

TOPICAL GELATIN-GLYCINE AND ALPHA-HYDROXY ACIDS FOR PHOTOAGED SKIN

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Synopsis

Skin hydration and well-being are known to depend upon the amount of water in the horny layer. Hydration depends also on the level of NMF_S (Natural Moisturizing Factors), thus on PCA (Pyrrolidone Carboxylic Acid) and on the proper intensity of *perspiratio insensibilis*. This depends in turn on balanced surface lipidic film. So-called photoageing, connected with the amount of UV and light absorbed over a lifetime, causes a decrease in skin hydration and surface lipids and increase of fine wrinkling which results in early ageing and skin xerosis. This work aims to demonstrate the rehydrating and lipid restoring action of different cosmetic emulsions. One hundred smoker women aging 52 to 63 have been investigated. They all frequented solar centers and were clearly affected by xerosis. They were treated with Gelatin-Glycine and Alpha Hydroxy Acids cosmetic emulsions for 120 days. Skin hydration and surface lipids were monitored through the new 3C System computerized equipment (Rome, Italy).

Fine wrinkling was evaluated using a visual analog scale in subject randomly treated on one side by the active cream, the other side serving as control.

Thank to the increase from 36% to 82% in surface lipids and from 31% to 90% in horny layer hydration, and to the decrease of about 17% of fine wrinkling these cosmetic treatments seem adequate for premature skin ageing caused by sun and environmental pollutants.

Riassunto

L'idratazione e lo stato di benessere della cute dipendono, come è noto, dalla quantità di acqua presente a livello del corneo. L'idratazione dipende anche dalla quantità di NMF (fattori Naturali di Idratazione), di PCA (Acido Pirrolidone Carbossilico) e dalla intensità giusta della *perspiratio insensibilis*, legata al film lipidico di superficie.

Il fotoinvecchiamento legato alla quantità di UV e di luce assorbita nell'arco della vita, si accompa-

gnano ad una riduzione dell'idratazione e dei lipidi di superficie ed ad un aumento delle piccole rughe cutanee superficiali. Si instaurano, quindi, invecchiamento e xerosi cutanea. Con questo lavoro si vuole dimostrare l'effetto reidratante e riequilibrante sui lipidi cutanei ottenibile con l'uso di differenti emulsioni cosmetiche. Sono state trattate 100 donne fumatrici di età compresa tra 55 e 63 anni frequentatrici abituali di "centri solari" sicuramente affette da xerosi cutanea. Sono state trattate con emulsioni a base di gelatina-glicina e alfaidrossiacidi per 120 giorni. Sia l'idratazione cutanea che i lipidi di superficie sono stati controllati utilizzando la metodica computerizzata 3C System (Roma, Italia). Le rughe sottili sono state valutate utilizzando una scala visiva analogica in soggetti trattati a doppio cieco su una guancia, mentre l'altra fungeva da controllo. Dato l'incremento, dal 36% all'82%, ottenuto sui lipidi di superficie e dal 31% al 90% dell'idratazione e la riduzione di circa il 17% delle rughe sottili, i cosmetici utilizzati sembrano utili per trattare la pelle precocemente invecchiata a causa del sole e degli inquinanti ambientali.

Skin hydration and well-being are known to depend upon the amount of water in the horny layer. Hydration depends also on the level of NMFs (Natural Moisturizing Factors), thus on PCA (Pyrrolydone Carboxylic Acid) and on the proper intensity of perspiration insensibilis (1-6). This depends in turn on the balanced cutaneous lipids (7-9).

So-called photoaging, connected with the amount of UV and light absorbed over a lifetime, causes a decrease in skin hydration and surface lipids and increase of epidermal keratinization and fine wrinkling which results in early ageing (10-13). Application of appropriate cosmetic emulsions can reverse these signs of ageing providing both symptomatic and objective improvement of this condition (14-17).

Moreover, it is known that Alpha Hydroxy Acids (AHA_s) and their salts seem to be effective in the treatment of xerosis and aged skin (18-21) such as gelatin-glycine seems to be useful in the prevention of premature ageing (22-27).

This double-blind study aims to evaluate the rehydrating action, the lipid skin restoring and the ability to reduce the visual signs of fine wrinkling, of a 8% lactic and glycolic acid (AHA_s) emulsion versus the same 6% gelatin-glycine enriched one. Skin hydration and surface lipids were controlled by the new 3C SYSTEM computerized equipment (28-29).

According to Lever (30) fine wrinkling was evaluated using the visual analog scale in subjects randomly treated on one face side by the active cream, the other side serving as control.

Material and methods

Material

QM[®] Soothing lotion⁽¹⁾

Distilled water, orange flower water, sorbitol, witch hazel extract, dimethicone copolyol, camomile extract, imidazolidinyl urea, lactic acid, glycolic acid, quaternium-15, Gelatin-Glycine, Peg-40 hydrogenated castor oil, fragrance, disodium EDTA.

QM[®]10 Base (control)

Distilled water, caprylic/capric triglyceride, glycerine, cyclomethicone, cetyl-dimethicone copolyol, cetearyl octanoate, isopropyl lanolate, squalane, octyl stearate, sodium chloride, soluble collagen, sodium PCA, tocopheryl acetate, retinyl palmitate, propyl paraben, methyl paraben, BHT, imidazolidinyl urea.

QM[®]10/GG

Base + 6% Gelatin-Glycine (GG)

QM[®]10/AHAs

Base + 8% AHAs (lactic acid, glycolic acid and ammonium lactilate)

QM[®]10/AHAs/GG⁽²⁾

Base + 8% AHAs + 6% Gelatin-Glycine

Methods

Cosmetic Treatments

One hundred smoker women ageing 52 to 63 were selected and enrolled. They all frequented solar centers and were clearly affected by sun-induced alterations classifiable as "smoker's face" (31).

The creams, sufficient for sixteen weeks of treatment, were then dispensed to all the volunteers by means of a randomisation code that balanced the right-left distribution in groups of five.

The Cream Containers were identified only by group letter (A,B,C,D,E) volunteer number and the notation "side to be used on (right or left)".

The volunteers, divided into 5 groups of 20 individuals, received two different creams to use for right and left side.

They were instructed to use the cosmetic products twice daily (morning and evening) on the assigned (right or left) face side for 16 weeks, after using the QM[®] Soothing lotion and abundant water rinsing. All enrolled women had routinely applied emollient creams or lotions, but no one had used creams for at least a week before the start of the study.

⁽¹⁾ Trade name QM10 NUTRIENTE

⁽²⁾ Trade name QM LOZIONE TONICA

The mean values for surface sebum and skin hydration were taken from each subject by carrying out four separate measurements in adjacent areas on the cheeks, as previously described (28). These measurements were taken weekly (monday morning) by the 3C System Dermotech (29), between 8.30 and 11.30 under standardized condition. Fine wrinkling was evaluated in the same areas, as later described.

3C System Dermotech

Surface sebum and skin hydration were measured by the use of the 3C System Dermotech (Roma, Italy) (28-29).

This computerized system permits a simple and quick determination of the quantity of lipids and water at the surface of the skin, while the environmental conditions are automatically standardized (50% RH and 22 C°) by the use of proper correction factors. Obtained results are reported in Figure 1 and 2.

Fine wrinkling evaluation

According to Lever et al. (30) fine wrinkling was clinically evaluated on the cheek area assessing individual signs on a 0-10 visual analog scale.

All the volunteers were treated on one face side

by the study cream, the other serving as control. To determine the possible long-term effects of Hydroxy acid and Gelatin-Glycine treatments, the fine wrinkles were evaluated prior, during and after each week use of various formulations for all the treatment period (16 weeks).

By 8, 12 and 16 weeks the difference between the two sides was highly significant in 4 of the 5 groups controlled. Results are listed in Table I-V

Results and comments

This study demonstrate that photoageing of the skin can be successfully treated with an 8% Alpha-Hydroxy Acid Emulsion, a 6% Gelatin-Glycine emulsion or a more active emulsion containing both the active compounds in the same concentrations.

Moreover, significant differences were found among the four tested formulations in their ability to significantly increase skin hydration and surface lipids and to reduce fine wrinkling. As it is possible to see from; Figures 1-2, components of the vehicles (QM10-base cream) are also active in treating skin photoaging, increasing both moisture (31%) and surface skin lipids

Table I.

RESULTS OF QM10-GG CREAM (GELATIN-GLYCINE) TREATMENT OF FINE WRINKLES OF FACE¹

WEEKS	QM10-GG (active)	QM10 BASE (vehicle)	DIFFERENCE	
0	542	545	-2	
4	498	521	-23 ²⁾	4.4%
8	485	537	-52 ²⁾	9.6%
12	438	508	-70 ³⁾	13.7%
16	414	499	-85 ³⁾	17%

¹⁾ Fine wrinkles on the face in 20 women treated on one side by Gelatin-Glycine cream (QM10-GG) and on the other side by vehicle only, at random. Mean scores (0-10) visual analog scale) X 100

²⁾ p<0.05

³⁾ p<0.001

Table II.

RESULTS OF QM10-AHA_S CREAM (ALPHA-HYDROXY ACIDS) TREATMENT OF FINE WRINKLES OF FACE¹

WEEKS	QM10-AHA _S (active)	QM10 BASE (vehicle)	DIFFERENCE	
0	615	619	-4	
4	581	601	-20 ²⁾	3.3%
8	538	592	-54 ²⁾	9.1%
12	517	586	-69 ²⁾	11.8%
16	492	582	-90 ²⁾	15.5%

¹⁾ Fine wrinkles on the face in 20 women treated on one side by Alpha-Hydroxy Acids cream (QM10-AHAs) and on the other side by vehicle only, at random. Mean scores (0-10) visual analog scale X 100

²⁾ p<0.05

³⁾ p<0.01

Table III.

RESULTS OF QM10-GG CREAM (GELATIN-GLYCINE) VERSUS QM10-AHA_S CREAM TREATMENT OF FINE WRINKLES OF FACE¹

WEEKS	QM10-GG	QM10 AHAs	DIFFERENCE	
0	583	586	-3 ²⁾	
4	565	569	-4 ²⁾	
8	557	557	0	
12	528	529	1 ²⁾	
16	504	500	4 ²⁾	

¹⁾ Fine wrinkles on the face in 20 women treated on one side by Alpha-Hydroxy Acids cream (QM10-AHAs) and on the other side by QM10-GG, at random. Mean scores (0-10) visual analog scale) X 100

²⁾ n.s.

(36%). The difference of mean hydration, surface lipids increase and fine wrinkling for the two Gelatin-Glycine (QM10-GG) and Alpha Hydroxy Acid (QM10-AHA_S) treatments approached significance at week 4 until the last day of treatment (4 months).

Formulation QM10-AHA_S/GG, which contained both GG (Gelatin-Glycine) and AHA_S (Alpha Hydroxy Acid), proved superior to the

other formulation used. In fact, at the completion of the study, the mean hydration and surface lipids increase (expressed as percentage of mean initial dry skin severity) was respectively 80% (moisture) and 63% (surface lipids), in the face treated with formula QM10-GG and QM10-AHA_S compared to 90% (moisture) and 82% (surface lipids) recorded for the face treated with formula QM10-GG/AHA_S containing

Table IV.

RESULTS OF QM10-GG/AHA_S CREAM (GELATINE-GLYCINE + ALPHA-HYDROXY ACIDS) VERSUS QM10-AHA_S CREAM TREATMENT OF FINE WRINKLES OF FACE¹

WEEKS	QM10-GG/AHAs	QM10-AHAs	DIFFERENCE	
0	600	603	-3	
4	567	584	-17 ²⁾	3%
8	501	530	-29 ²⁾	5.5%
12	470	503	-33 ²⁾	6.6%
16	446	485	-39 ²⁾	8%

¹⁾ Fine wrinkles on the face in 20 women treated on one side by Gelatin-Glycine + Alpha-Hydroxy Acids cream (QM10-GG/AHA_S) and on the other side by Alpha-Hydroxy Acids cream (QM10-AHA_S), at random. Mean scores (0-10) visual analog scale X 100

²⁾ p<0.05

Table V.

RESULTS OF QM10-GG/AHAs (GELATIN-GLYCINE + ALPHA-HYDROXY ACIDS) VERSUS QM10-GG CREAM TREATMENT OF FINE WRINKLES OF FACE¹

WEEKS	QM10-GG/AHAs	QM10-GG	DIFFERENCE	
0	569	573	-4	
4	540	565	-25 ²⁾	4.4%
8	486	510	-24 ²⁾	4.7%
12	432	463	-31 ²⁾	6.7%
16	422	459	-37 ²⁾	8%

¹⁾ Fine wrinkles on the face in 20 women treated on one side by Gelatin-Glycine + Alpha-Hydroxy Acids cream (QM10-GG/AHA_S) and on the other side by Gelatin-Glycine cream (QM10-GG), at random. Mean scores (0-10) visual analog scale X 100

²⁾ p<0.05

both the active compounds Gelatin-Glycine and Alpha Hydroxy Acids.

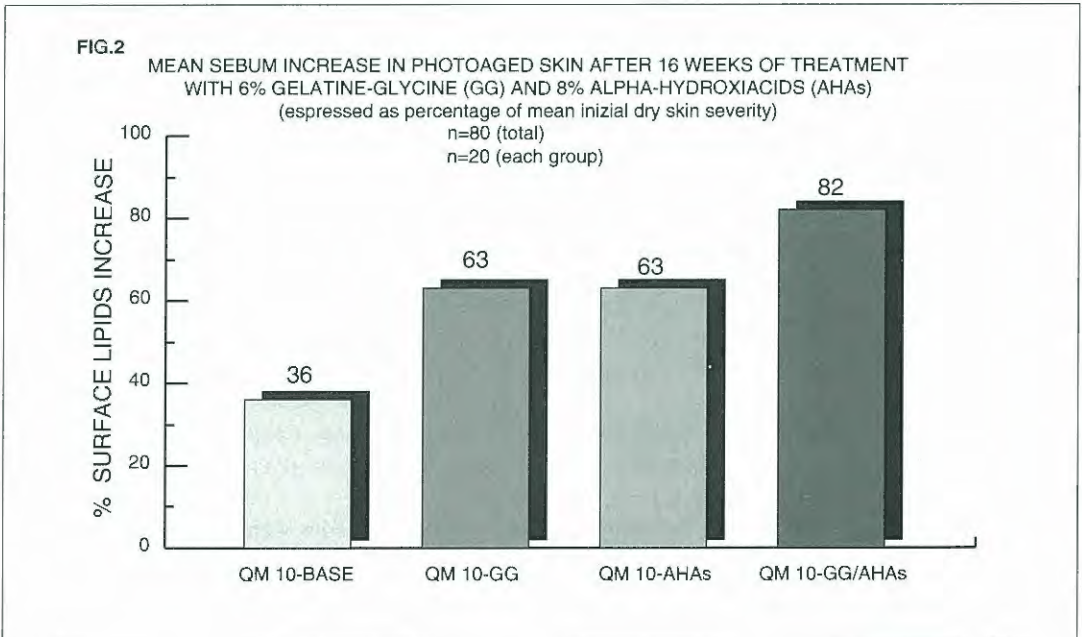
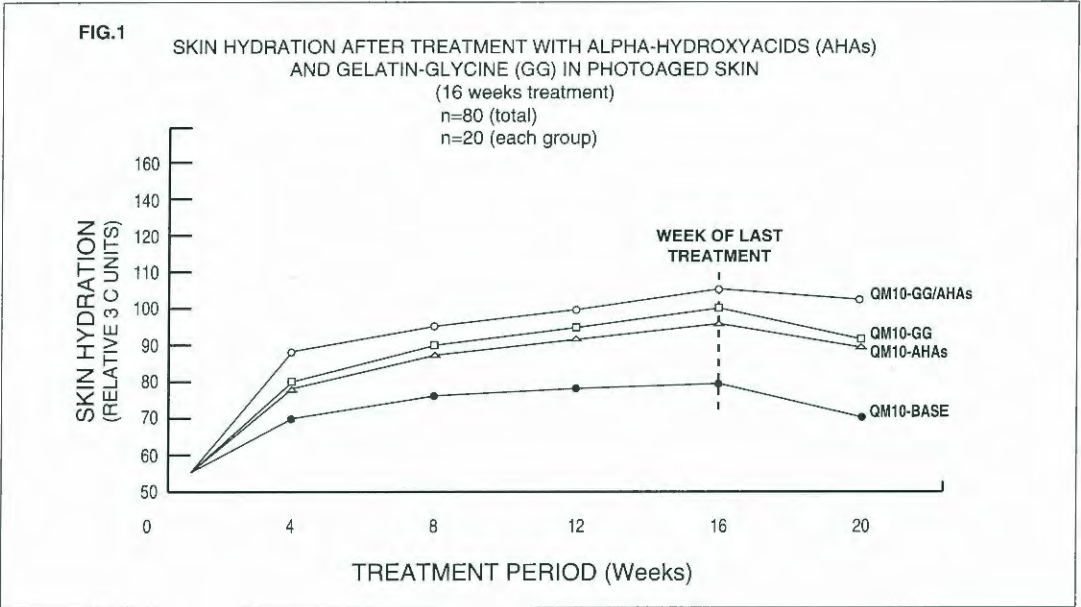
Same interesting results were obtained in the fine wrinkling test. By week 4 to week 16 the differences between the vehicle (QM10-base) and the different active creams were highly significant (p< 0.05).

It was obtained a reduction of fine wrinkles from 5% (p< 0.05) to about 17% (p<0.001) re-

spectively at 4 and 16 weeks for the face treated with formula QM10-GG and formula QM10-AHA_S; and 8% (p< 0.05) further increase with formula QM10-GG/AHA_S.

Thanks to the increase of 82% in surface lipids and 90% in horny layer hydration and thanks also to the obtained decrease of about 17% of fine wrinkling the Gelatin-Glycine and Alpha Hydroxy Acid formulations (QM10-GG/AHA_S)

seem an adequate cosmetic treatment for skin dryness and premature skin aging caused by sun and environmental pollutants.



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