

INTENSE MOISTURISING / "SECOND SKIN" EFFECT

Water is a vital element for the skin. It contributes to the suppleness, comfort and quality of the skin and can slow down the ageing process. Exposed to numerous aggressive factors on a daily basis, the skin dries out resulting in premature ageing.

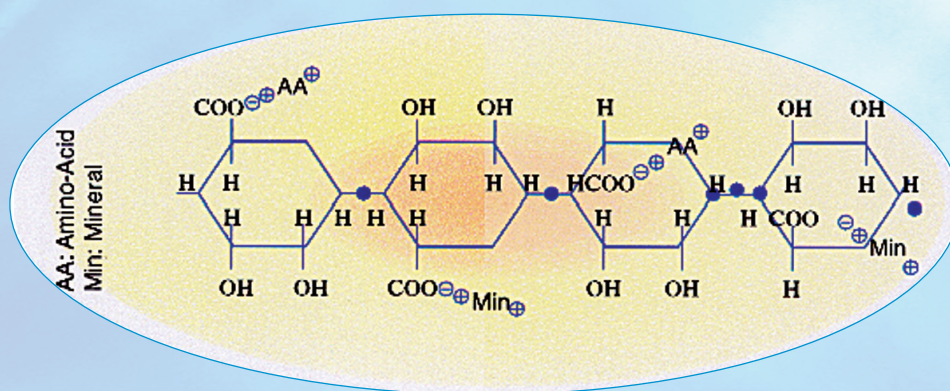
Moisturing the skin therefore involves:

- Providing the epidermis with hydrophilic substances, as NMFs (Natural Moisturising Factors), capable of binding water to the cell interior. The NMFs are mainly composed of amino acids (40%) and sea minerals (19%), to which urocanic acid, pyrrolidone carboxylic

acid and urea are added. It is this hydrophilic composition, rich in amino acids and sea minerals, which makes it possible to trap water in the *stratum corneum* and thus to limit the phenomenon of dehydration.

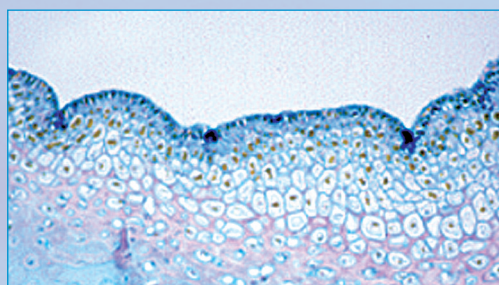
- Keeping the skin's hydrolipid film in a good condition.

CODIF Recherche & Nature has, therefore, developed an original molecule: **PHEOHYDRANE**.

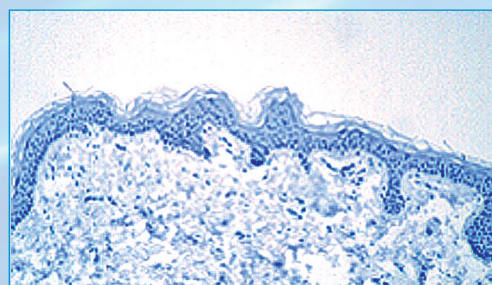


PHEOHYDRANE is obtained by biotechnology from the membrane polysaccharide of brown algae combined with amino acids extracted from the microalgae, *Chlorella vulgaris*, and minerals obtained from sea water.

Brown algae is found at low tide and is therefore subject to intense drying out (effect of the sun and the wind). To afford protection against this form of aggression, brown algae has a "protective skin", which is remarkably similar to human skin from a structural point of view.



Algae skin



Human skin

From this skin, CODIF has extracted and purified the Polysaccharide, which, by virtue of its hydroxyl functions, will act as a moistening agent. The elements that are complexed to the oligoalginates can be distributed to the epidermis and can restructure endogenous NMF elements.

PHEOHYDRANE is a complete moisturising active substance:

- 1- The elements complexed to the polysaccharide are NMF elements. Thanks to their strong hygroscopic potential, they have a **restructuring effect on the hydrolipid film** and the skin barrier, thus preventing dehydration phenomena,
- 2- It allows the **active binding of water** to various layers of the epidermis,
- 3- It has an **intense, residual effect** on the skin's water reserves.

Clinical tests

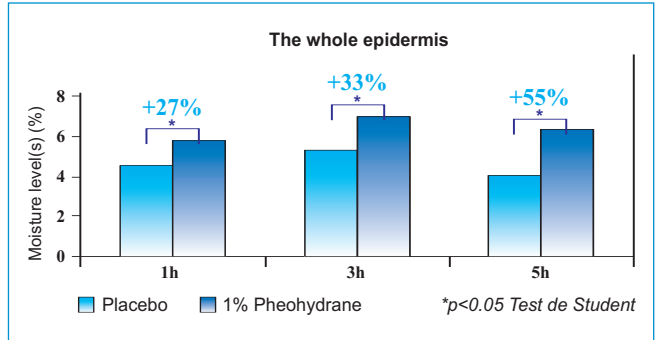
Experimental conditions of two clinical tests:

- Number of volunteers: 15,
- Between 20 and 59 years of age (average age: 42 years),
- Placebo: cream only,
- Test product: cream containing 1% **PHEOHYDRANE**,
- Method employed: Measurement of Transient Thermal Transfer (TTT)

Clinical test

Immediate moisturising effect

The effect was recorded in the various layers of the epidermis on the forearm, on 2 treated areas (one treated with the placebo and the other with the product) after standardised application (measurements taken at t1h, t3h and t5h).

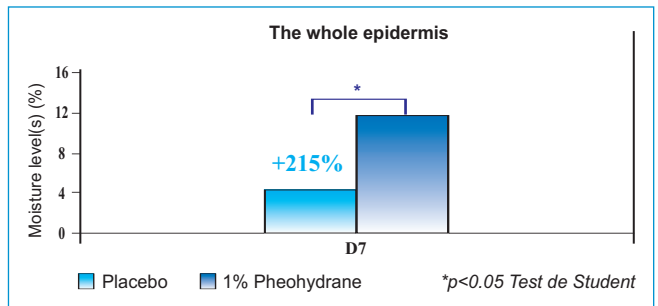


1% **PHEOHYDRANE** triggers a statistically significant increase ($p < 0.05$) in moisture levels in the various layers of the epidermis compared with the placebo (cream only).

Clinical test

Cumulative effect

The effect was measured in various layers of the epidermis, on the forearm, on 2 treated areas (one treated with the placebo and the other with the product) after applying twice a day for 7 days.

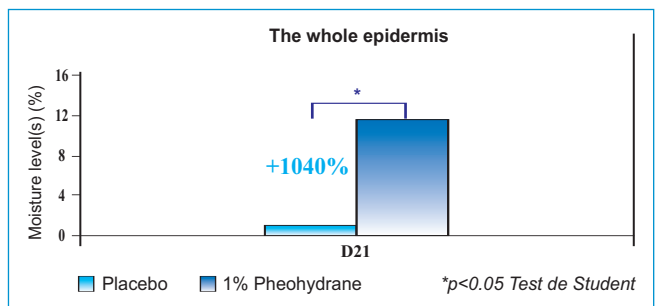


1% **PHEOHYDRANE** triggers a significant increase ($p < 0.05$) in moisture levels in all layers of the epidermis. After applying twice a day for 7 days, moisture levels increased by 215% but remained unchanged with the placebo.

Clinical test

Long-term moisturising effect

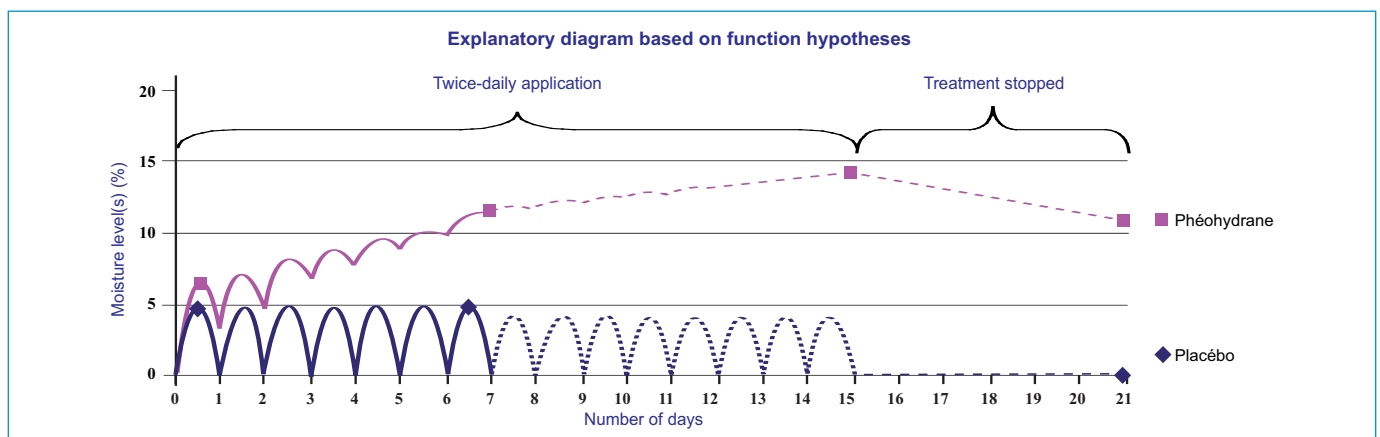
The volunteers continued treatment up until the 15th day and then stopped for one week. New measures were taken on D21 to investigate the residual effect of the product.



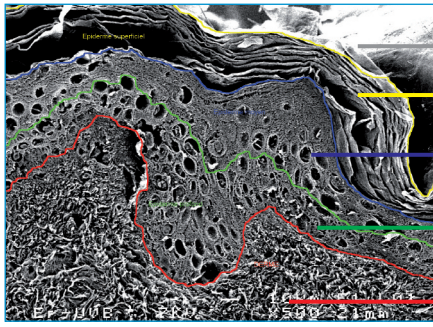
7 days after treatment was stopped, a persistent moisturising effect was observed, thus highlighting the incredible residual effect of the product thanks to **PHEOHYDRANE**.

PHEOHYDRANE is a complete moisturising active substance:

- **Immediate effect**
-> Immediate binding of the water in the *stratum corneum*
- **Cumulative effect**
-> Increase in moisture levels of the epidermis, which increase day by day each time the product is applied
- **Persistent effect**
-> Restructuring effect on the epidermis with a visible, long-term effect.



Comparison between PHEOHYDRANE and standard moisturising active substances



Stratum corneum (measured by corneometry)

Surface epidermis

Middle epidermis

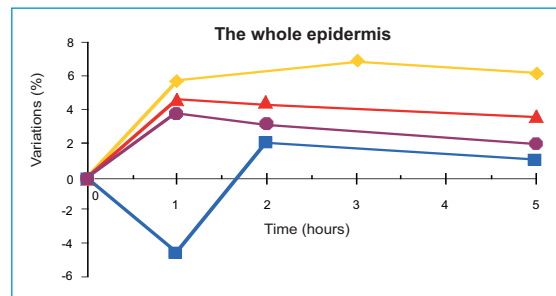
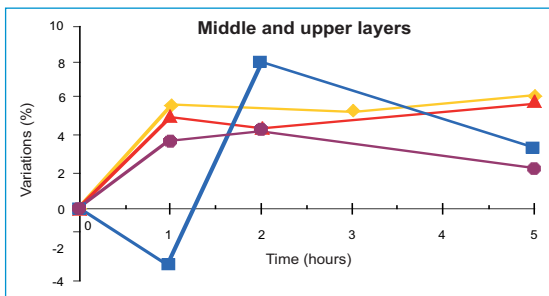
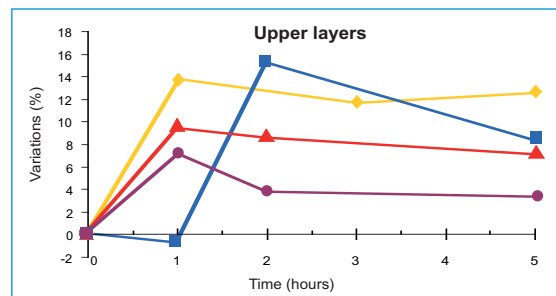
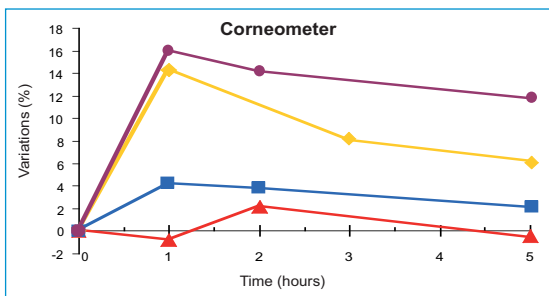
Deep epidermis

Dermis

Measured using the TTT method

The Transient Thermal Transfer (TTT) method is carried out thanks to Hydrascan, which is a micro-effusimeter. It offers the specific feature of measuring moisture levels at three depths in the epidermis: upper layer / middle and upper layer / the whole epidermis.

The outermost layers of the epidermis are the driest layers of skin. They therefore have an extensive water absorption capacity. Hydrascan, can explore the deeper, less dry layers of the epidermis.



Hyaluronic acid

Urea

Glycerine

Pheohydrane

	ADVANTAGES	DISADVANTAGES
Hyaluronic acid 0.05% gel	Immediate moisturising effect (from the first 2 hours onwards)	No long-term effect
Urea 5% solution	Effective, long-term moisturising	No moisturising of the <i>stratum corneum</i> => lack of comfort
Glycerine 5% gel	Moisturising of the <i>stratum corneum</i> => comfort	No penetration in the upper and middle layers of the epidermis Moisturising virtually non-existent in the deep layers of the epidermis

PHEOHYDRANE moisturises all the layers of the epidermis. Immediate and effective, long-term, moisturising effect.

• Hydrascan – Corneometer

The corneometer measures moisture levels in the outermost layers of the epidermis, which are consequently the driest and therefore have a considerable water absorption capacity. This explains why the data expressed as a percentage using this method are higher than with Hydrascan.

• Pheohydrane – Hyaluronic acid

In the presence of **PHEOHYDRANE**, varying moisture levels are obtained, which, overall, are as high as those obtained with hyaluronic acid, but which last over time.

• Pheohydrane – Urea

The results show a greater variation in moisture levels from the first hour onwards following the application of **PHEOHYDRANE** compared with Urea, regardless of the part of the epidermis in question.

• Pheohydrane – Glycerine

Regardless of the part of the epidermis considered, the variation in moisture levels with **PHEOHYDRANE** is greater than the values obtained with Glycerine.

Affinities of PHEOHYDRANE for the skin and hair

Given its cationic structure, **PHEOHYDRANE** has a strong affinity for the skin and hair. This allows the minerals and amino acids to remain on the surface of the skin or hair for longer without being

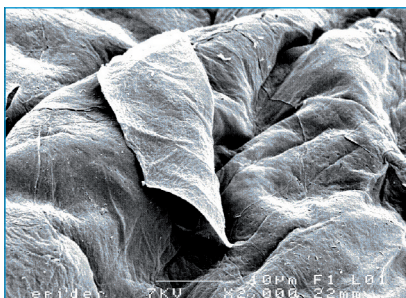
removed too quickly by rinsing. **PHEOHYDRANE** is like an “invisible patch” allowing the slow and lasting release of NMFs.

Affinity of PHEOHYDRANE for the skin: “second skin” effect

An aqueous solution of **PHEOHYDRANE** was applied to the surface of a fragment of human skin and then rinsed with water.

Slides obtained with sweeping electron microscopy:

Untreated skin



Treated, rinsed skin



PHEOHYDRANE causes a meshwork to appear on the surface of the skin, which resists water and has a dual action:

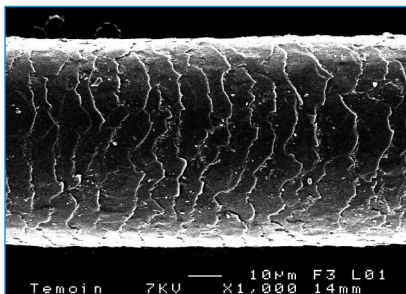
- the gradual re-release of amino acids and minerals on our skin throughout the day, and,
- a moistening role thanks to its hydroxyl functions, which act like a “sponge saturated with water”.

The skin is thus protected against drying out. This active substance is perfectly suited to the formulation of rinsed products.

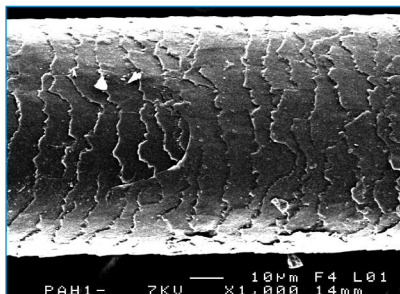
Affinity of PHEOHYDRANE for the hair

Slides obtained with sweeping electron microscopy (SEM):

Untreated hair



Treated hair



The slides highlight the presence of the product on the surface of the hair. On the hair, **PHEOHYDRANE** forms a very fine sheath, which protects the hair from drying out. In covering the hair, **PHEOHYDRANE** can also condition it.

-> **PHEOHYDRANE** has a conditioning effect upon the hair, thus lending volume to hairstyles. The hair is also less brittle.

Put an end to dry, brittle hair thanks to **PHEOHYDRANE!**

INCIUSA	INCEUROPE	N° CAS	N° EINECS
Water	Aqua	7732-18-5	231-791-2
Hydrolyzed algin	Hydrolyzed algin	73049-73-7	/
Chlorella vulgaris extract	Chlorella vulgaris extract	91079-57-1	293-445-7
Sea water	Maris aqua	/	/

2 versions of this active substance are available:

- **PHEOHYDRANE P (ALG009)**: Phenoxyethanol (~1%)
- **PHEOHYDRANE (ALG233)**: Phenoxyethanol / Chlorophenesine / Methylparaben (2.09 – 2.84%)