D-Stria™
The Skin Relaxer

Beauty is harmony. We design its concordance.
While stretch marks mostly affect women – up to 80% according to statistics – they can also affect men, with 15% of them subject to this condition.

**Stretch marks appear as stripes on the skin.** They result from a significant and rapid distension of the skin (pregnancy, rapid growth, illnesses, dry skin, etc.) and resemble depressions in the form of lines or streaks. First, they are a reddish-purple colour which then fades when they reach maturity, becoming pearly-white. The areas affected by stretch marks generally correspond to places where the skin is subject to tension (hips, buttocks, top or bottom of the back, armpits, breasts, etc.).

While stretch marks are highly visible on the surface, they actually occur in the dermis, particularly in the collagen and elastin fibres, which are altered and disorganised.

As a result, there are two phases to the traditional treatment for stretch marks:

- Reducing the colour and the perceived depth by abrading the epidermis.
- Redensifying by maintaining a layer of collagen and elastin in the dermis. This is achieved by introducing collagen or elastin, or by stimulating the production of these molecules.

The dermis is a difficult part of the skin to reach, hence surgery also offers numerous tools to reduce the appearance of stretch marks: carboxytherapy, chemical peeling, microdermabrasion, laser, LED and even radiotherapy. Although the techniques may differ, the goal is nevertheless the same: to smooth the epidermis through abrasion and boost the production of collagen and elastin, at the cost of considerable irritation and discomfort to the patient.

And the result isn’t guaranteed…

In terms of the extracellular matrix (ECM) constituents, the favoured biological target is fibroblast, the main producer of GAGs, collagen and elastin. This approach is similar to that for wrinkles, which share many common points with stretch marks (deficit in ECM constituents, lack of hydration, firmness, etc.). Its aim is also to stimulate fibroblasts in order to redensify the dermis. Hence, there is an increased tendency to treat stretch marks with the same active ingredients as those proposed in anti-wrinkle products with the same claims: to boost collagen and elastin. But are the fibroblasts in stretch marks the same as those found in healthy skin? Can stretch marks be treated with the same weapons as those used for wrinkles?

Contrary to supposedly “normal” fibroblasts, the fibroblasts stemming from stretch marks are said to be contractile. In reaction to the tension created in the stretch marks, the fibroblasts will contract in order to neutralise the stretching, and thus temporarily transform into striae-myofibroblasts. Known for their involvement in the healing process, myofibroblasts are the main cells responsible for the synthesis of the extracellular matrix in a scar. This is not the case in stretch marks, where the striae-myofibroblasts are quiescent.

With only their contractile ability in common with other myofibroblasts, the particular features of quiescent striae-myofibroblasts are, among others:

- Their inability to synthesise elastin and collagen,
- Organising the collagen and elastin fibres synthesised by the normal fibroblasts around the stretch marks in a parallel structure. This is what gives stretch marks their stripy, pearly-white appearance.

Is there an active ingredient that can reduce the contraction of the quiescent striae-myofibroblasts – thus making them functional again – and encourage the synthesis of both the collagen and elastin in the stretch marks?

This is the challenge BASF Beauty Care Solutions decided to take on with D-Stria™.

**A new approach to stretch marks, by BCS**
D-Stria™, an oily *Serenoa serrulata* extract, reduces the tension of the striae-myofibroblasts and boosts the synthesis of elastin and collagen, for an optimum reorganisation of the ECM within the stretch marks.

Our research has shown that D-Stria™ reduces the contractile force of the myofibroblasts stemming from stretch marks by 27%. Furthermore, our in vitro studies have allowed us to establish that D-Stria™ doubles the synthesis of Collagen I and elastin.

Finally, the clinical study carried out on 25 women shows that after only two months of application, *firmness and elasticity* are significantly improved and that after three months, the results are confirmed and have improved. The volunteers observed an improvement in elasticity, suppleness, and in the surface and colour of their stretch marks. Compared with a well-known anti-stretch mark product, D-Stria™ proved to be as good, if not better, concerning aspects such as the skin’s elasticity, and the colour and size of the stretch marks.

---

**Properties**

Fibroblast relaxant cosmetic ingredient for stretch mark skin care

**Origin**

Plant extract, taken from the berries of saw palmetto *Serenoa serrulata*

**Skincare**

Anti-stretch mark skin care treatment

Body firming skin care treatment.
To reduce contractile forces of the striae-myofibroblastes

Skin without stretch marks  Skin with stretch marks

Normal fibroblasts:
- synthesis of collagen and elastin
- proper organization of the constituents of the ECM.

Striae-myofibroblasts:
- no synthesis of collagen and elastin
- organization in a parallel structure of the constituents of the ECM

... to make them functional again

D-Stria™

By reducing the contractile forces of the striae-myofibroblasts, D-Stria™
- relaunches the synthesis of collagen and elastin
- allows proper organization of the constituents of the ECM.
D-Stria™ reduces the contractile force of the myofibroblasts stemming from stretch marks by up to 27%.

**IN VITRO STUDY**
Measurement of the contractile forces exerted by the myofibroblasts of stretch marks cultivated on an equivalent dermis under tension (GlaSbox®).

* * : statistically significant vs. untreated control, p<0.05 et p<0.01 respectively.

D-Stria™ doubles the expression of the elastin gene

**IN VITRO STUDY**
Measurement of the expression of the elastin gene.

***: statistically significant vs. untreated control, p<0.001.

D-Stria™ doubles the synthesis of Collagen I

**IN VITRO STUDY**
D-Stria™ acts on all stretch mark parameters

**. *** : statistically significant vs. T0, p<0.05 et p<0.01 respectively.

D-Stria™ visibly reduces the appearance of stretch marks.

**. *** : statistically significant vs. T0, p<0.05 et p<0.01 respectively.
... also perceived by consumers

Clinical study carried out on 25 Caucasian women aged 18 to 40 years old with recent stretch marks (appeared less than a year ago). Application of the two test products, one on the area with stretch marks on one side of the body, the other on the other side of the body, twice a day, for three consecutive months. Clinical assessment of the firmness and elasticity of the skin on (T0), then after eight weeks and three months on a scale of 0 to 9 (0 = atonic and rigid skin; 9 = firm and elastic skin)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Improvement Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-stretch mark product</td>
<td>The skin is more supple</td>
<td>74%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>87%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The skin is more elastic</td>
<td>70%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>87%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The appearance of stretch marks is reduced</td>
<td>68%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>77%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The surface of the stretch marks is smoother</td>
<td>78%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>83%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The depth of the stretch marks appear reduced</td>
<td>74%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>87%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The colour of the stretch marks has faded</td>
<td>55%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>68%</td>
</tr>
<tr>
<td>Anti-stretch mark product</td>
<td>The skin is more toned</td>
<td>74%</td>
</tr>
<tr>
<td>D-Stria™</td>
<td></td>
<td>87%</td>
</tr>
</tbody>
</table>

* : frequency of statistically significant positive responses, p<0.05.
Although all statements and information in this publication are believed to be accurate and reliable, they are presented gratis and for guidance only, and risks and liability for results obtained by use of the products or application of the suggestions described are assumed by the user. THERE ARE NO WARRANTIES OF ANY KIND. ALL EXPRESS AND IMPLIED WARRANTIES ARE DISCLAIMED. Statements or suggestions concerning possible use of the products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should not assume that toxicity data and safety measures are indicated or that other measures may not be required. The claims and supporting data provided in this publication have not been evaluated for compliance with any jurisdiction's regulatory requirements and the results reported may not be generally true under other conditions or in other matrices. Users must evaluate what claims and information are appropriate and comply with a jurisdiction's regulatory requirements. Recipient of this publication agrees to (i) indemnify and hold harmless each entity of the BASF organization for any and all regulatory action arising from recipient's use of any claims or information in this publication, including, but not limited to, use in advertising and finished product label claims, and (ii) not present this publication as evidence of finished product claim substantiation to any regulatory authority.