Personal Care

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Consumer Care

Biodynes™ EMPP

Extracellular Matrix Promoting Peptone

INCI Name: Water & Saccharomyces Ferment Lysate Filtrate
SAP Code#: 136460

Key Product Attributes:

- Stimulates production of soluble elastin
- Anti-wrinkle
- Line minimizing

Background Information

The extrinsic and intrinsic aging of skin leads to several visible changes – sagging, wrinkles and loss of elasticity.[1,2] In addition to these visible changes, there is a profound deterioration of the extracellular matrix.[3] The extracellular matrix of human skin is comprised of Collagens, Elastic Fibers (of which elastin is a major component) and the Basement membrane associated macromolecules such as proteoglycans, fibronectin and laminin.[4] Cosmetics is the art and science of visibly improving these signs of age.

It has been demonstrated that orally and topically applied glycosaminoglycans and proteoglycans can stimulate the production of elastin.[11] The reason for this effect is that these basement membrane proteins can act as messengers that can up-regulate the genes that influence the production of collagen and elastin.[1] In particular, glycosaminoglycans are of particular interest, as these types of peptides can be obtained from non-animal sources such as biofermentation reactions and marine-based sources. Biodynes™ EMPP is a new biofermentation lysate that has been developed by selectively modifying the nutritional peptone used to grow Saccharomyces cerevisiae by the addition of low molecular weight GAGs. Biodynes™ EMPP is also known as Biodynes™ Extracellular Matrix Promoting Peptone.

Technical Information

In Vitro - Fastin Elastin Stain Testing12
Full Thickness Tissue Model

To demonstrate the unique functionality of Biodynes™ EMPP, we have developed a new in vitro testing methodology for measuring the ability of active ingredients to stimulate the formation of soluble elastin from cell cultures. The method for testing the ability of Biodynes™ EMPP to stimulate elastin production is shown below, Figure 1.

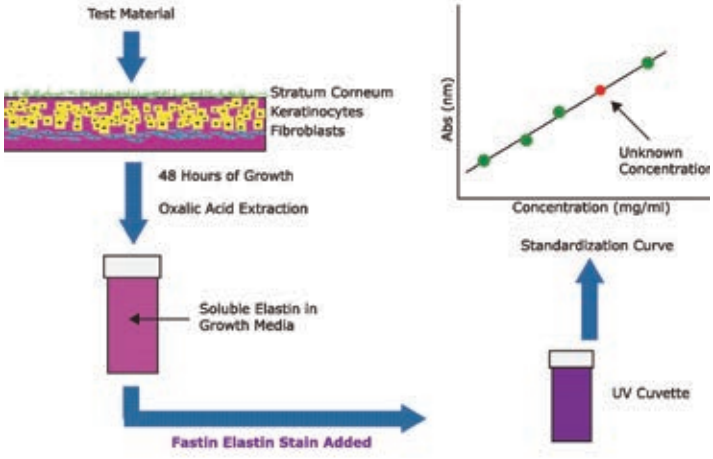

Fig. 1

Testing method for measuring the production of soluble elastin in full thickness human skin tissue models.

Results and Discussion

Production of elastin begins within the growing cells of the dermis and epidermis through the production of soluble elastin precursors known as tropoelastin, Figure 1.13 In order to stimulate the skin to produce more elastin, products must stimulate the production of these soluble elastin precursors. Therefore, testing for the production of soluble elastin precursors was felt to be indicative of the ability of the skin to produce additional insoluble elastin fibers.

Ascorbic acid is known to stimulate the production of elastin in human skin and was chosen as the positive control for this study.[14,15] It was necessary, however, to add additional ascorbic acid after 24 hours of testing as the half-life of ascorbic acid is quite short. Negative controls were untreated tissue. It can be seen below that 0.1% Biodynes™ EMPP indeed stimulates the production of soluble elastin in vitro in full thickness human skin tissue model, Figure 3.

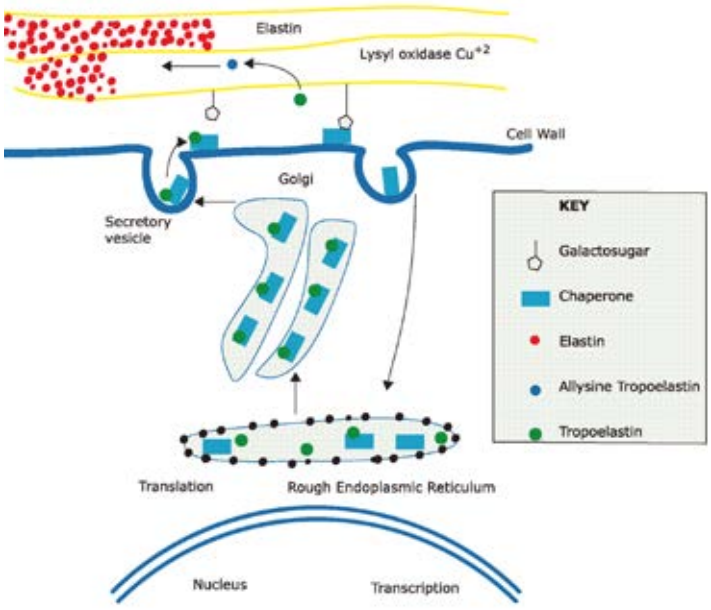

Fig. 2

Biochemical production of elastin in skin (modified from ref 13).

Soluble Elastin Content

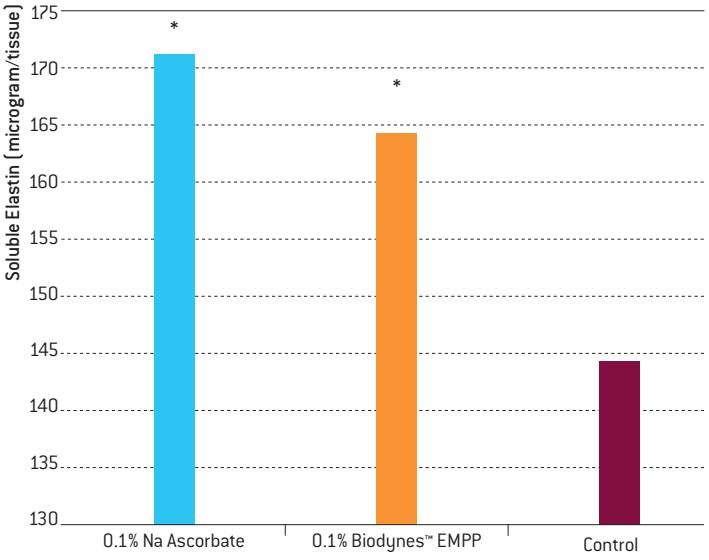

Fig. 3

Production of soluble elastin in MatTek Full Thickness Tissue Models. Data shows control untreated tissue (dark red), ascorbic acid treated tissue (blue) and Biodynes™ EMPP treated tissue (orange).

In Vitro - Stain Testing on Human Fibroblasts

Using the stain testing outlined for the MatTek full thickness tissue, Biodynes™ EMPP was also tested for measuring soluble elastin production in human fibroblasts. The results of the study are shown below in Figure 4.

Fibroblast Elastin Production

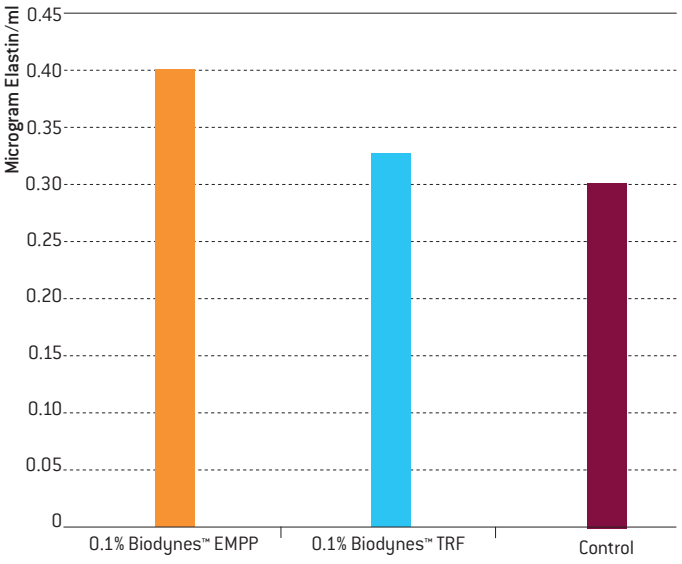

Fig. 4

The average production of soluble elastin in human skin fibroblasts in micrograms/ml of culture media. The results (run in triplicate) include: the control fibroblast cultures that were not treated, fibroblast cells grown in the presence of 0.1 wt% of Biodynes™ TRF™ and fibroblast cells grown in the presence of 0.1 wt% of Biodynes™ EMPP.

Results and Discussion

From the data, it can be seen that the presence of 0.1 wt% of Biodynes™ EMPP can improve the synthesis of soluble elastin in human fibroblasts by nearly 33% over an untreated control. Interestingly, the presence of 0.1 wt% the classic stress shocked yeast lysate, Biodynes™ TRF™, improves elastin production by nearly 10% over the untreated control.

In Vivo – Wrinkle Reduction

The wrinkle reduction properties of Biodynes™ EMPP were evaluated by conducting an *in vivo* study on 10 subjects. Informed participants applied a control serum to the crow's feet on one side of the face and a similar vehicle with 1% of Biodynes™ EMPP on the other. Application was done twice daily for 4 weeks. Quantification of cutaneous relief was done using laser profilometry and skin prints.

This method takes into account the three dimensions of the wrinkles to determine geometric parameters such as complexity (visual impact of wrinkle; related to smoothness of skin, expressed in %), maximum or average depth (mm), and wrinkle volume (mm3). These parameters are not detected on the wrinkle itself, but on its print in siliconed rubber (Silflo™). The determination of the geometric parameters was done on both the wrinkle and microrelief (small depressions at the surface of the epidermis) at each surface point.

Each participant's "print" was taken on both defined zones (crow's feet) at day 0 and at day 28. Parameter measurements were calculated from the prints to determine the differences in each category from the beginning of the study and the end. The 28 day Wrinkle Study results are shown in Figure 4 as the % change in each category comparing the Biodynes™ EMPP formula to the control.

The results from the microrelief study are not discussed in this document, as they were not significant. Based on the previously discussed *in vitro* work achieved on Biodynes™ EMPP, these results could have been anticipated. Biodynes™ EMPP stimulates the formation of newly synthesized elastin, therefore offers a dermic effect that is directly related to wrinkles and not to microrelief.

Laser Profilometry Results

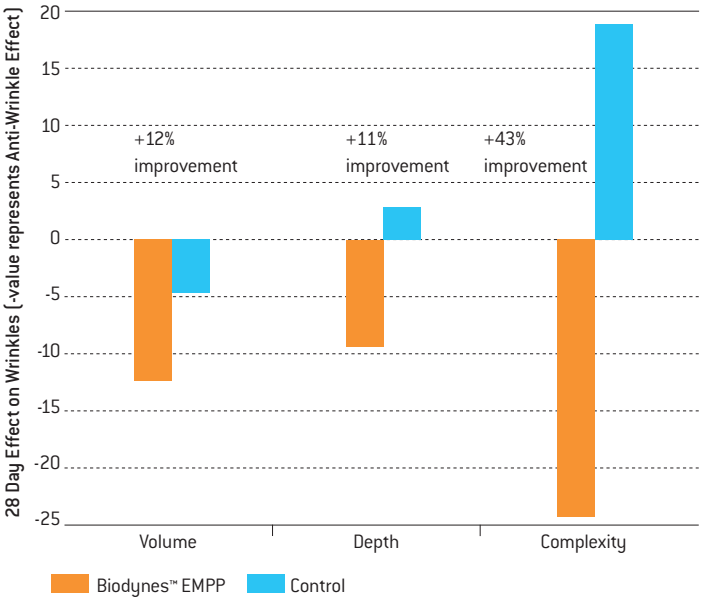

Fig. 5

Laser Profilometry results of the Wrinkle Study. Changes in treated side [1% Biodynes® EMPP] compared to control side from Day 0 to Day 28. The more negative the results, the more the test material provides an anti-wrinkle [wrinkle reduction observed] effect in that category.

From the data shown, it is clearly evident that the test formula containing 1% Biodynes™ EMPP has an anti-wrinkle effect in all parameters. The most statistically significant results were those obtained for wrinkle volume. The eye serum containing 1% Biodynes™ EMPP was more efficient than the vehicle alone, decreasing wrinkle volume by 17%. This is equivalent to a 12% improvement over control, experienced by 78% of the volunteers.

Biodynes™ EMPP demonstrated an average reduction of 8% in wrinkle depth, or an 11% improvement over control. This positive effect was noticeable on 50% of the panelists. 70% of the volunteers experienced an improvement in wrinkle complexity using the Biodynes™ EMPP formulation, by an average reduction of 24%; a 43% improvement over the control.

Improvements in both wrinkle depth and complexity can be attributed to a smoothing effect on the skin, while improvements in wrinkle volume result in a true anti-aging, anti-wrinkle effect.

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Conclusions

Biodynes™ EMPP has been specifically developed by manipulation of the nutritional peptone that the yeast is grown in through addition of specific low molecular weight glycosaminoglycans. Using newly developed *in vitro* testing methods, we have shown that Biodynes™ EMPP stimulates production of soluble elastin. *In vivo* laser profilometry studies confirm that this stressed yeast lysate affords skin smoothing, line minimizing, anti-wrinkle properties. Biodynes™ EMPP has demonstrated that it will effectively improve the visible signs of aging.

Typical Properties	
Appearance	Clear liquid
Color	Matches standard
NVM	12% min
UV	Matches standard
Odor	Characteristic yeast
pH	4.5 - 8.0
Residue on Ignition	7.5% max
Heavy Metals	less than 20 ppm
Arsenic	less than 2 ppm
Microbial Content	500 opg max, No pathogens
Recommended Use Level	0.1 - 1.0%

Toxicological Testing Review	
EpiOcular	Non-Irritating
EpiDerm	Non-Irritating
RIPT	Non-primary irritant, non-primary sensitizer

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