

A PEAT OF PALEOZOIC ORIGIN AS A MULTIFUNCTIONAL INGREDIENT FOR SKIN CARE

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Synopsis

A peat of paleozoic origin was used recently for skin care treatments. This organic peat, having the appearance of a brown blackish mixture, originates from the anaerobic decomposition of plants lived 30.000 years ago. Given its rich composition in minerals, sterols and fatty acids our team decided to test its activity on ageing skin, using it as a face mask.

The test was carried on a group of 30 women aged between 47-62 for a 90 days period. The peat and a comparative vehicle formulation being applied, on randomized basis, to bilateral symmetrical areas of the face. Each subject was used as her own control and the mask was applied 3 times a week, leaving it to act 15 minutes and controlling skin hydration, TEWL, surface lipids, skin firmness, skin hydroperoxides and the depigmentation activity. The obtained result, controlled weekly, has showed an interesting anti-ageing activity of this peat when weekly used as mask treatment. The daily and combined use with a vitamin-C cream has increased the results.

Riassunto

Una torba di origine paleozoica è stata usata recentemente per trattamenti di cura della pelle. Questa torba si presenta come una miscela marrone-nerastra originata dalla decomposizione anaerobica delle piante vissute oltre 30.000 anni fa. Data la sua ricca composizione di minerali, steroli e acidi grassi, la nostra equipè ha deciso di testare la sua attività sulla pelle invecchiata usandola come maschera per il viso.

Il test è stato effettuato su un gruppo di 30 donne di una età compresa fra i 47-62 anni per un periodo di 90 giorni. Una torba sotto forma di maschera e una formulazione di paragone sono state applicate a doppio ceco su aree bilaterali simmetriche del viso.

Ogni soggetto fungeva da controllo di se stesso. La maschera è stata applicata 3 volte alla settimana e lasciata agire per 15 minuti. Settimanalmente è stata controllata l'idratazione, la TEWL, i lipidi di superficie, l'elasticità, gli idroperossidi e l'attività depigmentante. I risultati ottenuti hanno posto in evidenza una interessante attività anti-invecchiamento legata all'uso settimanale di questa nuova torba. I risultati vengono

ulteriormente migliorati dall'uso giornaliero di una crema a base di vitamina-C.

A peat or bio-mud of paleozoic origin was used recently for skin treatments (1-5). This organic bio-

mud, originated from the anaerobic decomposition of plants lived 30,000 years ago, has the appearance of a brown-blackish mixture at pH of 5.1 and a rich content of proteins, aminoacids, sterols free fatty

Table I

CHEMICAL AND PHYSICAL CHARACTERISTICS

pH of centrifuged liquid	5.1
Dry residue at 105°	10,36%
Ashes	14,58% on dry residue
Ammonia on centrifuged liquid	traces
Nitrites on centrifuged liquid	traces
Phosphates on centrifuged liquid	absent
Bisulphides on centrifuged liquid	absent
Chloroformic extract	0.59 on dry residue
Organic nitrogen as per Kjedal	1.85% on dry residue
Proteins and aminoacids (Bradford)	7,35% on dry residue

Table II

CHEMICAL AND PHYSICAL CHARACTERISTICS PEAT MUD ASHES' ANALYSIS

Na ₂ O	1,155	Equal to	Na+	0,85%	(0,37 m eq/g)
K ₂ O	0,24%	Equal to	K+	0,20%	(0,05 m eq/g)
CaO	29,10%	Equal to	Ca ⁺⁺	20,80%	(10,40 m eq/g)
MgO	2,22%	Equal to	Mg ⁺⁺	1,34%	(1,10 m eq/g)
SrO	0,08%	Equal to	Sr ⁺⁺	0,07%	(0,01 m eq/g)
Fe ₂ O ₃	5,04%	Equal to	Fe ⁺⁺⁺	3,53%	(1,89 m eq/g)
MnO	0,10%	Equal to	Mn ⁺⁺	0,08%	(0,03 m eq/g)
Ni ⁺⁺	12 ppm				
Zn ⁺⁺	39 ppm				
Cr ⁺³	2,8 ppm				
Pb ⁺⁺	0,2 ppm				
Cu ⁺⁺	17,0 ppm				
Cd ⁺⁺	Traces				
Li ⁺	Traces				
Al ⁺³	Traces				
As ⁺³	0,60 ppm				
Hg ⁺⁺	0,07 ppm				
Se ⁺⁴	Traces				
Cl ⁻	0,77%				
SO ³	34,70%	Equal to	SO ₄ ⁺	41,70%	(8,68 m eq/g)
P ₂ O ₅	0,02%	Equal to	PO ₄ ³	0,03%	(0,009 m eq/g)
N ₂ O ₅	0,48%	Equal to	NO ₃ ⁻	0,56%	(0,09 m eq/g)
SiO ²	14,00%				

acids and trace elements (Tab. I and II).

AIM

Given these interesting contents the purpose of this study was to test its activity on skin ageing, using this bio-mud as a normal face mask.

MATERIALS AND METHODS

Materials

Bio-mud (mask A): 100% natural brown-blackish organic mixture having characteristics showed in tables I - II.

Control mud (mask B): as control formulation it was used a common clay mask taken from the market.

Vitamin-C - phospholipidic cream : Aqua (water), Cocoglycerides, Lecithin, C12-16 alcohols, Palmitic acid, Olea europaea (unsaponifiable olive oil), Butyrospermum parkii (shea butter), Cyclomethicone, Glycerin, Ethoxydiglycol, Sodium PCA, Glyceryl stearate, PEG-100 stearate, Cetearyl alcohol, Dimethicone, Glycine, Butylmethoxydibenzoyl methane, Citrus aurantium (orange extract), Tocopheryl acetate, PEG-8, Tocopherol, Ascorbyl palmitate, Ascorbic acid, Citric acid, Titanium dioxide, Mica, Xanthan gum, Parfum (fragrance).

Skin toner : Aqua (water), Calendula officinalis, Sorbitol, Hamamelis virginiana, Chamomilla recutita, Glycine, Sodium PCA, Hydrolyzed soy protein, Disodium EDTA, Imidazolidinyl urea, Chlorexidine digluconate, Propylene glycol.

EXPERIMENTAL DESIGN

The study was carried on 30 volunteer women of phototype 3 aged between 47-62 for a 90 days period. All selected volunteers showed clear signs of photoageing on their face such as wrinkles, hyperpigmented spots, dryness and dehydration. 10 other women served as untreated control using cream and toner twice a day.

The mask was applied as a thin layer 3 times a week

for 36 total applications leaving it to act 15 minutes each time. Soon after it was removed and cleansed with a cotton pad soaked always with the same alcoholic skin toner supplied by us. On the wet skin was applied the vitamin-C cream.

A double-blind treatment was performed after teaching patients how to apply the mask A and B in the evening (8 p.m.) at home to the right or left half of the face. The study masks, packaged in identical tube (200 ml) had to be always applied to the same designed skin area (right or left).

This cosmetic treatment lasted 12 weeks between November 1997 and January 1998, and tests were made always by the same researcher at 0, 4, 8 and 12 weeks, always on the day following the last application. During the entire study the researcher checked also that the mask had been regularly applied according to instructions.

During the treatment no other cosmetic products was used except the vitamin-C - phospholipidic cream provided by us. This cream had to be applied all over the face in the morning and in the evening. In this way we had the possibility of controlling skin hydration, surface lipids, skin firmness, skin depigmentation and skin hydroprovides.

Thirty days before starting the study all systemic drugs or dietetics were discontinued.

HYDRATION AND SURFACE SKIN LIPIDS

Quantitative measurements of skin hydration and surface skin lipids were performed according to Cardillo and Morganti methodology (6) before (0) and after 4,8 and 12 weeks of treatments, always in the morning from 10 to 12 on skin cleaned the night before.

This computerized methodology collects up to 10/15 measurements over 25 second sampling period and records the mean value automatically standardizing the environmental conditions, since it is known that rate of water loss and consequently skin hydration is affected by environmental factors. To alleviate the possibility of the patient's

physiologic state, the other major factor influencing rate of water loss, it was asked to rest in the testing room for 30 minutes before measurements. Possible site-to-site variation was eliminated by random selection of treated sites.

Skin hydration was assessed by measuring total capacitance of the horny layer and the values are expressed in 3C arbitrary units; skin lipids, absorbed by a special frosted plastic foil, are measured photometrically and expressed as ($\mu\text{g}/\text{cm}^2$).

The instrument probe was held perpendicular to the skin surface and allowed to equilibrate for 20 seconds. All the obtained results are expressed as mean values of the measurements performed on four different right or left sites (cheek, forehead, chin and nose). The obtained results are reported on fig. 1-2.

SKIN DEPIGMENTATION

According to Duteil and Ortonne (7) the activity of bio-mud was assessed in a light induced skin pigmentation. 4 zones were treated, all located on the middle of the back: two were treated respectively with the bio-mud, and the clay control mask and two were left untreated.

Each product was applied 3 times a week for 12 weeks, leaving it to act 15 minutes. At the end of the 12 weeks, 3 test zones were exposed to UVB-UVA rays with a total of 3 times, the minimal erythema dose distributed progressively over 3 consecutive days. 10 days after last irradiation, the induced photopigmentation was assessed by a chromameter.

Compared with the commercial control treatment the bio-mud proved a slightly preventive depigmenting effect on light-acquired skin pigmentation. (Fig. 3)

SKIN FIRMNESS

Skin firmness was evaluated measuring the skin elasticity by the use of a torsional equipment (8). Torsional equipment acts through a disk glued to the skin, which is rotated by a motor powered by a controlled voltage, thereby loading the peripheral skin with a torque, the value of which can be adjusted

and evaluated.

This test has the purpose to quantitatively assess the skin changes which are usually detectable by palpation but not measurable otherwise.

The obtained results are reported on fig. 4.

MEASUREMENT OF SKIN FREE RADICALS

Skin free radicals were evaluated measuring the concentration of lipid peroxides according to methodology of Pugliese (9).

A glass cylinder measuring 5 cm in diameter was placed on the skin and held snugly, extracting the lipids by two different aliquots of 5 ml portion of acetone. The lipid residue, dried under nitrogen stream, was emulsified with sodium dodecyl sulfate, acetic acid and thiobarbituric acid. The supernatant extracted, read at 531 nm, gave the concentration of lipid peroxides as MDA precursors.

The obtained results are reported on fig. 5.

RESULTS AND COMMENTS

As is shown in figures 1-5 this Bio-Mud proved to have interesting cosmetic properties, that definitely enhance both skin moisture (+ 67%), skin lipids (+55%) and firmness (+ 28%) (Fig. 1, 2, 4).

Moreover, it has been proved an interesting depigmenting activity and it was effectiveness towards free radicals (Fig. 3,5).

We would like to stress that these activities are performed at a certain level also by the vitamin-C cream, when it is used as a base of a daily treatment. However, they are clearly strengthened by the specific use of the bio-mud.

Indeed, when this bio-mud is replaced by a common mud, these properties are practically nonexistent. Moreover the only revealed efficacy is, in our opinion, due to the activity of the vitamin-C cream.

Therefore we can deduce that the vitamin-C cream has a remarkable activity on free radicals, surface lipids and skin moisture. It is capable of rebalancing ageing skin bringing back skin values to normality.

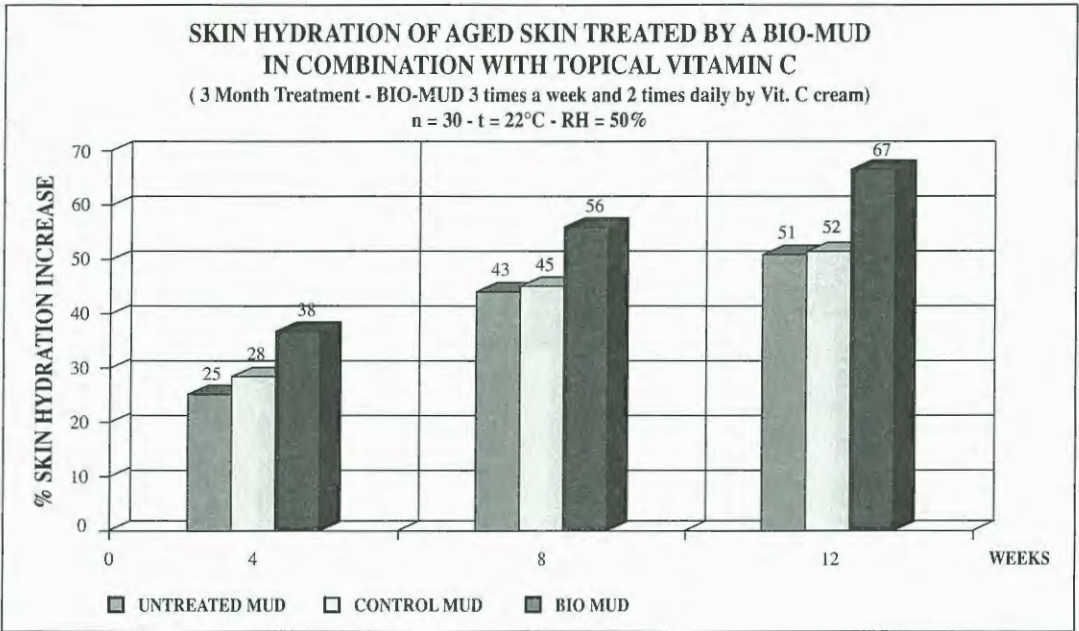


Fig. 1. All p values are highly significant ($p < 0.005$) as baseline values and as to groups. Untreated Mud versus Control Mud NOT-Significant.

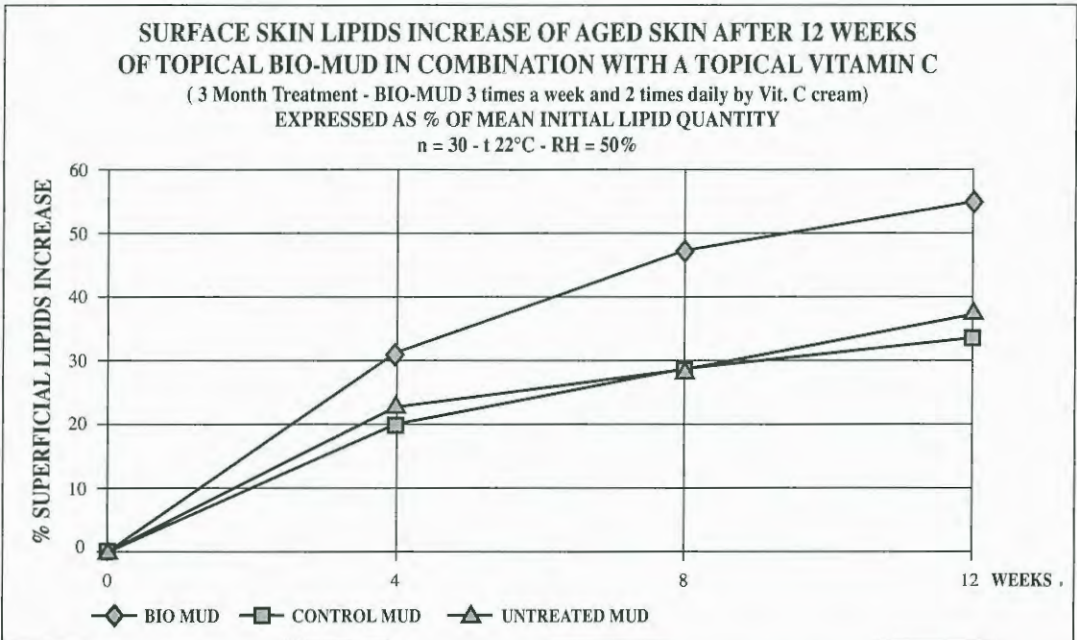


Fig. 2. All p values are highly significant ($p < 0.005$) as baseline values and as to groups. Untreated Mud versus Control Mud NOT-Significant.

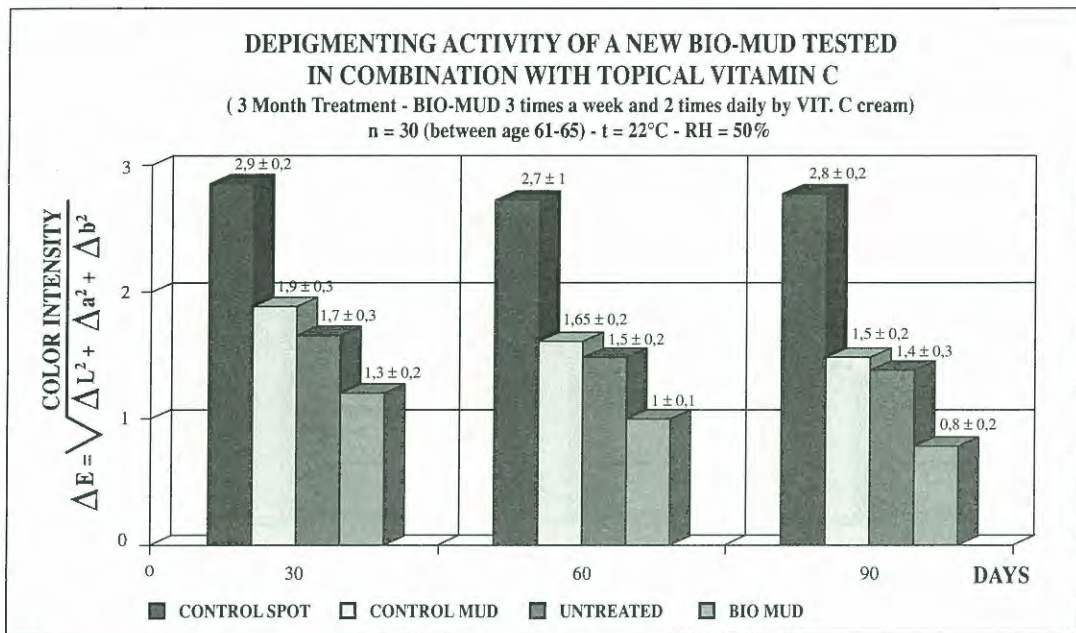


Fig. 3. All p values are highly significant (p < 0.005) as baseline values and as to groups. Untreated Mud versus Control Mud NOT-Significant.

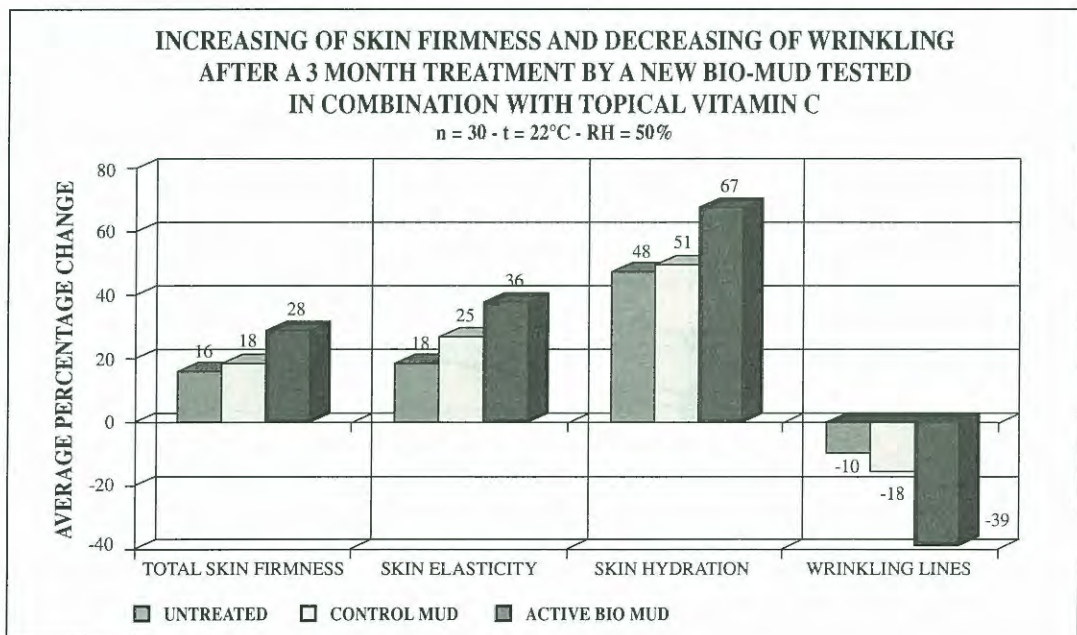


Fig. 4. All p values are highly significant (p < 0.005) as baseline values and as to groups. Untreated Mud versus Control Mud NOT-Significant.

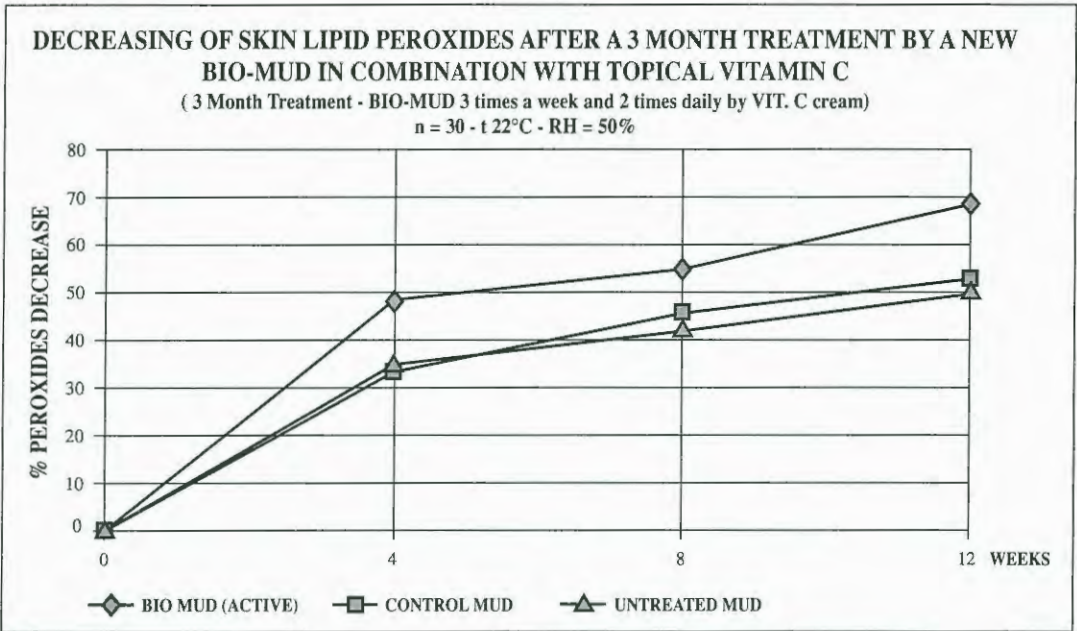


Fig. 5. All *p* values are highly significant ($p < 0.005$) as baseline values and as to groups. Untreated Mud versus Control Mud NOT-Significant.

On the other hand, Bio-Mud clearly enhances its qualities.

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