THE COSMETIC USE OF AN ANCIENT PEAT OF THERMAL ORIGIN

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Received: April 2000.

Key words: Natural peat, Peloid, Clay, Mud, Face Mask, Skin Hydration, Skin Elasticity, Skin Surface lipid, Vitamin C.

Summary

Used in ancient times, clays and natural peats, but mostly vegetal origin peats, are still used today in therapeutic treatments of real pathologies as well as for simple cutaneous alterations, depending on their qualitative/quantitative mineralization and composition.

For these reasons, we wanted to control the activity performed by a thermal bio-peloid of natural origin, of dark aspect, and vegetal derivation (over 90%), particularly rich in proteins, sterols, trace-elements, lipids, that we previously valued carefully for its peculiar characteristics.

The study, a double blind treatment, was carried out for a two month period, on 60 healthy volunteers (32 women and 28 men, range age 32-45) with a minimum xerosis severity of grade 6, according to the grading scale of Dahl and Dahl.

The mask was applied on skin and/or on hair as a thin layer 3 times a week for 24 total applications leaving it to act 15 minutes.

Soon after, it was removed and cleaned with a cotton pad soaked always with the same bath oil supplied (Keratotal Bath oil) and abundant water rinsing. Then, on the treated skin of face and legs was only applied a vitamin C phospholipidic cream (Kera C).

It was controlled skin hydration, surface lipids and skin firmness by 3C System, and hair resistance to traction by the Instron Tenside Tester®; hair elasticity, comb-ability and shininess was evaluated by the users.

After the two month treatment, the hydration both of skin face and legs increased of 24% (p<0.01) and lipids of about 22% (p<0.05).

Also the skin elasticity had a light improvement because of the vitamin C based cream, but in this case, the mask did not cause any improvement.

From these first results, we can say that the set up of natural or thermal “cosmeceuticals” is possible only if using adapt raw materials in those percentages allowing them to perform the cosmetic activity required.

Riassunto

I fanghi di origine minerale o vegetale usati fin dall’antichità, costituiscono ancora oggi un trattamento terapeutico per molte patologie e anche gravi in rapporto al loro grado di mineralizzazione...
quali-quantitativa.
Per questi motivi si è voluto controllare l’attività svolta da un bio-pelioide di origine naturale, di aspetto scuro e di origine vegetale (90%), particolarmente ricco di proteine, steroli, elementi traccia, e lipidi di cui erano già state verificate le caratteristiche chimico-fisiche.
Lo studio a doppio cecò è stato condotto per un periodo di due mesi su 60 volontari (32 donne e 28 uomini, di età compresa tra 32 e 45 anni) affetti da una leggera xerosi di grado 6 secondo la scala di Dahl e Dahl.
La maschera è stata applicata sulla cute e/o sui capelli in leggero strato 3 volte a settimana per 15 minuti per un totale di 24 applicazioni. Subito dopo è stata rimossa e l’area trattata è stata deteresa con del cotone imbito sempre con lo stesso olio (Keratotal Bath Oil) e con abbondante acqua. Sulla cute del viso e delle gambe trattate è stata applicata una crema fosfolipidica a base di vitamina C (Kera C).
E’ stata quindi controllata l’idratazione cutanea, i lipidi di superficie e la consistenza della cute mediante l’utilizzo del 3C System.
La resistenza del capello è stata controllata mediante l’Instron Tensile Tester®, mentre la pettinabilità, la lucentezza e l’aspetto generale sono state controllate direttamente dagli stessi volontari.
Dopo due mesi di trattamento, si è notato che mentre l’idratazione ed i lipidi di superficie aumentavano rispettivamente del 24% (p<0,01) e del 22% (p<0,05) sia sul viso che sulle gambe, l’elasticità cutanea veniva incrementata soltanto dall’uso della crema, mentre non aveva effetto la maschera.
Dai risultati raggiunti, si può affermare che i cosmetici di origine termale, svolgono una loro specifica attività soltanto se si utilizzano materie prime adatte e nella percentuale richiesta da un trattamento cosmetico.
INTRODUCTION

Used in ancient times, clays and natural peats, but mostly vegetal origin peats, are still used today in therapeutic treatments of real pathologies as well as for simple cutaneous alterations, depending on their qualitative/quantitative mineralization and composition (1-7).

Basically natural peats, which are special peoids of vegetal origin, consist of the following three matrices:

- a solid inorganic one: clay and mineral salts
- a liquid one: mineral water
- a solid, organic one: bacteria, diatoms protozoa, arthropods, etc.

All the above mentioned matrices have a heterogeneous and multiphasic nature: the diluted component, be it inorganic or organic, may be of a varied nature, while the diluting component, vs water, may be differently organized, depending on its capacity to interact with the solid components and the presence or absence of bioactive compounds (8). Important to remember is that the organic matrix usually prevails in a natural peat or biopeloid (Biomud) and its final composition substantially changes. These changes depend on the locations from which water originates, on the peat maturation time, on the type of vegetable the peat originates from, and on the geological and morphological conditions under which it formed.

For all the mentioned reasons, we wanted to control the activity performed by a thermal biopeloid of natural origin (Tab.I and II), of dark aspect (fig.1) and vegetal derivation (over 90%), particularly rich in proteins, sterols (Tab III), trace-elements (tab IV), lipids, (Tab.V), that we previously valued carefully for its peculiar characteristics (8-14).

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>INORGANIC COMPOUNDS (mineral)</td>
</tr>
<tr>
<td>Common mud</td>
</tr>
<tr>
<td>Synonyms: lutos, mire, slime, etc.</td>
</tr>
<tr>
<td>It is used for medical treatments.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORGANIC COMPOUNDS (vegetable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVE</td>
</tr>
<tr>
<td>Common peoids</td>
</tr>
<tr>
<td>Compounds and decomposition of prevalently vegetable organic substances.</td>
</tr>
</tbody>
</table>

**General Characteristics of a 3000 years old Biopeloid**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH of centrifuged liquid</td>
<td>5.1</td>
</tr>
<tr>
<td>Dry residue at 105°C</td>
<td>10.36%</td>
</tr>
<tr>
<td>Ashes</td>
<td>14.40% on dry residue</td>
</tr>
<tr>
<td>Ammonia on centrifuged liquid</td>
<td>traces</td>
</tr>
<tr>
<td>Nitrates on centrifuged liquid</td>
<td>traces</td>
</tr>
<tr>
<td>Phosphates on centrifuged liquid</td>
<td>absent</td>
</tr>
<tr>
<td>Bisulfides on centrifuged liquid</td>
<td>absent</td>
</tr>
<tr>
<td>Chlorofom extract</td>
<td>0.59% on dry residue</td>
</tr>
<tr>
<td>Organic nitrogen as per Kjeland</td>
<td>1.85 on dry residue</td>
</tr>
<tr>
<td>Proteins and aminoacids (Bradford)</td>
<td>7.32% on dry residue</td>
</tr>
</tbody>
</table>

**AIMS**

The aim of this study was to verify the efficacy of the bio-mud used as:

1. Active principle of a shampoo studied for dry and weakened hair (product A)
2 - a purifying body mask (product B)
3 - an hydrating mask (product C)
4 - and a nourishing one (product D)

**MATERIALS AND METHODS**

Put in uncovered tanks in contact with the open air, this mud is mellowed with a selected mineral water for a period of six months. After that period, mud stores the biological characteristic of the mineral water used to mellow it.

**SHAMPOO A:**
Sodium laureth sulfate/decyl glucoside based shampoo in peat water bio-mud (product A active)

**SHAMPOO A1:**
Sodium laureth sulfate/decyl glucoside based shampoo in water (product A1 - control)

**BODY PURIFYING MASK B:**
W/O emulsion + 10% biomud (product B - active)

**BODY PURIFYING MASK B1:**
W/O emulsion + 10% clay (product B1 - control)

**HYDRATING MASK C:**
O/W emulsion + 10% biomud (product C - active)

**HYDRATING MASK C1:**
O/W emulsion + 10% clay (product C1 - control)

**NOURISHING MASK D:**
W/O emulsion + 10% biomud (product D - active)

**NOURISHING MASK D1:**
W/O emulsion + 10% clay (product D1 - control)
EXPERIMENTAL DESIGN

The study, a double blind treatment, was carried out for a two month period, on 60 healthy volunteers (32 women and 28 men, range age 32-45) with a minimum xerosis severity of grade 6, according to the grading scale of Dahl and Dahl (15):

- 0 Normal skin: no sign of dryness.
- 1-3 mild xerosis: ashy appearance and appearance of minute skin flakes
- 4-6 moderate xerosis: defined scaling
- 7-8 severe xerosis: heavy scaling and deep erythematous fissures, included eczema craquè

All volunteers were instructed to apply the cosmetic products on the randomly assigned (right or left) skin face and lower legs area (lateral, medial and petibial) right or left for an 8 weeks period.

MASK TREATMENT

The mask was applied on skin and/or on hair as a thin layer 3 times a week for 24 total applications leaving it to act 15 minutes.

Soon after, it was removed and cleaned with a cotton pad soaked always with the same bath oil supplied (Keratotal Bath oil) and abundant water rinsing. Then, on the skin of face and legs was only applied a Vitamin C phospholipidic cream (Kera C).

The double-blind treatment was performed after teaching volunteers how to apply the mask C and C1 in the morning or the mask D or D1 in the evening (8 p.m.) at home to the right or left half of the face, together with the mask B or B1 to the right or the left leg.

This way, all the 60 volunteers used the Hydrating mask C and C1, and the Nourishing mask D e D1. All the 60 volunteers used for their legs purifying mask B and B1. At time 0 (starting) and at 1st, 2,3,4, 5,6,7, and 8th week of treatment, always on the day following the last application, it was controlled skin hydration, surface skin-lipids and pH by the 3C System Methodology (16), and skin elasticity using a torsional equipment (17). During the whole study, the researcher checked also that the mask were regularly applied according to instructions, and that no other cosmetic product was used, except the vitamin C phospholipidic cream and the mask applied. Thirty days before starting, all systemic drugs or diet supplements were discontinued.

SKIN HYDRATION, pH AND SURFACE LIPIDS MEASUREMENTS

pH, quantitative measurements of skin hydration and surface skin lipids were performed by the 3C System methodology (16), always in the morning from 8 to 11 a.m. on skin cleaned the night before.

This computerized method 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 conditions.

To alleviate the possibility of the volunteers’ 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 photo-metrically and expres-
The cosmetic use on ancient peat of thermal origin

sed as mg/cm².

All the obtained results are expressed as mean values of the measurements performed on four different right or left sites of the face (cheek, forehead, chin and nose) and/or the legs.

The obtained results are reported on figures 2-7.
SKIN FIRMNESS

Skin firmness was evaluated measuring the skin elasticity using a torsional equipment (17). Torsional equipment works 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 purposed to quantitatively assess the skin changes, which are usually detectable by palpation but not measurable otherwise.

The obtained results are reported on Figure 8.

HAIR TREATMENT

Shampoo A or A1 was given in double-blind to all the participants at the experimentation, so that 30 of them used Shampoo Active 1, and the other 30 Control shampoo A1. Hair washing was effectuated every day for all the treatment period (60 days).

On the same days of the skin controls, it was measured hair resistance to traction, the relative electric charges and combability using l'INSTRON® Tensile Tester, by which it’s possible to highlight the hair elasticity variation before and after proper cosmetic treatments.

A specific sensor, linked to an automatic combing system can record the electrostatic charges caused by combing and the eventual anti-static effect given by the product.

Elasticity, combability, shyness, extricability, manageability to the treatment were evaluated directly by the products users, who, before starting the treatment, filled a form using an arbitrary scores scale.

The obtained results are reported on Figure 9 and 10.

![Skin Elasticity after a Two-Month Topical Treatment by a Bional and a Vitamin C cream](image1)

![Electrostatic Change Decrease of the Hair after a Two-Month Daily Shampooing by a Bional Shampoo](image2)
STATISTICAL ANALYSIS

The obtained results are recorded on disks using a micro-calculator TRS 80 (C PU-1284) furnished of two drive disks and an analysis system Advanced Statistical Analysis (ASA) reported on the Radio Schach software (19).

RESULTS AND COMMENTS

As it can be seen from the obtained results (fig. 2-10), the Biomud used shows to have characteristics that make it very useful as raw material of polyvalent cosmetic use.

In fact, adding a high percentage of this peat to the different formulations improves remarkably the cosmetic efficiency characteristics of the studied cosmetic formulations.

Concerning its usage as facial mask, it has to be underlined how the positive activity it performs, both on the hydration and on the surface lipids, it's evident since the first week of treatment. The hydration on skin face and legs, in fact, increases of about 24% (p<0.01) (fig. 3 and 4) and the lipids of about 22% (p<0.05) (fig. 2 and 5) till reaching respectively positive values of about 95 and 70% after 8 weeks of treatment.

The vitamin C based cream used had a remarkable positive activity towards dry and dehydrated skin of the group studied, activity strengthened when in addition to the twice daily creams application are used the active masks enriched with the peloid (Bio-Mud). We obtained similar results for the legs treatment, with a notable decrease in xerosis found at the beginning of the study and an improving in hydration and surface lipids (Fig.4 and 5). In this case also the vitamin C based cream used performed a better activity, but the contemporaneous usage of the mask gave an increasing of the two parameters controlled.

Concerning the pH, at facial and legs skin level, we did not note any substantial change. pH was acid at the beginning of the study and remained the same during the whole period of observation both at face and legs level (fig.6 and 7). Also the elasticity of the skin legs had a light improving because of the vitamin C based cream (Fig.8), but in this case the mask did not cause any improving.

With regards to the activity performed by the peloid included in the hair shampoo, the results were satisfactory. Observing figures 9 and 10 it's possible to see how the shampoo is able to reduce notably the electrostatic charges improving also hair combability and shyness.

From these first results, we can say that the set up of natural or thermal "cosmeceuticals" is possible only if using adapt raw materials in those percentages allowing them to perform the cosmetic activity required.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge for the technical and financial support of this study given by Dermotech S.r.l. and Mavi Sud S.r.l for the test samples given.
References

5. S. Brenner (1998), Balneo-therapy and climato-therapy at the dead sea, Joint Meeting 5th European Congress on Psoriasis and 7th International Psoriasis Symposium, Milan, Italy, Sept 2-5, p.23.
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