

Distributed By –
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HA-OIL

Hydrophobized hyaluronic acid dispersed in oil



HA-OIL



Key advantages

- Dispersion of hydrophobized hyaluronic acid in oil
- Suitable for lipophilic or anhydrous products
 - Skincare (face oils, body oils)
 - Haircare (oils, masks, balms...)
 - Decorative cosmetics (make-up, lip balms, lipsticks, nail products)
- Enhanced skin, hair, nail penetration for better activity
- Natural (Cosmos approved)
- Preservative-free
- China compliant



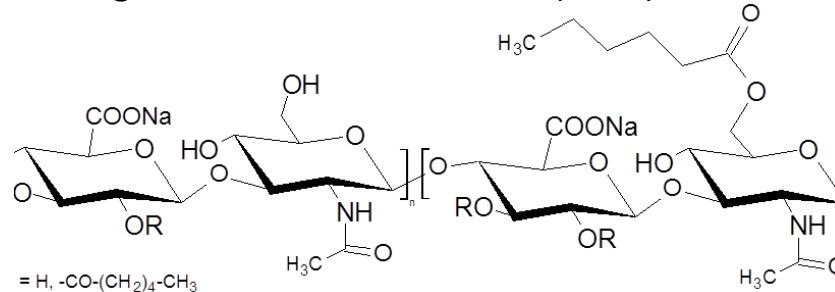
HA-OIL



Dispersion composition:

Composition	%
Castor oil	93
Sorbitan olivate	6
Sodium caprooyl hyaluronate	1

- Hyaluronic acid (HA) modified with caproic (hexanoic) acid
- Molecular weight of HA 200-300 kDa
- Degree of substitution of caprooyl 50 – 80%



Results

HA-OIL: hair and nail penetration

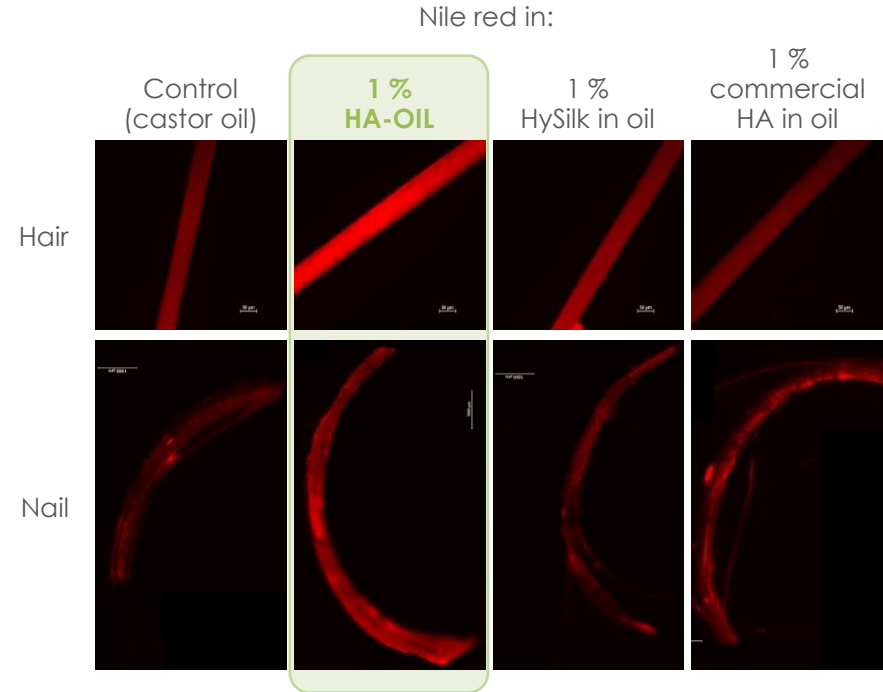


Experimental details:

- Human hair and nail
- 1 % HA-OIL mixed with Nile red (10 µg/mL) in castor oil
- Incubation 30 min, room temperature
- Rinsing in water
- Fluorescence microscopy

Enhanced penetration of HA-OIL
into hair and nail

(better than 1 % HySilk in oil and 1 %
commercial HA in oil)



HA-OIL: skin penetration

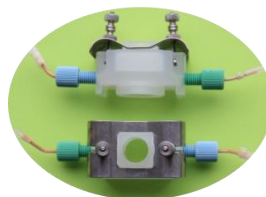


Experimental details:

- Skin explants in Franz diffusion cells
- Nile red (1 $\mu\text{g}/\text{mL}$) in oleic acid or in 0,1 % caprooyl-HA in a buffer
- Incubation 20 h, 37 °C
- Fluorescence microscopy

Šmejkalová et al. 2017. *Hyaluronan polymeric micelles for topical drug delivery. Carbohydrate Polymers*, 156, 86–96

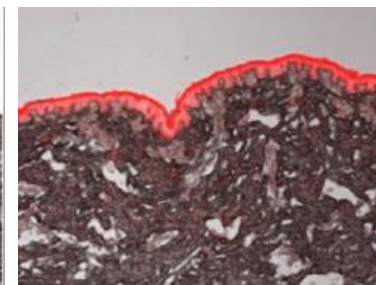
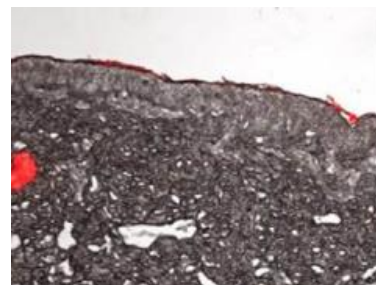
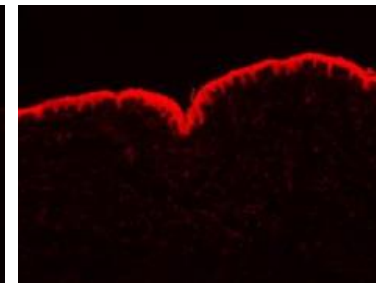
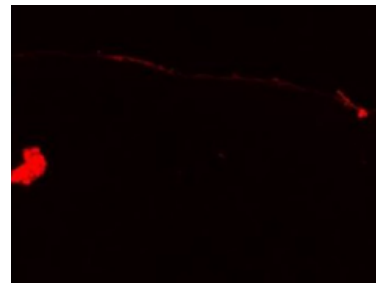
Caprooyl hyaluronate effectively penetrates the skin



Control
(oleic acid)

Nile red in:

0,1 %
Caprooyl-HA



HA-OIL stimulates hair growth

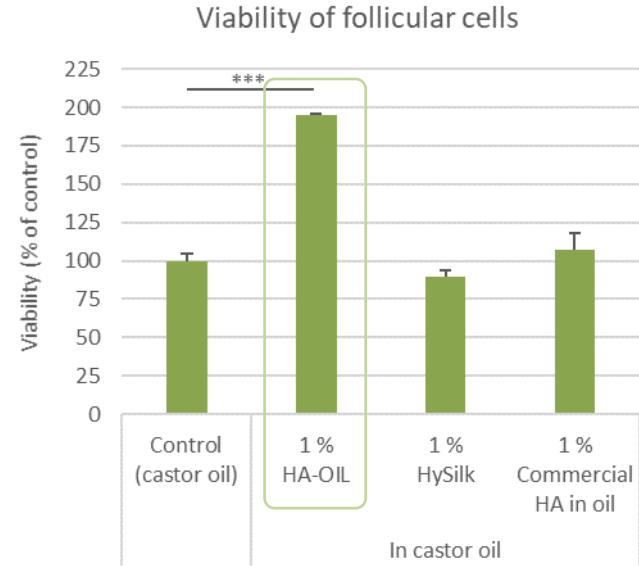


Experimental details

- Hair follicles (10/well in 96-well plate)
- Incubation with samples in castor oil 30 min, RT
- Rinsing in water
- 18 h in cell culture medium, 37 °C
- MTT cell viability assay

1 % HA-OIL increased viability of follicular cells

(no effect by 1 % HySilk nor 1% commercial HA in oil)



HA-OIL stimulates hair growth

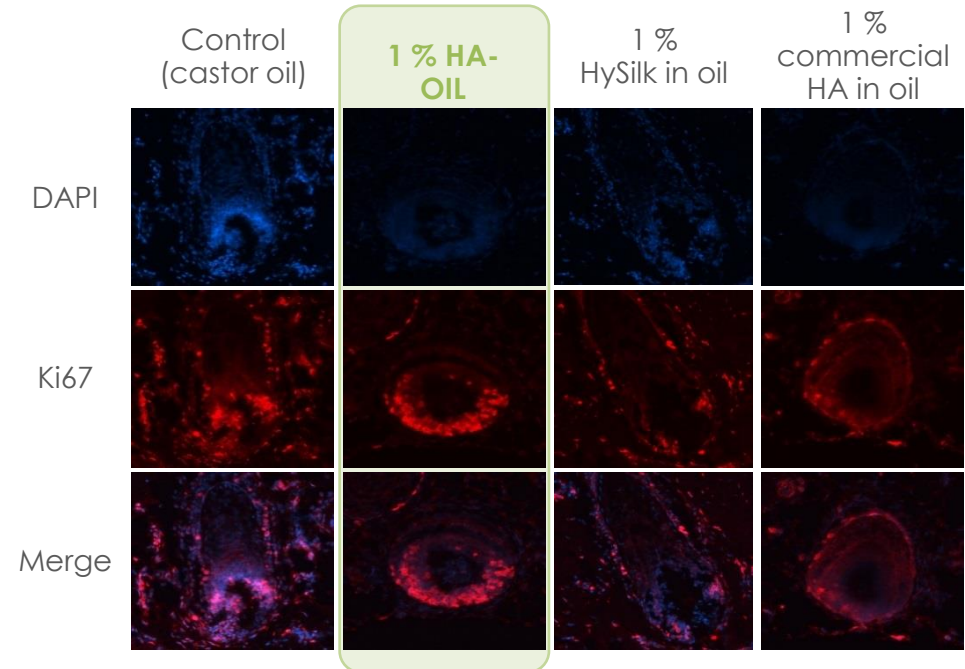


Experimental details:

- Skin explants
- Application of samples in castor oil on top of the skin
- Incubation 30 min, RT
- Rinsing in water
- Incubation 18 h, 37 °C
- Immunofluorescence staining:
 - Ki67 – proliferation marker (**red**)
 - DAPI – cell nuclei (**blue**)

HA-OIL increased proliferation of follicular cells

(no effect by 1 % HySilk nor 1 % commercial HA in oil)



HA-OIL increases hair strength

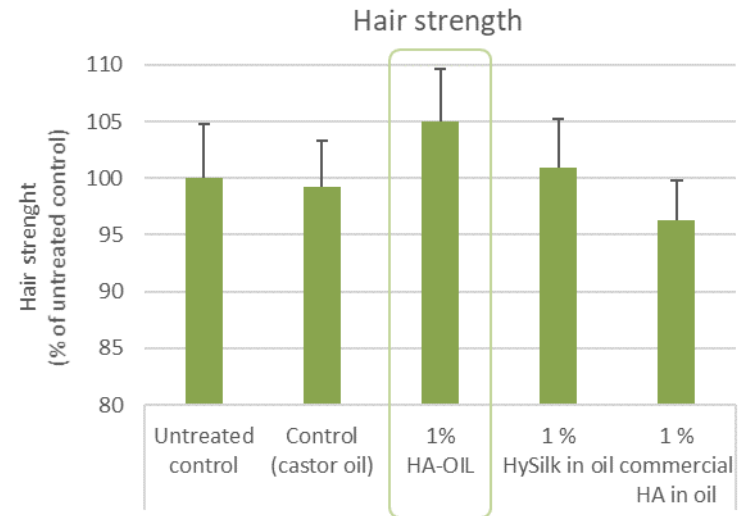


Experimental details

- Human hair
- Incubation with samples 30 min, RT
- Rinsing in water, air-drying
- Single fiber tensile test (ripper)

HA-OIL increased hair strength

(no effect by 1 % HySilk nor
1 % commercial HA in oil)



HA-OIL smoothens hair surface



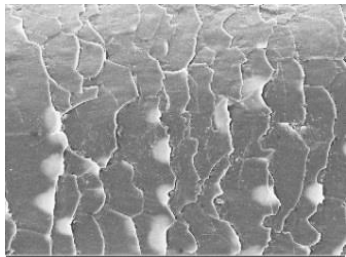
Experimental details

- Human hair
- Incubation with samples 30 min, RT
- Rinsing by water and air drying
- Scanning electron microscopy

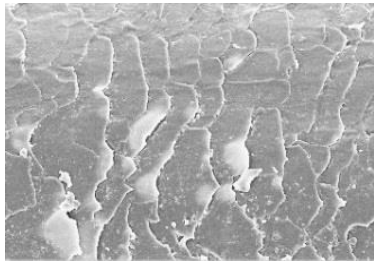
HA-OIL made hair smoother

(better than 1 % HySilk and
1 % commercial HA in oil)

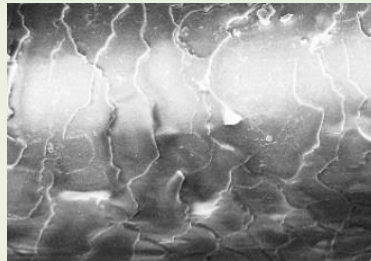
Untreated control



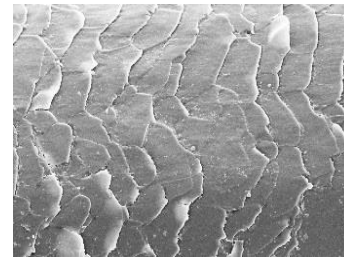
Control
(castor oil)



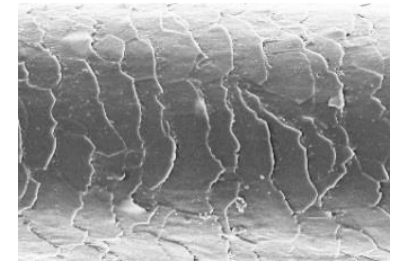
1 %
HA-OIL



1 %
HySilk in oil



1 %
commercial HA in oil



HA-OIL *in vivo* study (lip balm)



Volunteers

- 15 women
- 25-50 years



- Double-blind study
- Single application of lip balm
- Amount: 30-35 mg
- Timepoints: 0 (before), 30, 45, 60 min (after application)
- Experiment repeated next day on the same volunteers with another sample



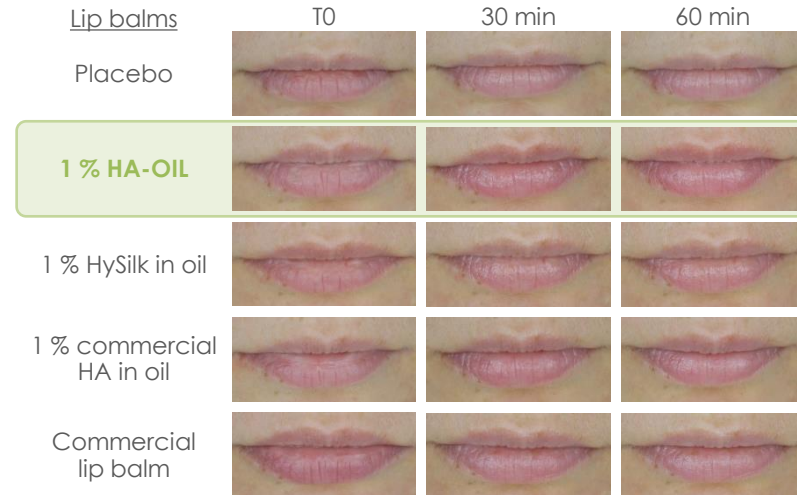
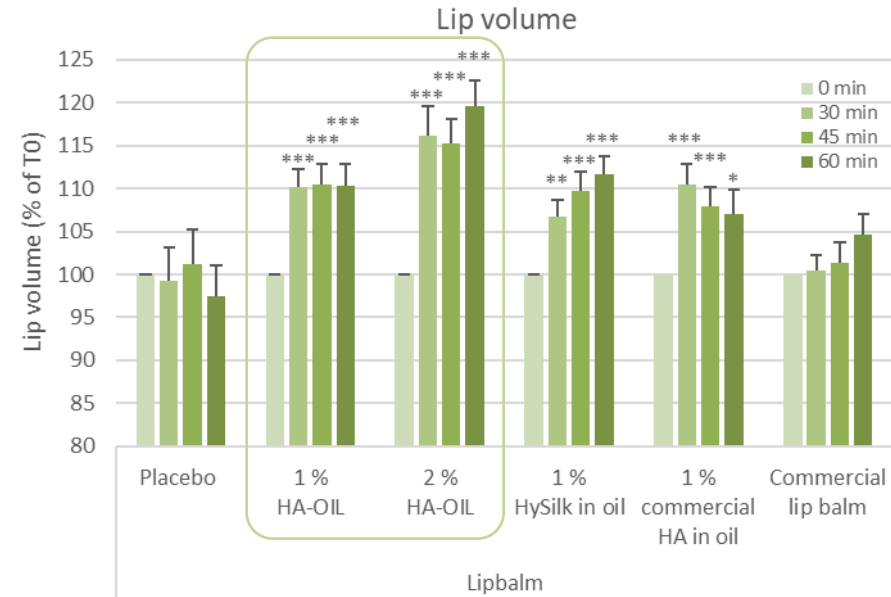
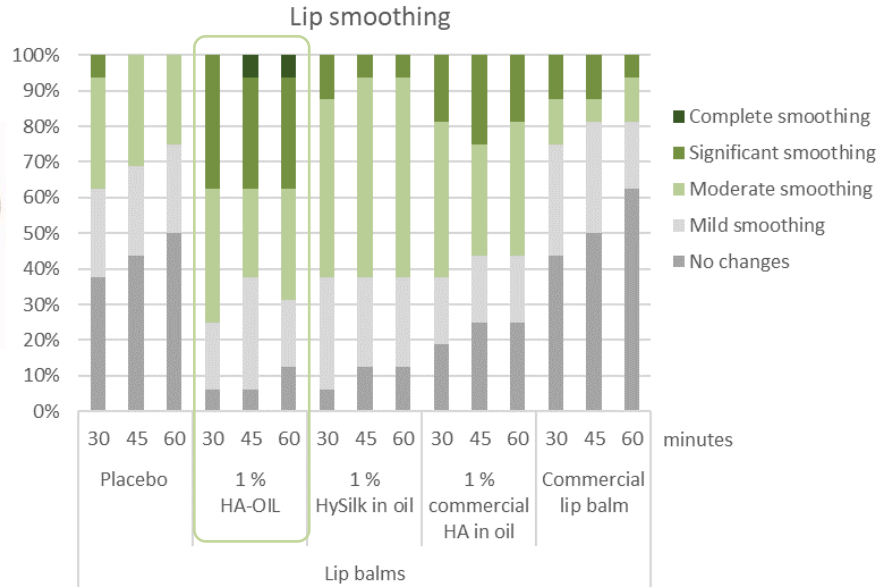
- Primos Lite – lip volume
- Visioface 1000D – pictures of lips
- Scoring of lip smoothing from Visioface pictures

Ingredients	INCI	Tested lip balm (%)	Placebo lip balm (%)
Castor oil	Ricinus communis seed oil	19 (18)	20
Shea butter	Butyrospermum parkii butter	20	20
Beeswax	Cera alba	20	20
Triglyceride	Caprylic/capric triglyceride	15	15
Jojoba oil	Simmondsia chinensis seed oil	15	15
Avocado butter	Persea gratissima butter	10	10
HA-OIL	Ricinus communis seed oil, sorbitan olivate, sodium hyaluronate, caproic acid		
HySilk in oil	Ricinus communis seed oil, sorbitan olivate, sodium hyaluronate	1 (2)	0
Commercial HA in oil	Ricinus communis seed oil, hydrogenated castor oil, sodium hyaluronate		

Commercial lip balm with HA (INCI)

Cocos nucifera oil
 Copernicia cerifera cera
 Prunus amygdalus dulcis oil
 Glyceryl behenate
 Butyrospermum parkii butter
 Parfum
 Aloe barbadensis leaf juice
Sodium hyaluronate
 Limonene
 Eugenol
 Benzyl benzoate

HA-OIL: lip volume and smoothening



HA-OIL increased lip volume (plumping effect) and made lips smoother

(better than 1% HySilk, 1% commercial HA in oil or commercial lip balm)

HA-OIL long-term in vivo study



Volunteers

- 35 women
- age 35-60, aver. 45,0



- Double-blind, randomized, placebo-controlled, split-face
- **1 % HA-OIL** in face oil (avocado oil + vitamin E)
- Vehicle control: avocado oil + vitamin E
- Application once a day for 6 weeks



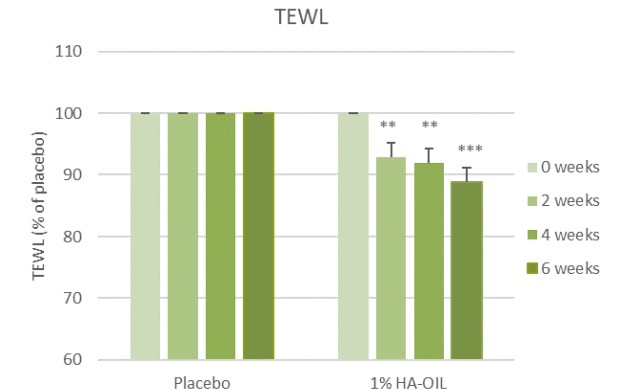
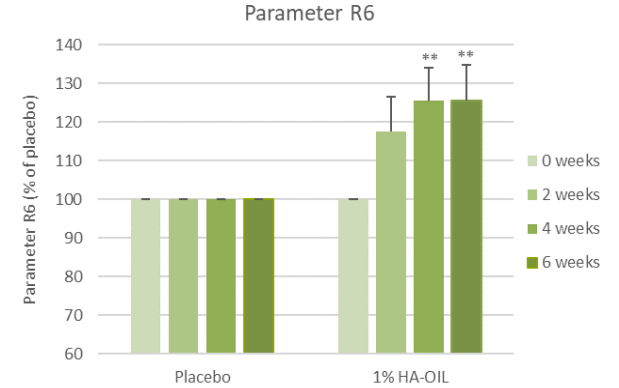
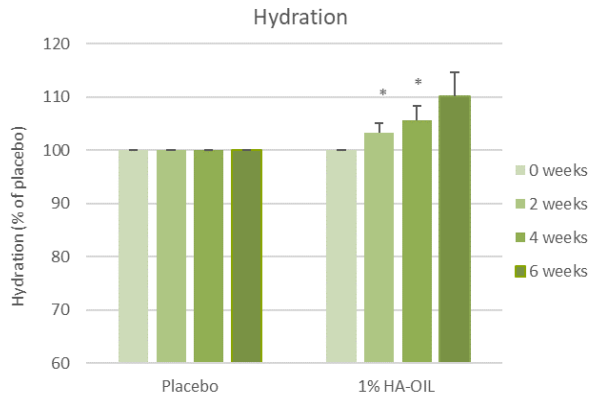
- Primos Lite: wrinkles
- Visia CR: pores, red areas
- Ultrascan: density of epidermis and dermis
- Vivascope: dermal papilas
- Tewameter: TEWL
- Corneometer: hydration
- Glossymeter: skin gloss
- Frictiometer: skin roughness
- Cutometer: elasticity, hydration
- Mexameter: erythema index

HA-OIL: long-term effect



In vivo study with HA-OIL in face oil

- Skin barrier improvement (TEWL, tewameter)
- Skin hydration improvement (corneometer, cutometer)

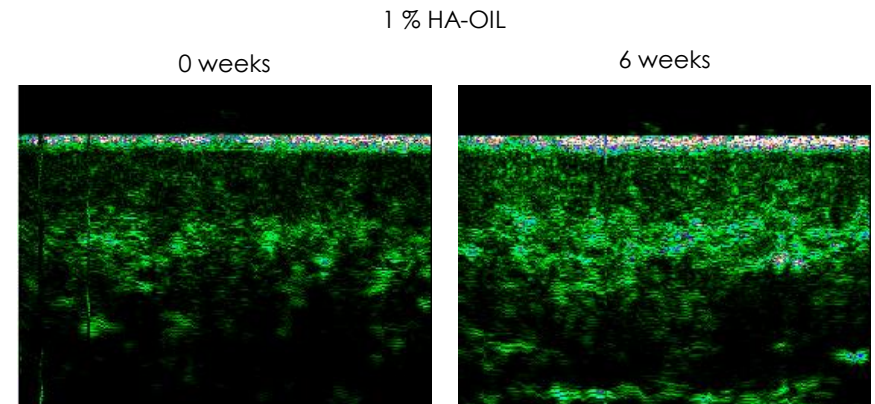
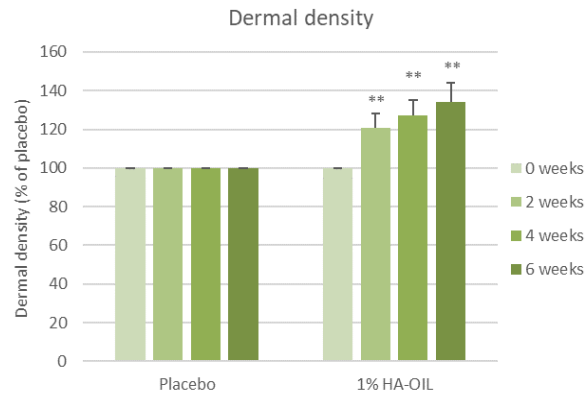


HA-OIL: long-term effect



***In vivo* study with HA-OIL in face oil**

- Dermal density improvement (Ultrascan)

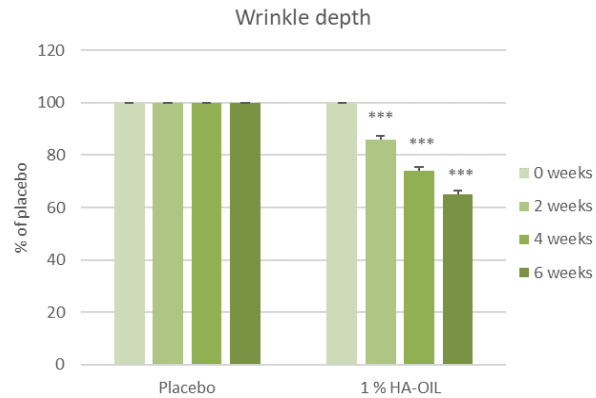


HA-OIL: long-term effect



In vivo study with HA-OIL in face oil

- Wrinkle reduction (Primos Lite)

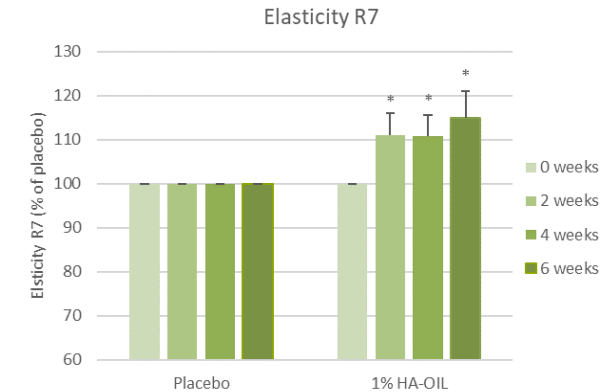
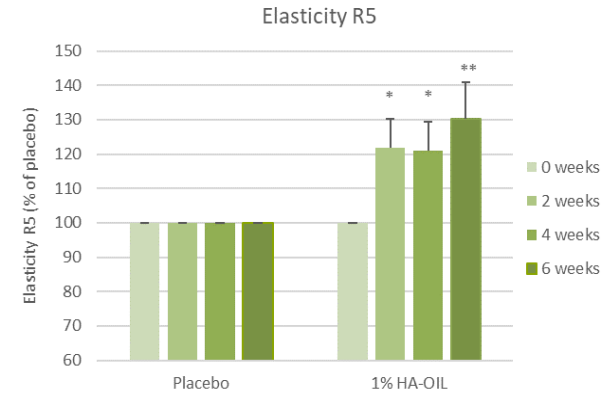
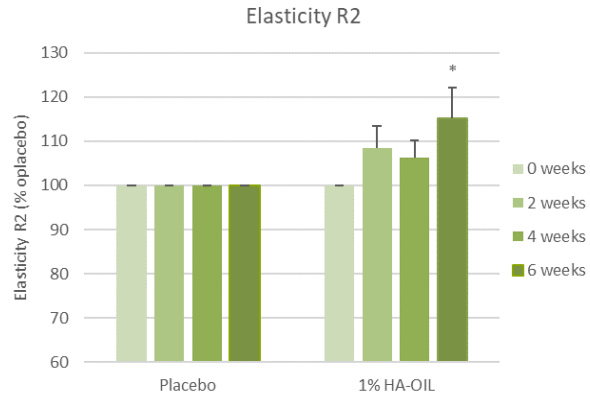


HA-OIL: long-term effect



In vivo study with HA-OIL in face oil

- Elasticity improvement (cutometer: parameter R2, R5 and R7: the higher, the better elasticity)

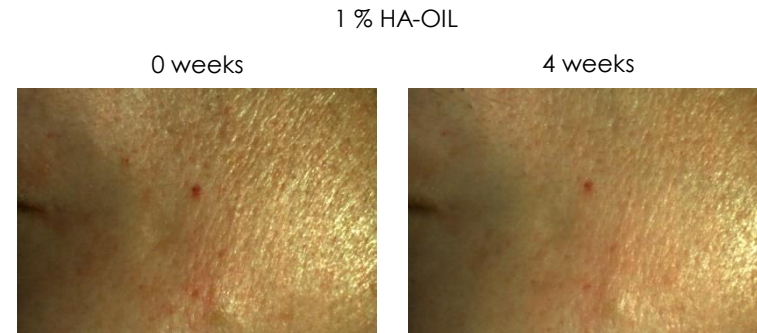
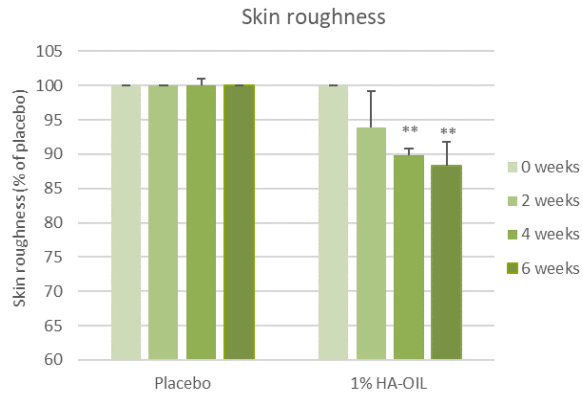


HA-OIL: long-term effect



***In vivo* study with HA-OIL in face oil**

- Skin roughness improvement (frictiometer)

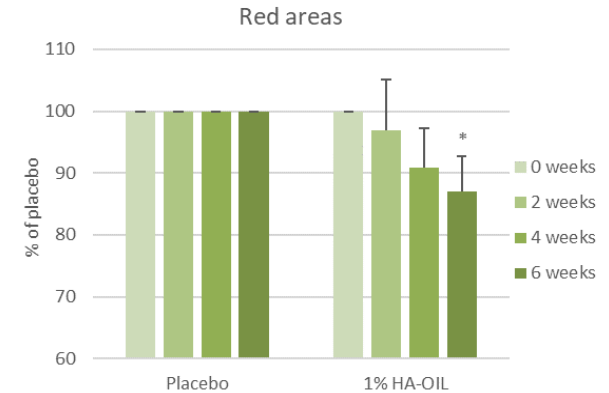
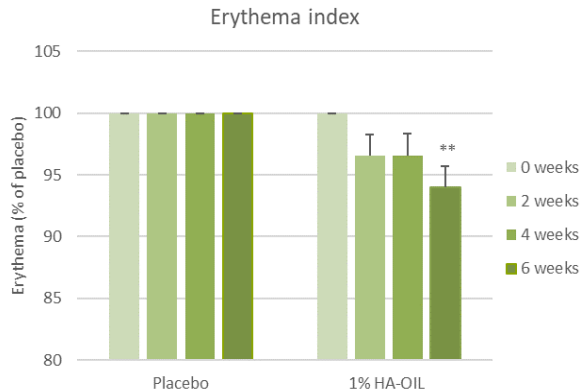
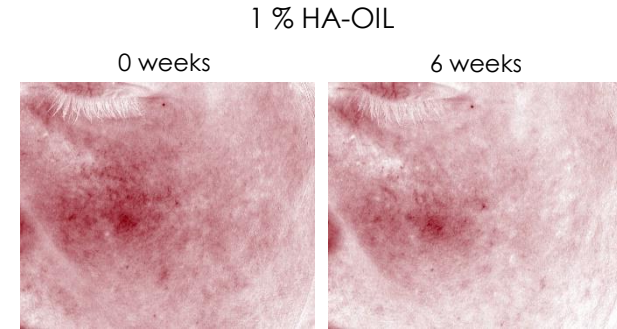


HA-OIL: long-term effect



***In vivo* study with HA-OIL in face oil**

- Skin calming, reduction of erythema (mexameter)
- Reduction of red areas (VisiaCR)



Caprooyl-HA *in vivo* study II



- Double-blind, randomized, placebo-controlled
- 8 volunteers, age 25-40, aver. 31,6



- 0,005 % caprooyl-HA in emulsion \approx **0,5 % HA-OIL**
- Placebo emulsion
- 84 days (12 weeks)



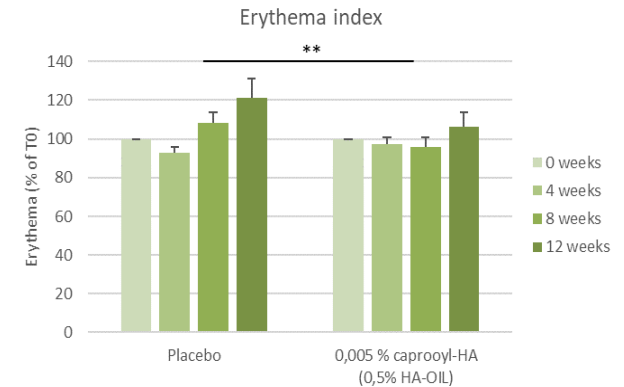
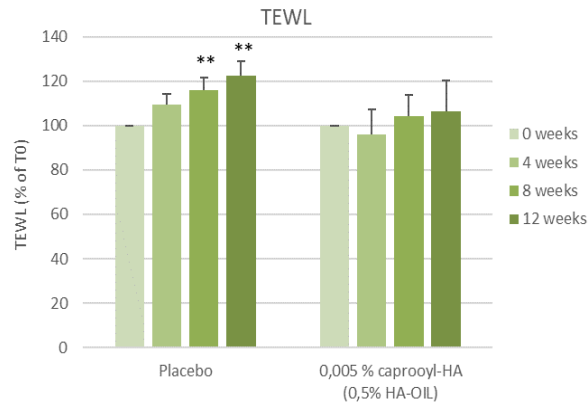
- Tewameter: TEWL
- Mexameter: erythema
- Visioface: pores, spots

Caprooyl-HA: long-term effect



In vivo studies with caprooyl-HA in emulsion

- Skin calming, reduction of erythema (mexameter)
- Skin barrier improvement (TEWL, tewameter)

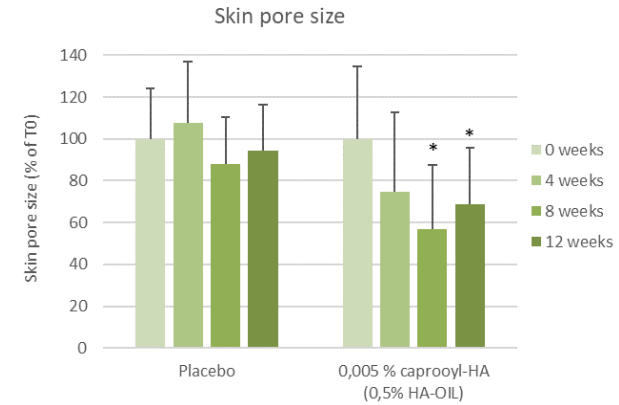
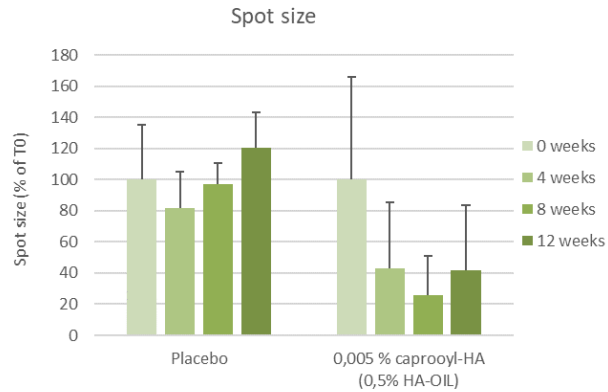


Caprooyl-HA: long-term effect



***In vivo* studies with caprooyl-HA in emulsion**

- Skin pore size reduction (Visioface)
- Spot size reduction (Visioface)



HA-OIL – conclusion



- **Hydrophobized hyaluronic acid dispersed** in oil
- Enhanced skin, hair and nail **penetration**
- Increased: => **hair growth**
=> **hair strength**
=> **hair smoothness**
=> **lip volume**
=> **lip smoothness**
- **Multiple skin benefits:**
 - Hydration, enhanced skin barrier function
 - Wrinkle reduction, elasticity improvement
 - Skin calming
 - Spot and pore reduction, decreased roughness

=> **More effective than simple hyaluronic acid in oil**
and similar available commercial products

- Natural – COSMOS approved
- Preservative-free
- Water-free
- China compliant



HA-OIL - Technical Data



- **INCI name:**
Ricinus communis seed oil, sorbitan olivate, sodium hyaluronate, caproic acid
- **Samples:** 10 g
- **Minimal ordering quantity:** 1Kg
- **Recommended concentration:** 1-2 %
- **Appearance:** creamy ointment
- **Supplied form:** homogenous dispersion of 1 % sodium caprooyl hyaluronate with 6 % sorbitan olivate in castor oil
- **Shelf-life:** 18 months (expected to be prolonged, stability studies are ongoing)
- **Compatibility and processing:**
Partly incompatible (precipitation may occur):
Caprylic/Capric Triglyceride, Oenothera Biennis Oil, Simmondsia Chinensis Seed Oil, Rosa Canina Seed Oil.

HA-OIL is added into formulation as it is. For oil products (lipbalm, hair oils) is recommended to add HA-OIL into the preheated oil phase (75°C) and keep this temperature at least 30min (while stirring).
- **Solubility:** Insoluble in water, partly soluble in oil (the product is dispersion, not solution)

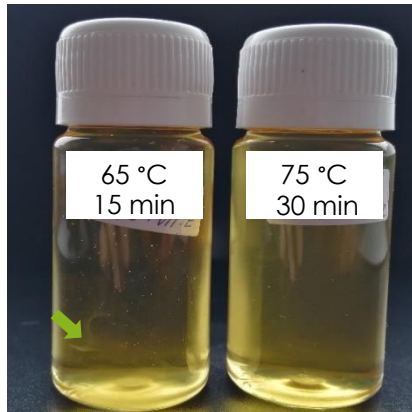
HA-OIL

Technological guidelines

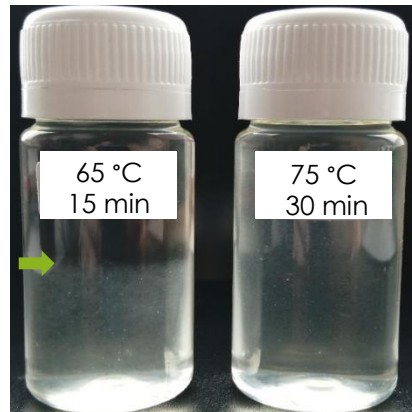
Technological guidelines

- In some oils, precipitation of sorbitan olivate may occur
- To avoid this precipitation, heat the mixture after adding of HA-OIL
- Heat to 75 °C for at least 30 min, if precipitation occurs, heat longer
- HA-OIL was stable even after 7 h at 75 °C in our tests
- In the case of mixtures of different oils, we can also recommend to decrease of concentration of a problematic oil (e.g. triglyceride) and increase a non-problematic one

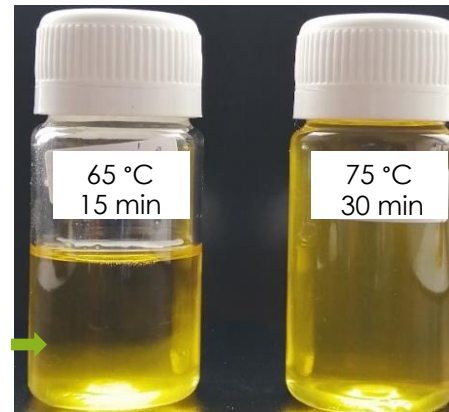
Argan oil



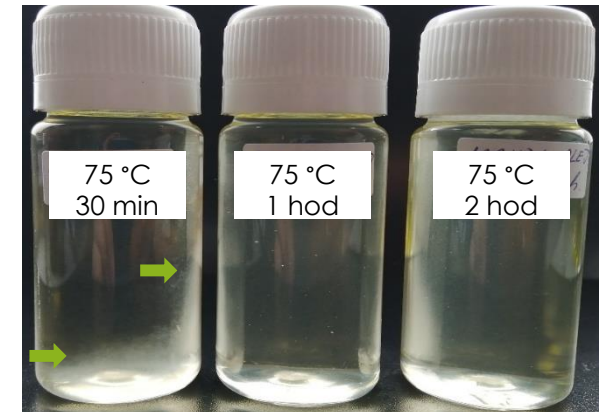
Macadamia oil



Plum oil



Almond oil



Oils from different suppliers

Oils from different suppliers → different composition → different results → always check with different supplier and prolong heating if necessary

Olive oils from different suppliers



75 °C
30 min

Compatibility with oils

Name	INCI	Compatibility
Almond oil	Prunus Amygdalus Dulcis Oil	Compatible
Apricot oil	Prunus Armeniaca Kernel Oil	Compatible
Apricot oil refined	Prunus Armeniaca Kernel Oil	Compatible
Argan oil	Argania Spinosa Kernel Oil	Compatible
Avocado oil	Persea Gratissima Oil	Compatible
Avocado oil refined	Persea Gratissima Oil	Compatible
Borage oil	Borago Officinalis Seed oil	Compatible
Caprylic/capric triglyceride	Caprylic/Capric Triglyceride	Incompatible
Castor oil	Ricinus Communis Seed Oil	Compatible
Cottonseed oil	Gossypium Herbaceum Seed Oil	Compatible
Evening Primrose oil	Oenothera Biennis Oil	Incompatible
Grapeseed oil	Vitis Vinifera Seed Oil	Compatible
Grapeseed oil refined	Vitis Vinifera Seed Oil	Compatible
Hazelnut oil	Corylus Avellana Seed oil	Compatible
Hemp oil	Cannabis Sativa Seed Oil	Compatible
Joboba oil	Simmondsia Chinensis Seed Oil	Compatible
Linseed oil	Linum Usitatissimum Seed Oil	Compatible
Macadamia oil	Macadamia Integrifolia Seed Oil	Compatible
Meadowfoam oil	Limnanthes Alba Seed Oil	Compatible
Moringa oil	Moringa Oleifera Seed Oil	Compatible
Olive oil	Olea Europaea Fruit Oil	Compatible
Plum oil	Prunus Domestica Seed Oil	Compatible
Poppyseed oil	Papaver Somniferum Seed Oil	Compatible
Rice oil	Oryza Sativa Bran Oil	Compatible
Rice oil refined	Oryza Sativa Bran Oil	Compatible
Rosehip oil	Rosa Canina Seed Oil	Compatible
Safflower oil	Carthamus Tinctorius Seed Oil	Compatible
Sesame oil	Sesamum Indicum Oil	Compatible
Squalene	Squalene	Incompatible
Sunflower oil	Helianthus Annuus Seed Oil	Compatible
Wheat Germ oil	Triticum Vulgare Germ Oil	Compatible



For more information, please
contact our sales department

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