

BoroHyal



- Free radical scavenger
- Inhibition of cellular senescence & Activation of the anti-aging metabolism
- Stimulation of hyaluronic acid neo synthesis

A global approach to anti-aging

BoroHyal: A global approach to anti-aging

Skin aging is a complex biological process influenced by combination of endogenous or intrinsic (genetics, cellular metabolism, hormone and metabolic processes) and exogenous or extrinsic (chronic light exposure, pollution, chemicals, toxins) factors.

1. The epidermis, the first line of defense of the skin against external aggressions, is continually subjected to the action of free radicals which constitute one of the main causes of skin aging. UV radiations generate free radicals that will alter the skin cell membranes cells and degrade the structural proteins of the epidermis and dermis (Trouba et al., 2002). These radical attacks will also be able to interact with the cellular genetic material, resulting in an impoverishment of the quality of neo-formed cells within the skin tissue during its renewal. BOROHyal helps to fight the radical attacks daily suffered by the skin tissue. The surface of the skin is effectively protected
2. During skin aging process, cells lose their efficiency. Their metabolism is modified and some harmful enzymes could be activated to the detriment of other enzymes more useful. This is the case of β -Galactosidase, a degradation enzyme. This enzyme is characteristic of cellular senescence and is now recognized as a biological marker of cellular senescence. By inhibiting cell senescence BoroHyal helps other cells to be ultra-functional, maintaining and extending their « youth ».
3. Hyaluronic acid is a major components of the cutaneous extracellular matrix involved in tissue repair. As a physical background material, it has functions in space filling, lubrication, shock absorption, and protein exclusion. Hyaluronic acid neo-synthesis promotes skin rejuvenation by increasing both hydration and fibroblast activation.

Composition



Lamellar biomineral : montmorillonite

Thanks to its structure, it allows to encapsulate the active ingredient, protect it and release it progressively on the skin.



Borojo Pulp extract

Rich in minerals and amino acids, the mucopolysaccharide of Borojo pulp stimulates hyaluronic acid synthesis by fibroblasts and maintains cells in a state of « youth » by inhibiting cell senescence.

In vitro : free radical scavenging activity

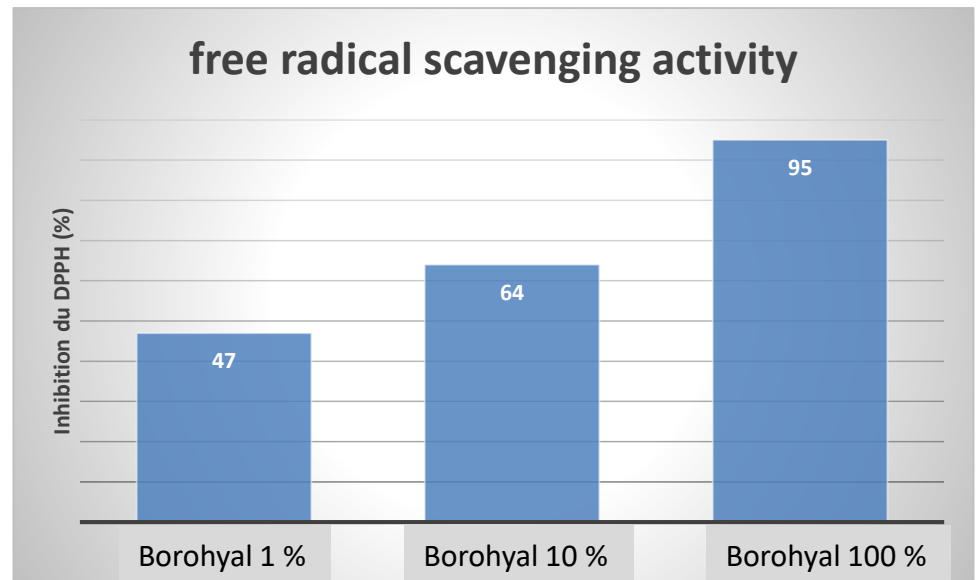
MATERIALS AND METHOD:

Model: Acellular in vitro assay using 1,1-diphenyl 2-picrylhydrazyl (DPPH)

Protocol: DPPH solutions were incubated for 30 minutes in absence (control) or in the presence of increasing concentrations of BOROHyal (0.025, 0.05 and 0.125%, w / v)).

At the end of the incubation period, the absorbance of the reaction media at 520 nm was measured and free radical scavenging activity was calculated.

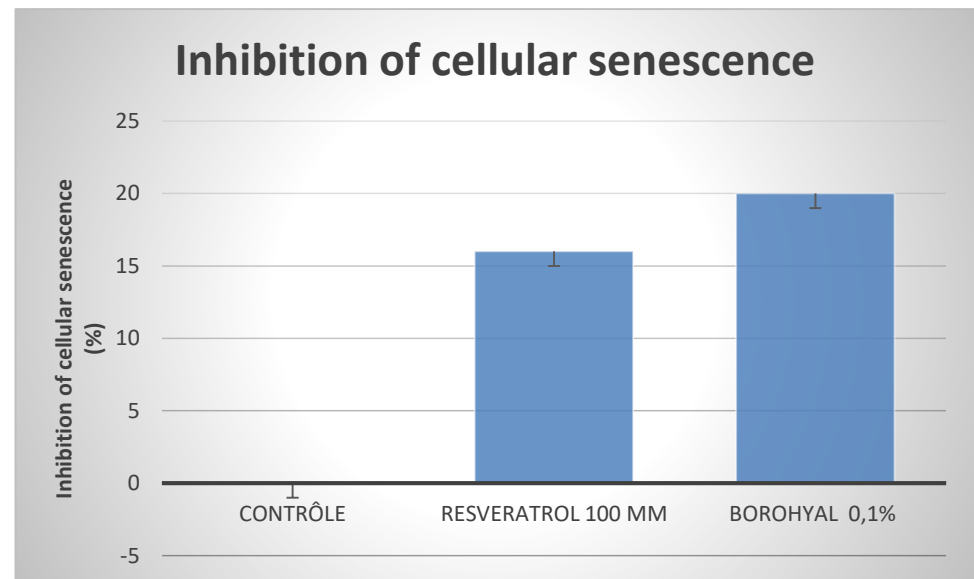
Each experimental condition was performed (at least) in triplicate (n = 3).



Average significantly different from Control's one (p<0,05).

In vitro : Inhibition of cellular senescence

BOROHyal activates the anti-aging metabolism which keeps cells in a "youthful state" by inhibition of cellular senescence .



Average significantly different from Control's one ($p < 0,05$).

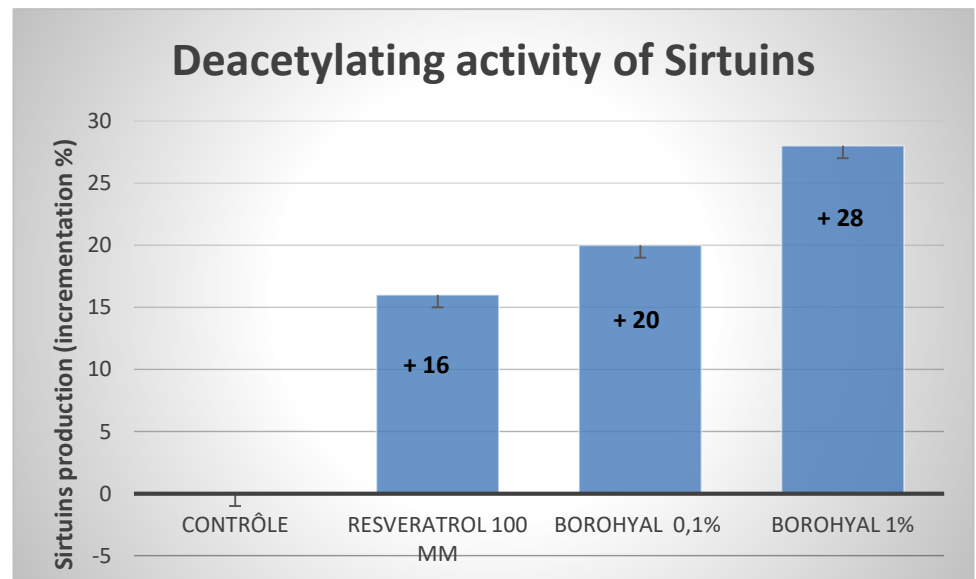
In vitro : Stimulation of the deacetylating activity of Sirtuins

MATERIALS & METHODS :

On a model of a normal dermal monolayers human fibroblasts.

Fibroblasts are incubated at 37°C during 1 hour, under humid atmosphere and 5 % of CO₂, with or without the reference product (RESVERATROL 100 µM) or active ingredient at different concentrations.

At the end of the incubation period, a sirtuin specific fluorescent substrate, as well as all the co-factors which are necessary to the enzymatic reaction, are introduced in the culture mediums. Fibroblasts are incubated 60 additional minutes. The enzymatic reaction is stopped, and the deacetylase activity is assessed by reading the fluorescence signal. Tests evaluated each experimental condition in triplicate.



SIRT 1 are cellular "youth" markers, an Increasing of the SIRT 1 activity corresponds the metabolism of a young cell

Average significantly different from Control's one (p<0,05).

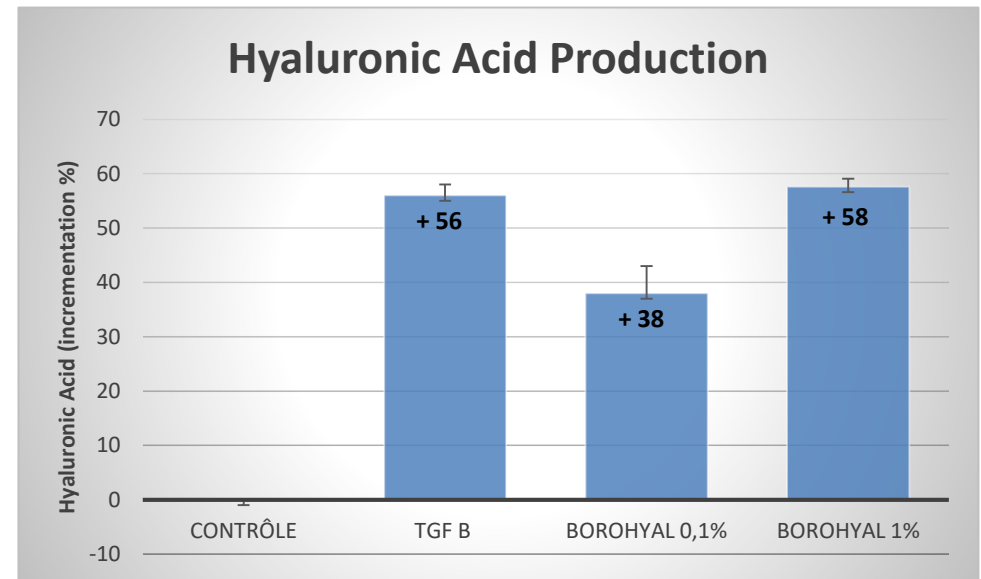
In vitro : Stimulation of HA production

MATERIALS & METHODS :

On a model of a normal dermal monolayers human fibroblasts.

Fibroblasts are incubated at 37°C during 48 hours, under humid atmosphere and 5 % of CO₂, with or without the reference product (TGF β 50 ng/ml) or active ingredient at different concentrations.

At the end of the incubation period, hyaluronic acid in the culture medium is quantified with a specific and sensitive ELISA kit. Tests evaluated each experimental condition in triplicate.



Moyenne significativement différente de celle du groupe « Contrôle » (p<0,05)

In Vivo: Reduction of crow's feet wrinkles

MATERIAL AND METHOD :

Morphological analysis of crow's feet wrinkles on 24 volunteers for 28 days (analysis are carried out using a fringe projection device). 1% Borohyal dosage in topical application

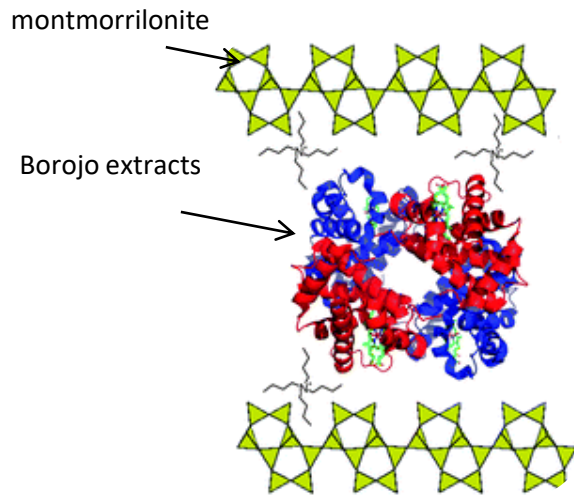
Results:

Decreased amplitude and average roughness of skin tissue :

- **5,6% et 7,3 % respectivement**

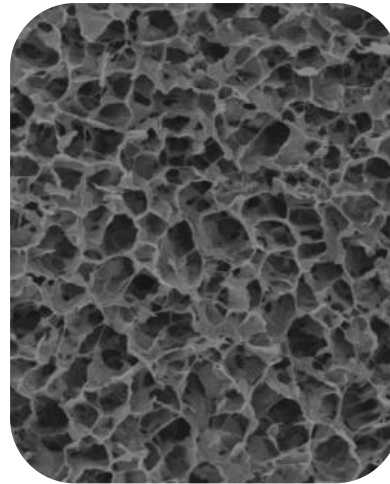
PROTECTION and DRUG RELEASE mechanism

Protection and stability of active ingredients



Active ingredients as raw material in powder form:

Biological active ingredients are integrated in montmorillonite sheets as a dehydrated form without preservatives.

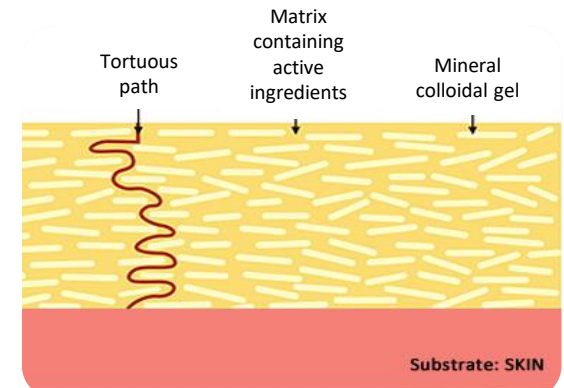


Active ingredient as finished products:

In aqueous environment, montmorillonite creates a 3D structure as « honeycomb » able to protect biological active ingredients.



Drug release mechanism



Once on the skin:

Creation of a scaffolding structure type « second skin » able to release biological active ingredients in a controlled way.

BOROHyal, technical data sheet

- INCI: Bentonite & Borojoa patinoi fruit juice
- CAS: 1302-78-9 & ND
- EINECS: 215-108-5 & ND
- COSMOS approved; CHINA compliant
- APPEARANCE, beige powder without preservatives
- FORMULATION: dispersible in aqueous phase
- STORE CONDITIONS: 18 months in a ventilated area
- DOSAGE 1%
- TOLERANCE:
 - Cutaneous: non-irritant
 - Ocular: moderately irritant
 - Genotoxicity: non-mutagenic
- **Garanti sans perturbateurs endocriniens de type œstrogène**



Conclusion

1. BOROHyal helps to fight the radical attacks daily suffered by the skin tissue. The surface of the skin is effectively protected
 - Free-radical scavenger activity: + 47 %
2. BOROHyal activates the anti-aging metabolism which keeps the cells in a "youthful state" :
 - Deacetylating activity of Sirtuins: + 28 %
 - Inhibition of β -Galactosidase: + 50%
3. BOROHyal allows the stimulation of the intracellular mechanisms involved in the production of hyaluronic acid
 - Stimulation of HA production : +58 %
4. BOROHyal is an "anti-wrinkle" active ingredient capables of restructuring the skin tissue deeply in order to give it a more youthful appearance :
 - Decrease in surface area and wrinkle volume: 12.3% and 13.2% respectively



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