

Care  
Creations™

# Collrepair™ DG

Reverses 20 years of glycation in only 4 months

by Beauty Creations  
another Care Creations product group Inspired by Life

 **BASF**

We create chemistry

# COLLREPAIR™ DG

## Reverses 20 years of glycation in only 4 months

**In order to manage our busy life style, our body needs energy rapidly available and sugar is one of the most potent fuels. Although in today's society, our daily consumption of sugar easily reaches 100g per person, twice what our bodies really need. What happens to the excess of sugar accumulated in our body that wasn't consumed for energy?**

At the same time vital and harmful, we all know that sugar alters our health, but did you know that it is also one of the main culprits responsible for skin aging? Indeed, consuming too much sugar can have a direct negative impact on our skin through a chemical reaction (Maillard reaction) called glycation.

Glycation mainly occurs in the heart of the dermis: glucose molecules react with intracellular and extracellular protein structures. As a result, AGEs (advanced glycation end products) are formed and accumulate over time.

AGEs affect structural proteins in the extra cellular matrix of the skin, such as collagen and elastin. They modify protein properties, making them more resistant to proteolysis, thus stopping their renewal and impairing their interactions with other proteins. Moreover, AGEs induce the formation of chemical bonds between collagen fibers, disorganizing the extracellular matrix network which becomes more and more rigid.

At cellular level, intracellular proteins are also affected. Among them, the vimentin, required for many vital cell functions in fibroblasts, becomes a preferential intracellular target of glycation.

Slowly and irreversibly, glycation damages the structure of the skin. As a result, the skin loses its elasticity and resiliency, surface wrinkles appear, and skin tone is altered by a yellowing phenomenon.

How can we still talk about skin aging without discussing one of its major causes, glycation?

While BASF has actives that address fiber protection and functionalization, we go one step further in matrix fiber management by reversing 20 years of glycation in only 4 months with our new active ingredient, Collrepair™ DG.

For the first time in the cosmetic field, a decrease in the accumulation of glycated collagen is possible and confirmed through *in-vitro* and *in-vivo* testing. Collrepair™ DG is able to reverse glycation; AGEs are broken, fibers become more flexible, and the skin reveals the mechanical properties from its past youth.

### Cosmetic use

- Rejuvenating day/night cure
- Anti-dull skin serum
- Firming face & Body cream

### Cosmetic properties

- Breaks the settled intracellular and extracellular AGEs
- Scavenges ROS
- Restores healthy glow
- Improves skin firmness

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WHAT'S IN IT FOR YOU?

WE TRANSLATE INNERMOST WISHES  
INTO PRODUCTS THAT PEOPLE LOVE ■ ■ ■

HOW?

SUCCESSFUL BRANDS

OUTPERFORMING PRODUCTS

SCIENCE EXCELLENCE  
MEETS  
MARKET EMPATHY

## In *tubo* efficacy and selection of ingredients

### Collrepair™ DG, extracellular proven deglycation of isolated human glycated collagen.

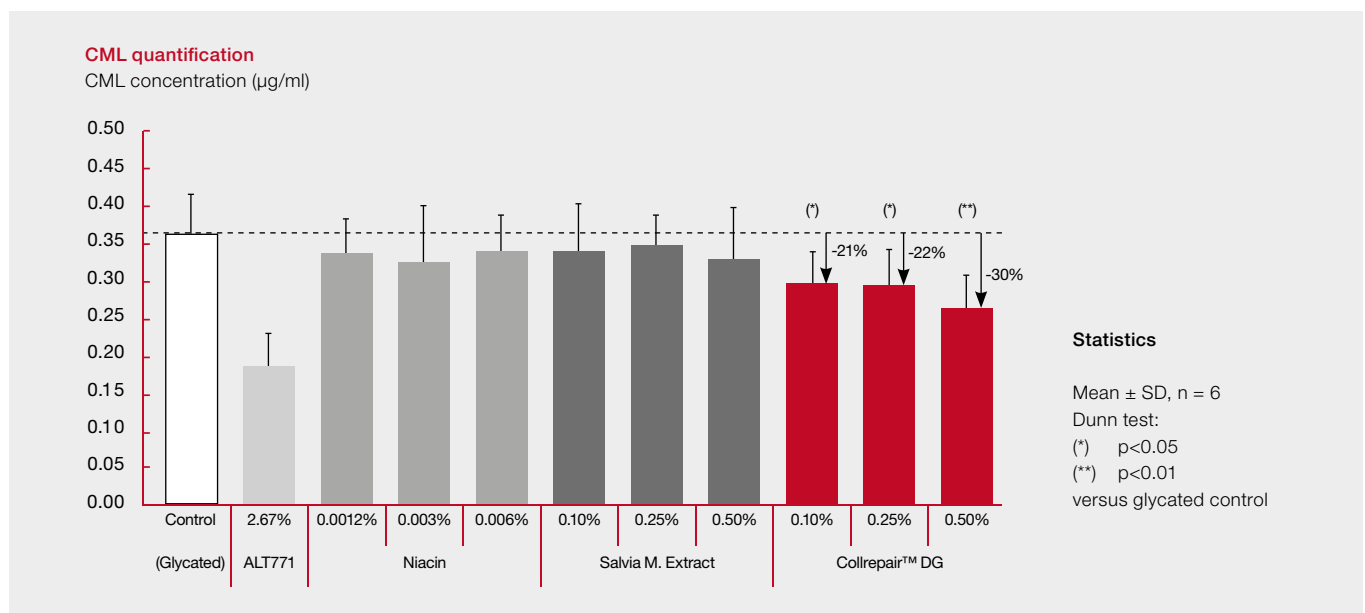
#### Our aim

Demonstrate the ability of Collrepair™ DG to decrease the amount of preformed AGEs, the CML (N(ε)-(carboxymethyl) lysine), in a glycated solution of collagen - collagen extracted from human skin biopsies and glycated *in tubo*.

#### Results

Demonstrated synergistic effect of Salvia miltiorrhiza extract and Niacin solution. At 0.5%, Collrepair™ DG significantly decreases by 30% the amount of CML adducts: for the first time, an experiment shows AGEs breakage. (Fig. 1)

**Collrepair™ DG showed *in tubo* a statistically significant deglycating activity, breaking 30% of pre-formed AGEs, in a solution of human glycated collagen.**



**Figure 1:** Decrease in CML adducts in a solution of glycated human collagen.

### Collrepair™ DG, a powerful synergistic blend made of a pure molecule and a natural ingredient.

Salvia miltiorrhiza also known as red sage, is a perennial plant highly valued for its roots in Traditional Chinese medicine (TCM). Native to China and Japan, it grows at 90 to 1,200 m elevation, preferring grassy places in forests and hillsides. Salvia is traditionally used to treat a diversity of illness, particularly cardiac (heart) and vascular (blood vessel) disorders such as atherosclerosis ('hardening' of the arteries with cholesterol plaques).

Niacin or vitamin B3 helps break down blood sugar for energy. Higher amounts of niacin can improve cholesterol levels and lower triglyceride level in order to lower cardiovascular risks. It thus plays a major role in protecting against cardiovascular disease. BASF Beauty Creations has combined these 2 valuable ingredients in Collrepair™ DG in order to detoxify skin from accumulation of glycation products and renew the skin collagen to make it younger.

## In vitro efficacy

**Collrepair™ DG**, intracellular proven deglycation of fibroblasts culture.

### Our aim

Assess the effect of Collrepair™ DG at 0.25% on glycated fibroblasts culture *in vitro*. Fibroblasts monolayer culture was glycated by glyoxal for a quick and efficient AGEs induction.

Intracellular AGEs were quantified; particularly CML adducts accumulation.

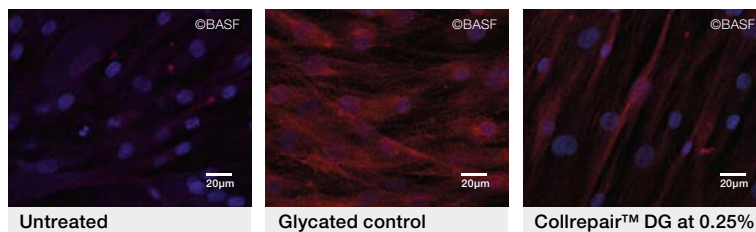
The distribution of vimentin, a preferential intracellular target of glycation, was studied.

### Results on CML content:

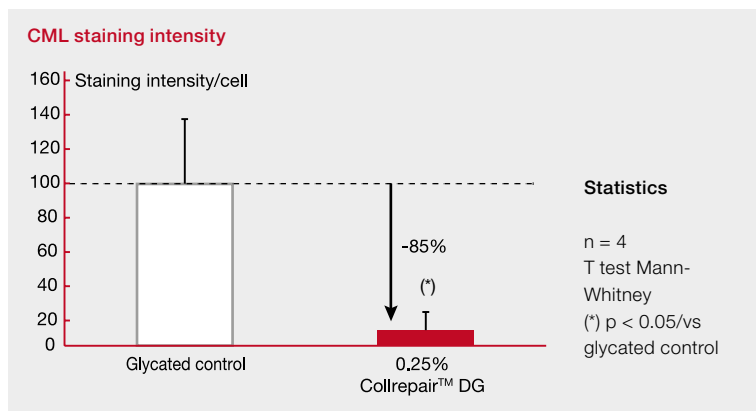
Collrepair™ DG significantly lowers by 85% the accumulation of AGEs in glycated fibroblasts. (Fig. 2, Fig. 3)

### Results on vimentin distribution:

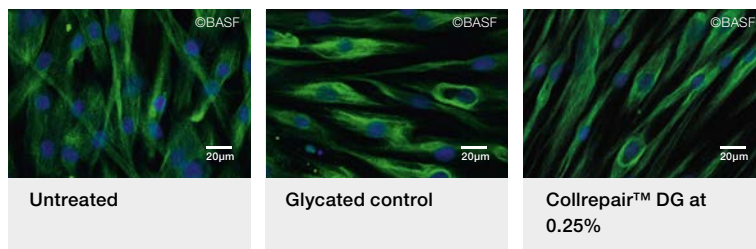
In addition Collrepair™ DG repairs the effects of glycation on vimentin, giving back to the fibroblasts the normal fused shape and thus their functionality. (Fig. 4)



**Figure 2:** Decrease in CML accumulation in fibroblasts with Collrepair™ DG at 0.25%. Immunofluorescence staining of CML (red); nuclei in blue, scale bar 20 µm



**Figure 3:** Quantification of decrease in CML intensity staining with Collrepair DG



**Figure 4:** Normalization of distribution of vimentin with Collrepair™ DG versus Glycated control. Immunofluorescence staining (green); nuclei in blue, scale bar 20 µm

## Conclusion (*in vitro*)

**Collrepair™ DG has proven its efficacy in deglycating intracellular and extracellular proteins.**

**Extracellular deglycation (at 0.5%):** -30% of AGEs in a solution of human glycated collagen.

**Intracellular deglycation (at 0.25%):** -85% of AGEs in glycated fibroblasts that find back their fused shape. *Fibroblasts find back their ability to react toward mechanical stress by decreasing glycation and stiffening of proteins involved in fibroblasts motility\**

\* Full *in vitro* results in the scientific brochure

## In vivo efficacy

**Collrepair™ DG**, the first time in cosmetic field that a decrease of glycated collagen is demonstrated *in vivo*.

BASF internal study has shown an increase of AGEs content in the skin by 8% between the ages of 20/29 and 60/69<sup>1</sup>.

### Our aim

Assess the decrease of AGEs accumulation, namely collagen crosslinked, in the skin. The AGEs quantification was done through the measurement of skin fluorescence\*.

Skin yellowing which is directly linked to AGEs accumulation, was evaluated by measuring the b parameter (yellow component) using 2 methods: chromametry\* and image analysis\*.

#### First clinical trial protocol:

**Collrepair™ DG** was tested during 4 months at 3% on hemi face on 27 Caucasian females from 45 to 60 years old with dull complexion, compared to a placebo formula.

### Results on AGEs decrease:

Collrepair™ DG decreased settled AGEs in skin by 4% after 4 months of application which represents half of the difference naturally observed between 2 groups of individuals separated by 40 years.\*

### Collrepair™ DG reversed 20 years of glycation in only 4 month.

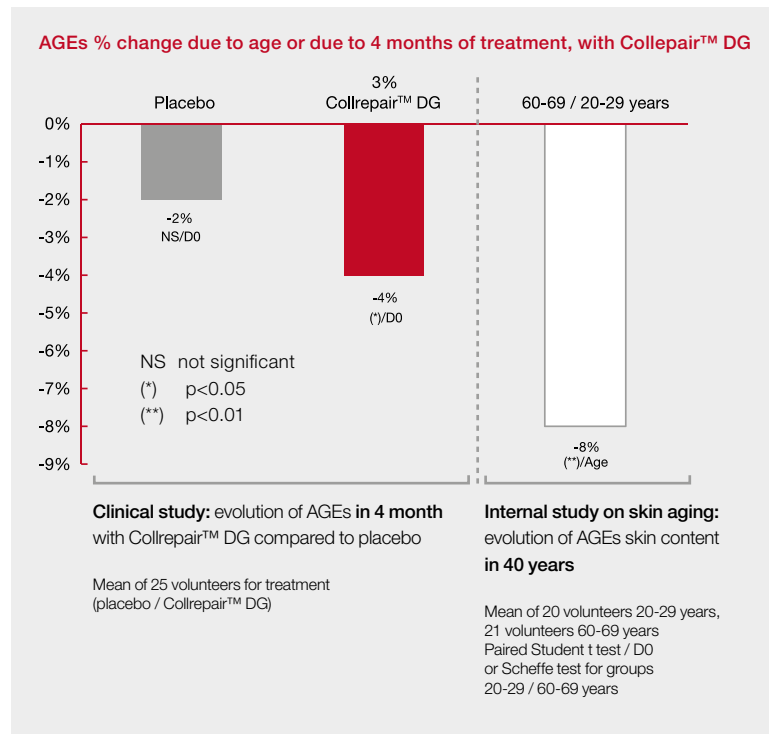
### Results on skin tone improvement:

Collrepair™ DG showed a continuous and significant skin deyellowing from 2 to 4 months. After 4 months, Collrepair™ DG was significantly better than placebo: - 6% of skin yellowing with chromametry which correspond to a rejuvenation of 17 years in terms of skin tone improvement.\*

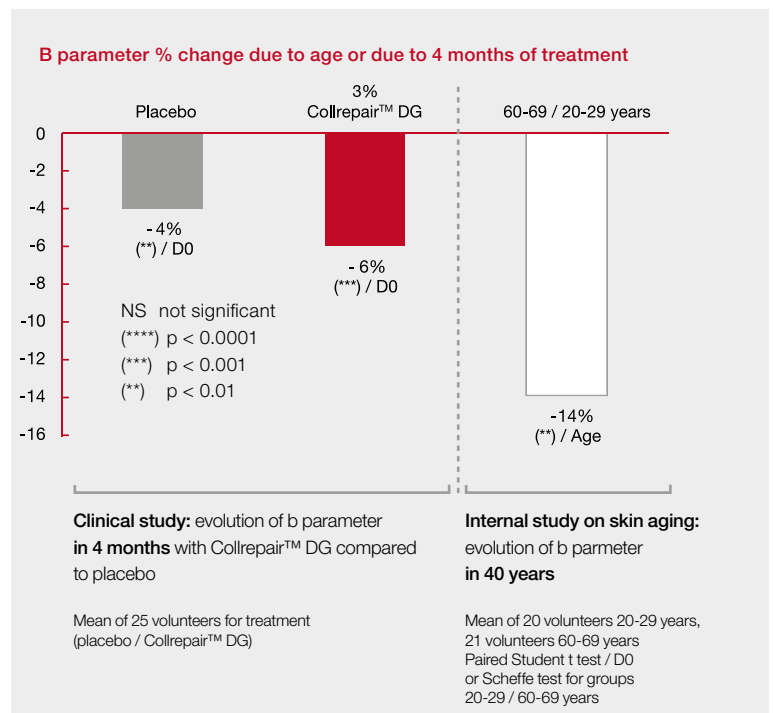
### Collrepair™ DG enables to recover the healthy glow of a skin 17 years younger.

\* Results available in the scientific brochure.

<sup>1</sup> Study previously done by BASF, Full results upon request



**Figure 5:** Comparison of Collrepair™ DG capacity to decrease AGEs versus placebo and natural AGEs accumulation in young and old volunteers<sup>1</sup>.



**Figure 6:** Comparison of Collrepair™ DG capacity to decrease skin yellowing versus placebo and natural yellowing in young and old volunteers<sup>1</sup>.

# Collrepair™ DG

contributes to skin elasticity recovery

### Results on skin elasticity:

After one month of application, Collrepair™ DG at 5% shows the ability to improve by 6% the skin elastic recovery, which is significantly higher than placebo.

Thanks to deglycation, the mechanical properties of the skin are recovered.

### Second clinical trial protocol:

The improvement of skin biomechanical properties was evaluated using a cutometer. Collrepair™ DG at 5% was applied for one month on 39 volunteers arms compared to placebo.

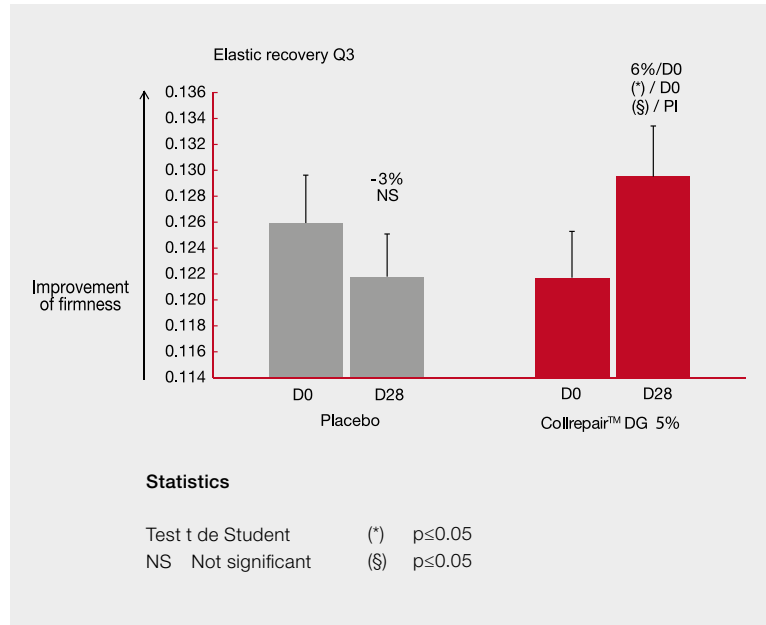


Figure 7: Measurement of skin elastic recovery.

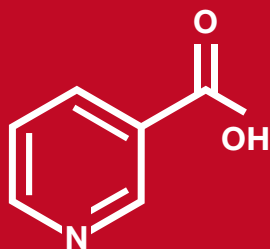
## Conclusion (*in vivo*)

Collrepair™ DG is the first active ingredient in cosmetic field that reverses the glycation with proven and significant results vs. placebo *in vivo*:

- 20 years of glycation reversed in only 4 months by breaking the AGEs
- Healthy glow recovery of a skin 17 years younger
- Restoration of skin elasticity

# COLLREPAIR™ DG

## Origin / Description



### A powerful Synergistic blend made of a pure molecule and a natural ingredient

BASF Beauty Creations has combined these 2 valuable ingredients in Collrepair™ DG in order to detoxify skin from accumulation of glycation product and renew the skin collagen to make it younger.

Regarding the important status of Salvia miltiorrhiza in TCM, BASF decided to protect this natural resource by cultivating this plant for its use as cosmetic ingredient in Collrepair™ DG. We have applied the same natural environment cultivate this plant: adapted altitude and grassy ground in Asia.

## Summary file

### Collrepair™DG

Reference A00331

### Regulatory Data

**INCI:** Water; Niacin; Caprylyl Glycol; Hexylene Glycol; Xanthan Gum; Salvia Miltiorrhiza Leaf Extract

**China:** Each component listed in "Inventory of Existing Cosmetic Ingredient in China" (IECIC 2014)

**CAS#:** 7732-18-5 ; 59-67-6 ; 1117-86-8 ; 107-41-5 ; 11138-66-2

**EINECS#:** 231-791-2; 200-441-0; 214-254-7; 203-489-0; 234-394-2

### Appearance

Yellow to amber syrupy liquid

### Preservative

None

### Natural Labels

None

### Formulation Data

**Concentration of use:** 3 to 5%

**Solubility:** Soluble in water and glycol

**Incorporation method:** Collrepair™ DG is incorporated into the finished process below 35°C, or at room temperature for cold processing

**Optimal pH:** 3-7

### Storage

Room temperature : 10-30°C; avoid freezing

### Shelf Life

18 months

### Patent family

Patent applied in France

### Manufacturer

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