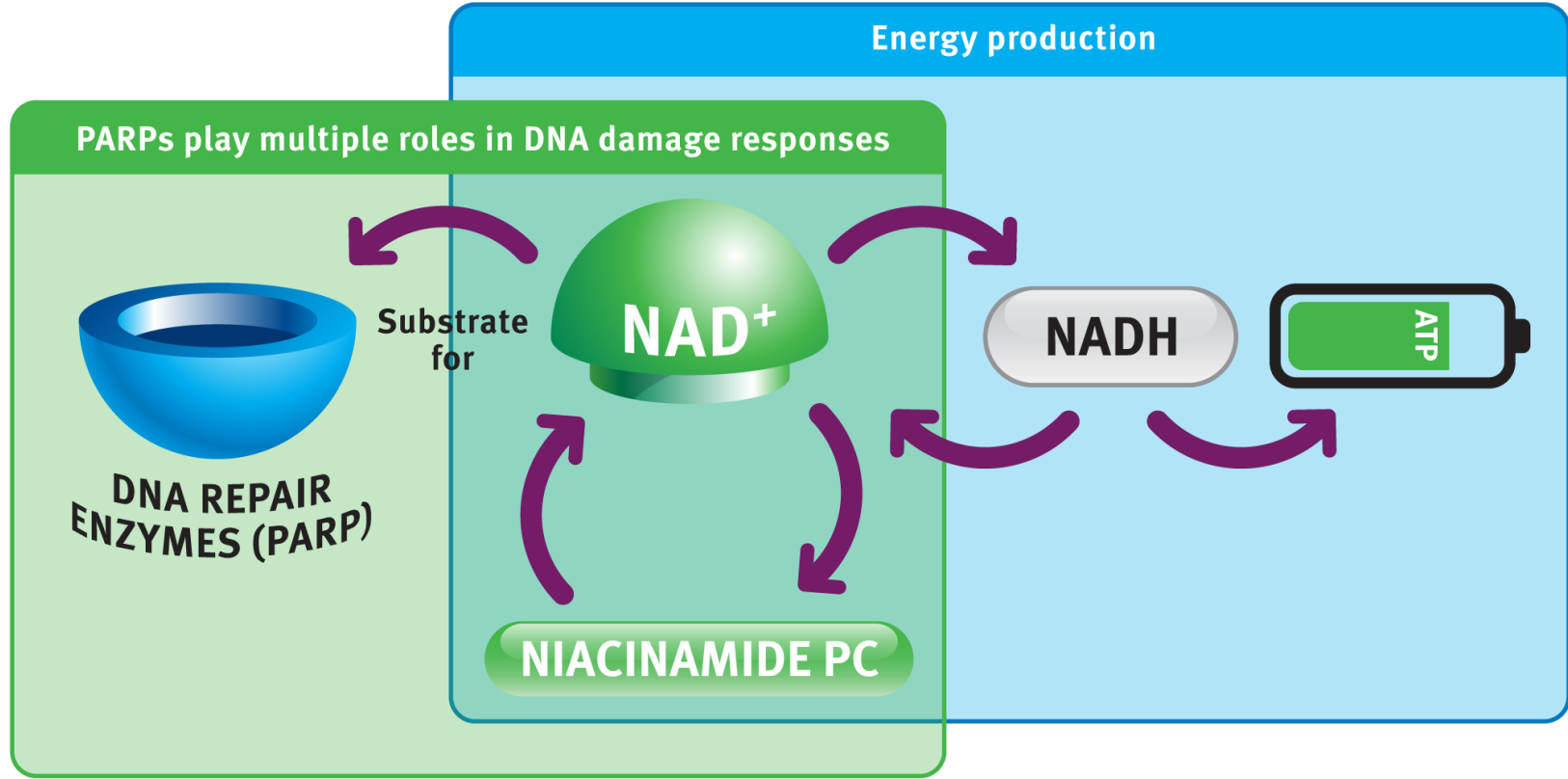


Niacinamide PC is the essential NAD+ precursor in two key pathways: energy production and DNA repair

Environmental Stressed Skin Care

NAD+ is a substrate for poly (ADP-ribose) polymerases (PARP).

PARP play multiple role in DNA damage responses including DNA repair and maintenance of genomic stability



Simplified pathway of cellular energy production (ATP production) with niacinamide and NAD+

Blue Light effects

Consumer level



Helps to relieve premature aging



Reduces skin discoloration



Functional level

- ✓ Niacinamide protects the skin from oxidative stress (free radicals -48%) in vitro and ex vivo
- ✓ Niacinamide protects the protein damage (-48%) from blue light ex vivo
- ✓ In clinical trials: Niacinamide reduced the hyperpigmentation (-23%) and the redness (-25%) generated by blue light exposure

UV and Blue Light
Stressed Skin Care



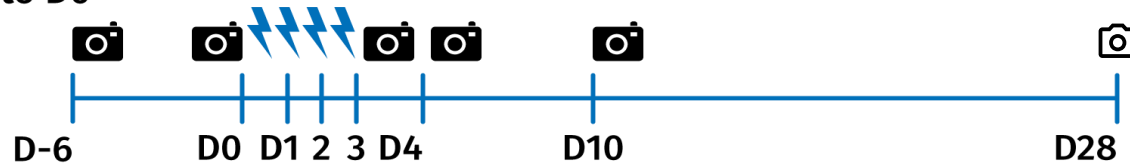
Niacinamide PC blue light *in-vivo* study design

- 33 female volunteers (mean 32 years old, Caucasian 55%, Asian skin 18% and 27% mixed-ethnicity with phototype III and IV)
- Randomized double blind with placebo
- Cream formulations with 3% Niacinamide PC (without sun filter)
- Forearm application once a day for 34 days (application started 6 days before blue light exposure to strengthen the skin)
- Exposition 4 days consecutively on forearm with LED lamp at 450nm with 60J/cm²: natural dose you get within one hour from European midsummer sun

Pre-treatment phase

D6 to D0

Recovery phase D4 to D28



 = image acquisition and chromometer measurements

Skin color measurements (chromameter) and Image analysis

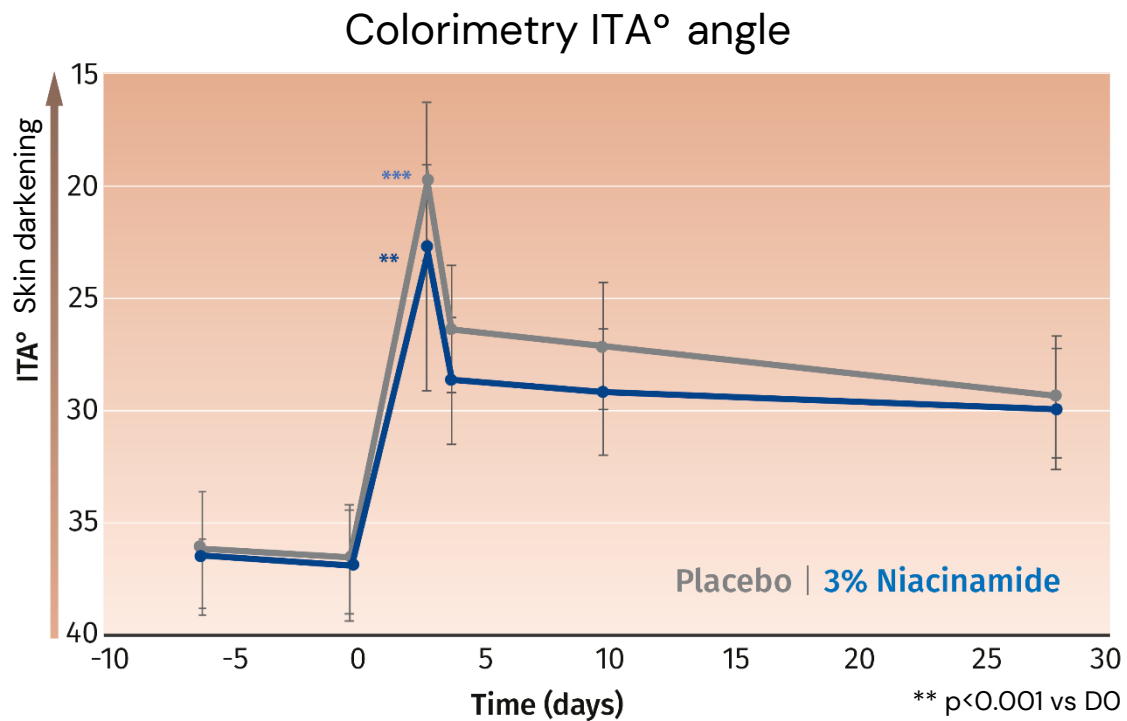
UV and Blue Light
Stressed Skin Care



Skin darkening: Niacinamide PC protects from blue light induced immediate skin hyper-pigmentation

UV and Blue Light
Stressed Skin Care

Impact of niacinamide on protecting cellular bioenergetics under hydrogen peroxide induced oxidative stress conditions



ITA° is inversely correlated with skin pigmentation: **the lower the ITA value, the darker the skin** Colorimetry ITA angle, ITA° takes into account 2 parameters: luminance (L*) and yellow-blue tone (b*).

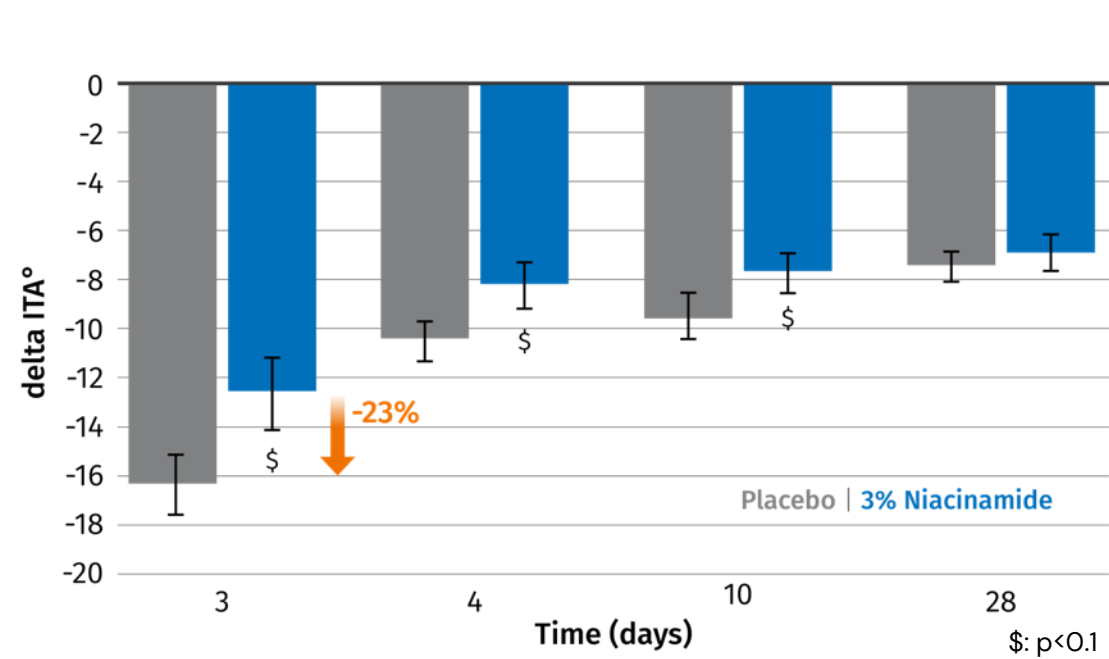
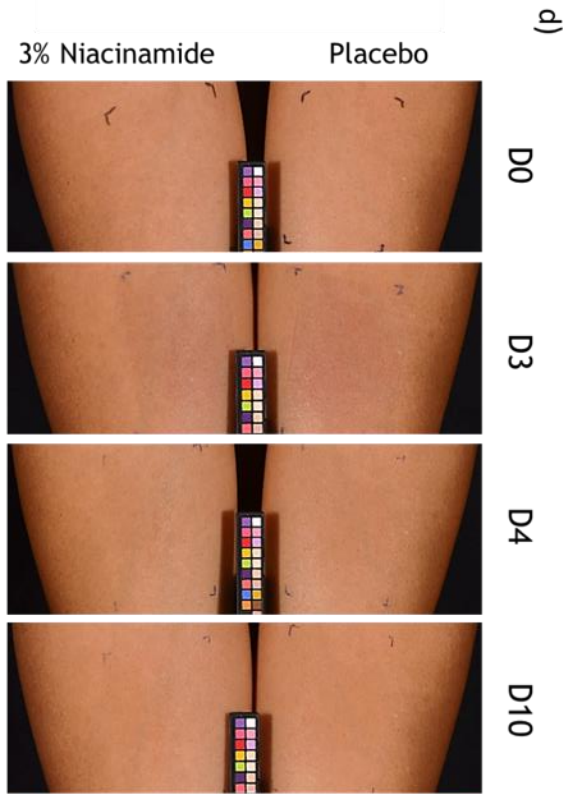
Niacinamide PC proves to be effective against hyper-pigmentation:

- Highly significant skin darkening after 4 days blue light irradiation
- Immediate reduction of skin pigment darkening with Niacinamide PC

Niacinamide PC protects against blue light induced skin pigment darkening by 23%

In vivo study

UV and Blue Light Stressed Skin Care



Niacinamide PC protects immediately by 23% the skin hyper-pigmentation induced by 4 days blue light irradiation

Volunteer 20 – ITA° – left forearm with placebo and right with 3% Niacinamide

Pollution protection

Pollution Protection Care

Consumer level



Well-protected from urban pollutants damage for beautiful and healthy skin



Functional level

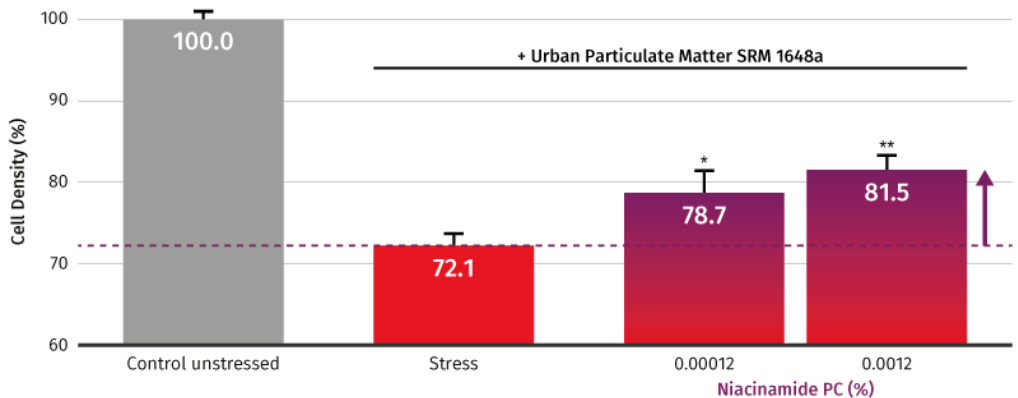
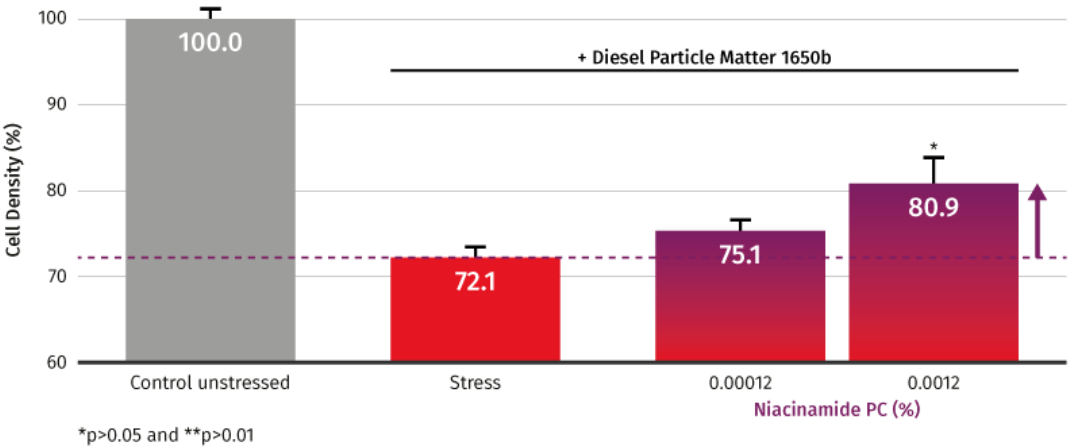
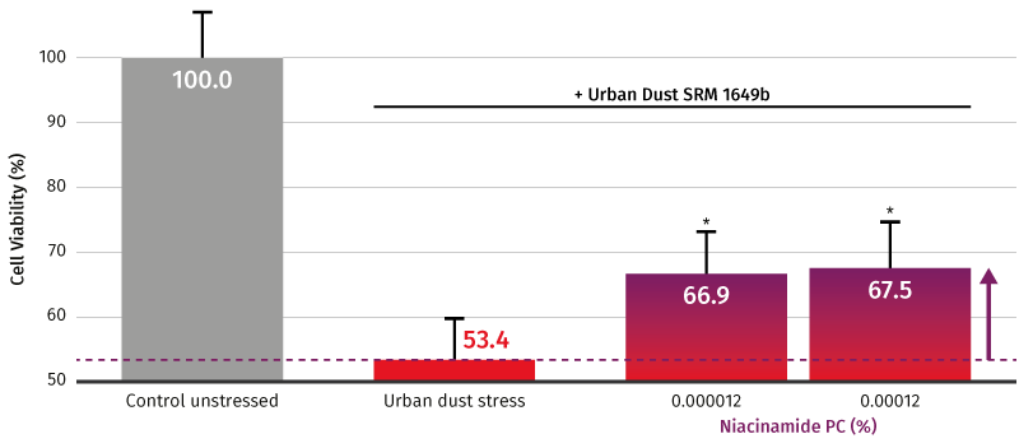
- ✓ Niacinamide is the ideal candidate for urban pollution care as it:
 - Strengthens the skin barrier
 - Rebalances uneven skin tone and reduces discoloration



- ✓ **Air Pollution**
 - Increases cell viability exposed to particulate matter (up to 81%) in vitro
- ✓ **Water Pollution**
 - Enhances repair of arsenic (water contamination) + UV induced DNA damage

Niacinamide protective effect in presence of urban particulate matter

Pollution Protection Care



Niacinamide PC partially corrects cell viability even at very low concentrations



Skin Tone effects

Consumer level

-  Rebalances uneven skin tone
-  Reduces discoloration



Funcitonal level

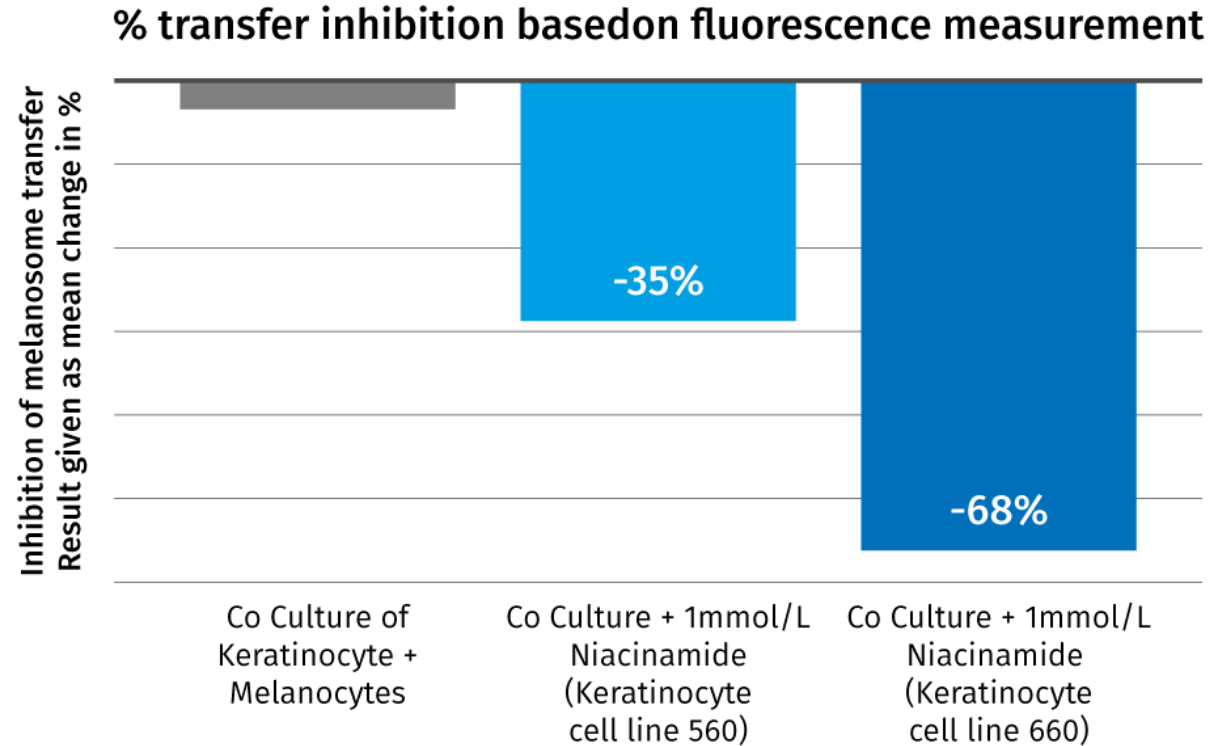
- ✓ Niacinamide prevents the pigments from surfacing on the skin *in vitro*
 - Inhibition of melanosome transfer (up to 68%)
- ✓ Niacinamide reduces cutaneous pigmentation in 3D skin model
- ✓ In clinical trials: Niacinamide shows significant skin lightening effects, as effective as hydroquinone with a safe mode of action
- ✓ Niacinamide is safe and effective in helping even out skin tone

Even skin tone care



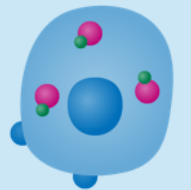
Niacinamide prevents pigments from surfacing on the skin

Even skin tone care



- Co-cultures of fluorescence-labelled melanocytes/ melanosomes and keratinocytes were supplemented with niacinamide (1mmol/l).
- After seven days fluorescence measurement of keratinocytes carrying.

**melanosome specific label
+ keratinocyte specific label**



Niacinamide inhibits the melanosomes transfer by up to 68% ⁽¹⁾

⁽¹⁾ Hakozaiki et al, Br. J. Dermatol 2002;147, 20-31

Niacinamide is safe and effective in helping even out skin tone

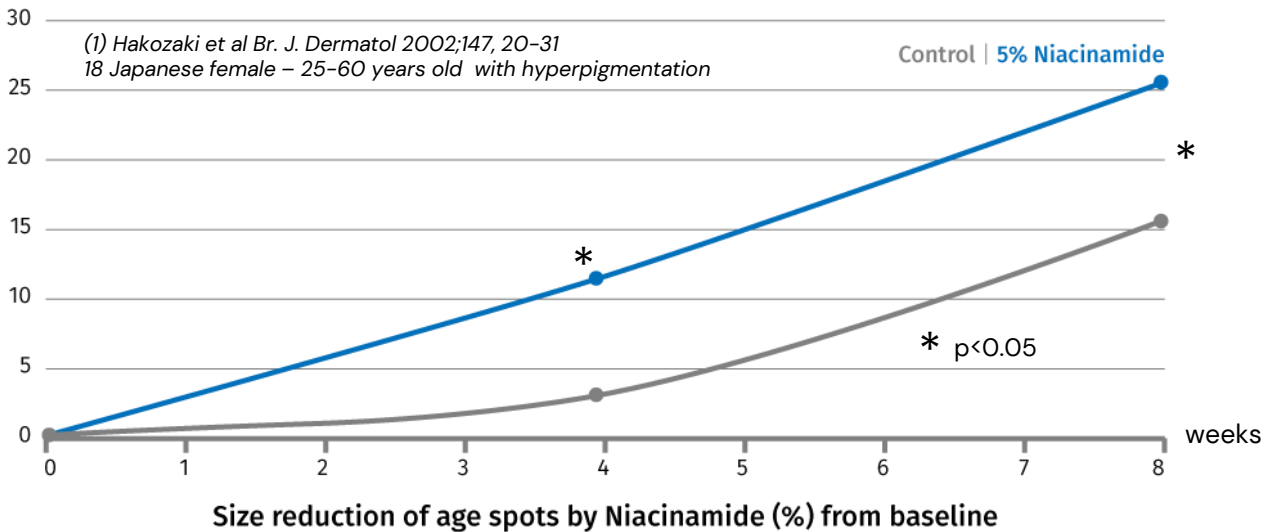


Even skin tone care

Niacinamide is an effective skin lightening compound showing in several high-quality clinical trials

- effects at 2 and 5%, significant at 5%^(1,2)
- 4% niacinamide being as effective as 4% hydroquinone⁽³⁾

Niacinamide shows no side effect



5% Niacinamide at T0, 4 and 8 weeks
(2) Greatens et al. Experimental Dermatology 2005;14: 498-508
twice daily half face application for 8 weeks, 39 Japanese female, 28-54 years old



4% Niacinamide, melasma patients at week 0 (left) and week 8 (right)
(3) Navarrete-Solis J. et al, Dermatology Research and Practice, 2011
27 melasma patients with phototype IV-V – 25-53 years old, hemiface application – for 8 weeks

Blemish Care

Consumer level



Blemish-free, shine-free refined skin appearance



Funcitonal level

- ✓ Niacinamide reduces acne condition, including reduced severity (grade, -52% *in vivo*) and reduced lesions (number of papules, pustules: up to -73% *in vivo*)
- ✓ Niacinamide shows trend of reduced sebum formation and excretion (-23% *in vivo*)

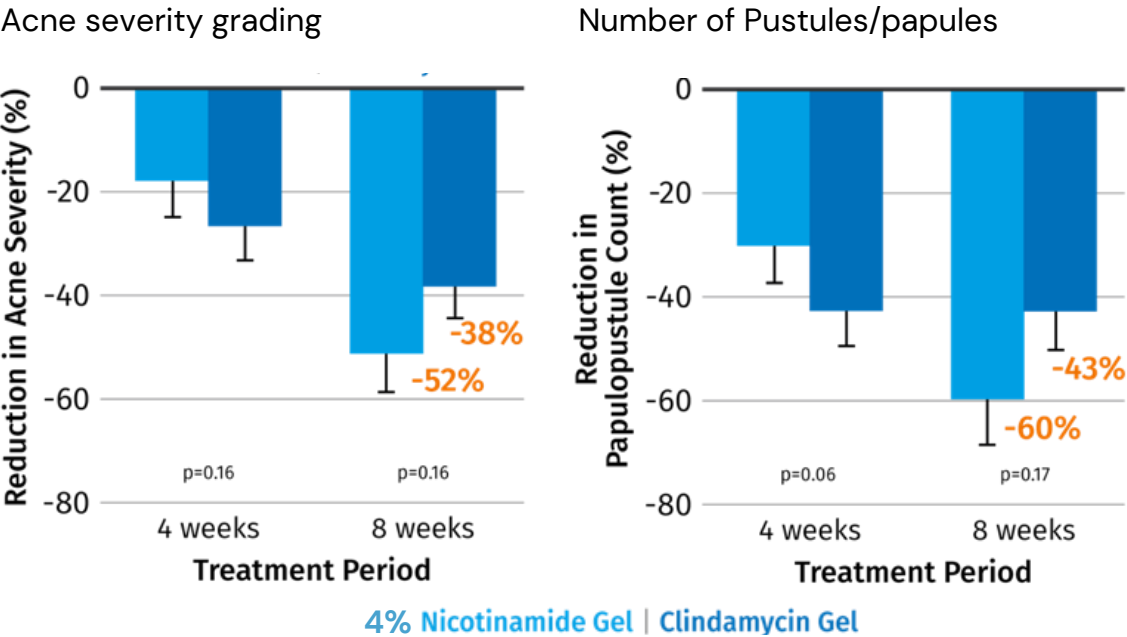


Blemish Care

Results of several clinical trials with 4% niacinamide vs 1% clindamycin



Blemish Care



76 men and women (aged 13–35) with moderate inflammatory acne vulgaris for 8 weeks. Measurement by dermatologist (acne severity according to modified Cook grading by Allen and Smith)¹

Acne grading	4% Niacinamide		1% Clindamycin	
T0	5.93		5.7	
T4 weeks	4.03**	-32%	3.85**	-32%
T8 weeks	2.08**	-65%	2.03**	-64%

Number of papules/pustules	4% Niacinamide		1% Clindamycin	
T0	88.0		88.2	
T4 weeks	49.6**	-44%	48.6**	-45%
T8 weeks	24.4***	-73%	22.5***	-74%

80 volunteers with moderate inflammatory acne vulgaris for 8 weeks. Cook’s acne grading from 0 to 8²

Niacinamide just as effective as clindamycin, but without side effect

¹Shalita et al, International Journal of Dermatology, 1995, 34 (6):434–437
²Khodaeianii et al, International Journal of Dermatology 2013, 52:999–1004

Anti-aging effects

Anti-aging care

Consumer level



Reduces the appearance of lines and wrinkles



Improves the elasticity of the skin



Functional level

- ✓ Exposure to sun light prematurely ages our skin. Niacinamide is the ideal candidate for day care and sun care products as it:
 - Stimulates collagen synthesis (+54% *in vitro*)
 - Improves the appearance of lines and wrinkles



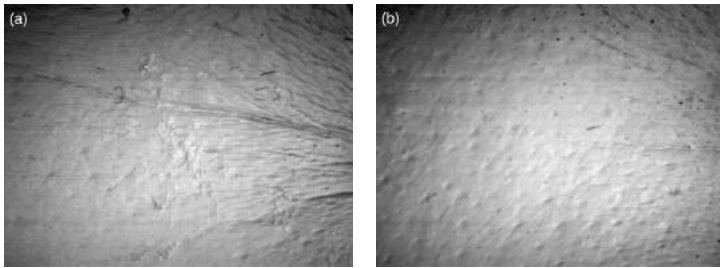
Niacinamide improves the appearance of lines and wrinkles in any skin ethnicity

In vivo
study

Anti-aging care

Significant wrinkles decrease in eye area

Japanese female volunteer



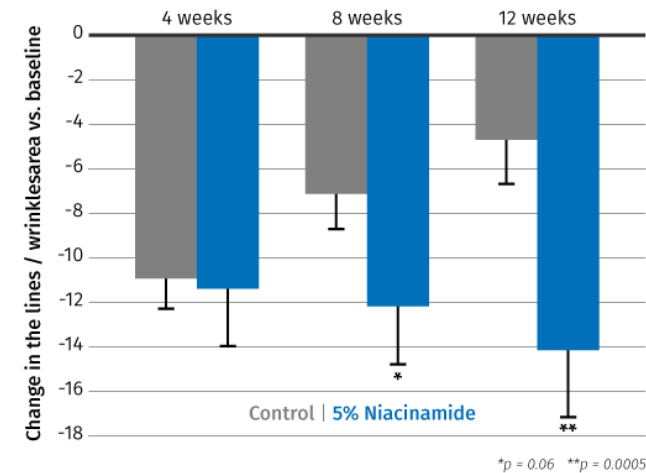
Skin replica in a 44-year-old woman (a) before and (b) 8 Weeks after application of 4% Niacinamide preparation.

Significant reduction of wrinkle grades ($p < 0.001$) after 4 and 8 weeks

29 Japanese female volunteer, ages 31–49, split face application, Kawada et al., *Journal of Dermatology*, 2008, 35:637–642

Significant reduction of fine lines

Caucasian female volunteer

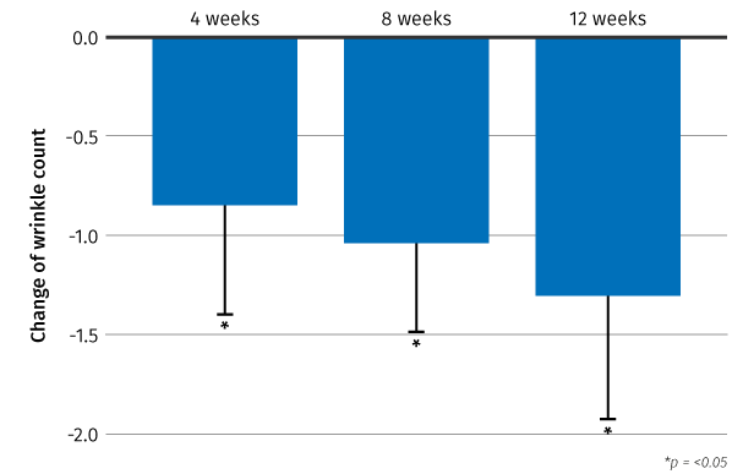


Treatment with 5% Niacinamide shows significant improvement in fine lines and wrinkles following both 8 and 12 weeks of treatment.

49 Caucasian female volunteer, ages 40–60, split face, for 3 months Bissett et al., *International Journal Cosmetic Science*, 2004, 26:231–238

Significant wrinkle reducing effects

Taiwanese female volunteer



Significant decrease (–51.6%) of wrinkle count with 4% Niacinamide after 12 weeks vs baseline.

25 Taiwanese female volunteer, ages 43.4±8.3, splitface application, Visia complexion analysis system Chiu et al., *Journal of cosmetic dermatology*, 2007, 6:243–249

Niacinamide PC– For resilient, flawless skin and a radiant complexion



CORNEOCARE® – Skin Resilience

-  Strengthens skin barrier, stimulates ceramides and lipids in stratum corneum
-  Reduction of water loss
-  Increasing key proteins involved in skin barrier: involucrin, filaggrin, keratin



Even skin tone

-  Inhibition of melanosome transfer
-  Reduces cutaneous pigmentation
-  Rebalances uneven skin tone



Environmental stress protection

-  Protects and repairs from environmental damage for beautiful and healthy skin
-  Boost cell energy production and repair (UV induced DNA damage)
-  Protection from urban pollutants damage



Anti-aging activities

-  Stimulates collagen synthesis
-  Improves the appearance of lines and wrinkles
-  Improves the elasticity of skin



Blemish Care

-  Reduces the appearance of acne
-  Reduces skin lesions: number of papules and pustules
-  Helps to reduce sebum level



UV and Blue light protection

-  Helps to relieve premature aging from UV and Blue light
-  Reduces oxidative stress and skin discoloration from blue light exposure

Formulating with Niacinamide PC

- Niacinamide PC is very **stable** (air, heat, light) and **easy** to formulate with.
- **Highly soluble** in water and alcohol and soluble in glycerol.
- Niacinamide PC shows **a very good compatibility** with all groups of cosmetic ingredients
- **Recommended pH** of the final formulation: 4.0 – 8.0
- Niacinamide PC can be **processed either cold or hot** at temperatures up to 70°C . Generally added in the aqueous phase of a cosmetic formulation
- Recommended use level: max 10%
- Caution:
 - Niacinamide PC is incompatible with strong acids and bases and oxidizing agents which may cause hydrolysis to nicotinic acid.
 - It is important to not use ingredients containing enzymes such as amidases to avoid biological hydrolysis of niacinamide to nicotinic acid



Niacinamide PC

Regulatory status



Global status: Niacinamide PC can be used in all countries for any kind of cosmetic products



China status: Full chemical and cosmetic registration

- ✓ Chemical notification
- ✓ Chinese INCI name
- ✓ IECIC listed

Allows development of global products



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We bring progress to life

Hero Vitamins to nourish skin beauty & keep skin defenses robust!

Energize

Vitamin C

- Energizes tired skin, leaving it fresher and revived
- Protects against UV/ozone- induced oxidative damage
- Fights photoaging
- Collagen booster
- Ensures resilient immune function

Antioxidant & protect

Vitamin E

- The preventer, protects the skin against oxidative stress, for comfortable, beautiful and healthy-looking skin
- Ideal partner for vitamin C

Fight stress

Vitamin B3

- Protects from external stressors (UV, blue light & pollution)
- Rebalances even skin tone
- Moisturizes and improves skin elasticity
- Boosts skin immunity

Moisture & restore

Panthenol (Pro Vitamin B5)

- Strong skin moisturizer
- Soothes irritated skin
- Helps protect and regenerate compromised skin
- Rejuvenates the skin
- Tightens the skin barrier against external insults

Please note

When translating the literature or scientific support into marketing claims, there are regulatory limitations in claiming ***"immunity"***. It's recommended using consumer-friendly expressions, as for example ***"strengthening skin defenses"***

A. Carr and S. Maggini Vitamin C and Immune Function, 2017 (for vitC)
Oblong J. 2014 DNA Repair 23, 59-63 (for B3)
Yuen and Halliday Photochemistry and Photobiology, 1997, 65(3) p587-592 (for vitE)
Stettler et al. 2016 J. of Dermatol. Treatment (for Panthenol)

