ELEMENTIS

A global specialty chemicals company

MEADOWESTOLIDE®

ADVANCED SKIN HYDRATION

Enhanced Performance Through Applied Innovation

MEADOWESTOLIDE®

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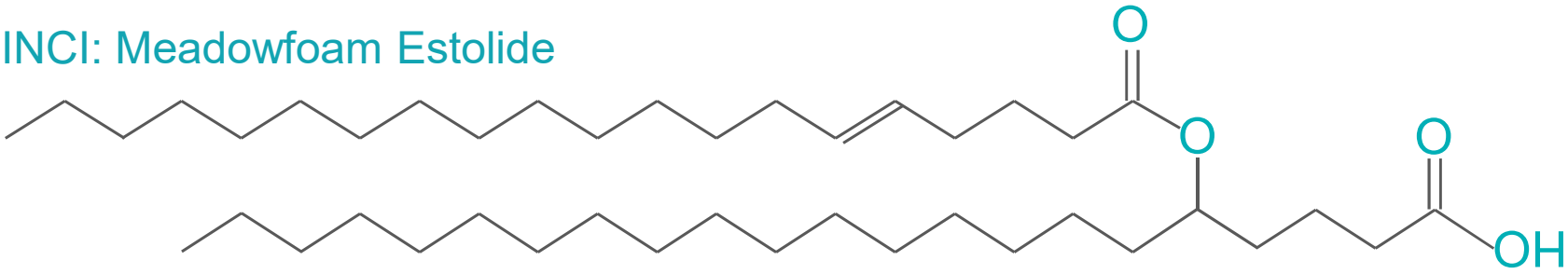
ADVANCED HYDRATION PERFORMANCE

- MEADOWESTOLIDE® is naturally derived from sustainable MEADOWFOAM SEED OIL. The structure is very similar to ceramide 3B, essential for water retention in the epidermis.

INCI: Meadowfoam Estolide



- Non-polar, long-chain lipid moiety
- Polar carboxylic acid/ester function is extremely hydrophilic as a result of effective hydrogen bonding
- Highly fluid owing to internal ester linkage and unsaturation

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BIOACTIVE ANALOGUE OF CERAMIDES

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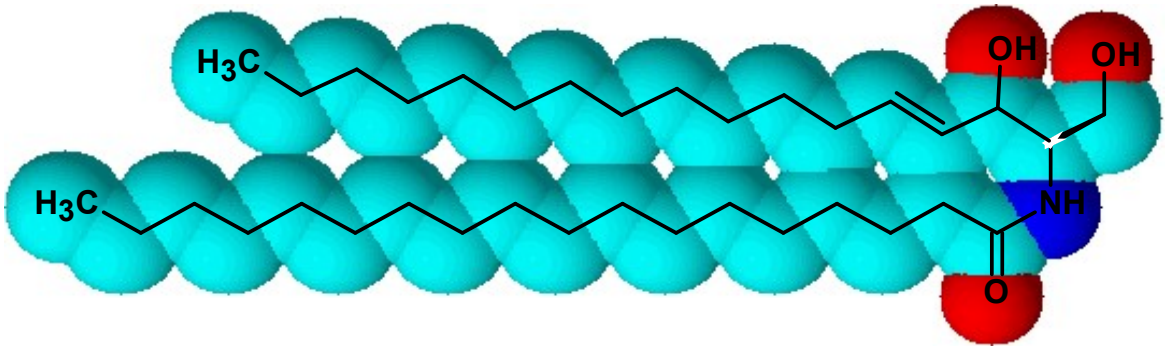
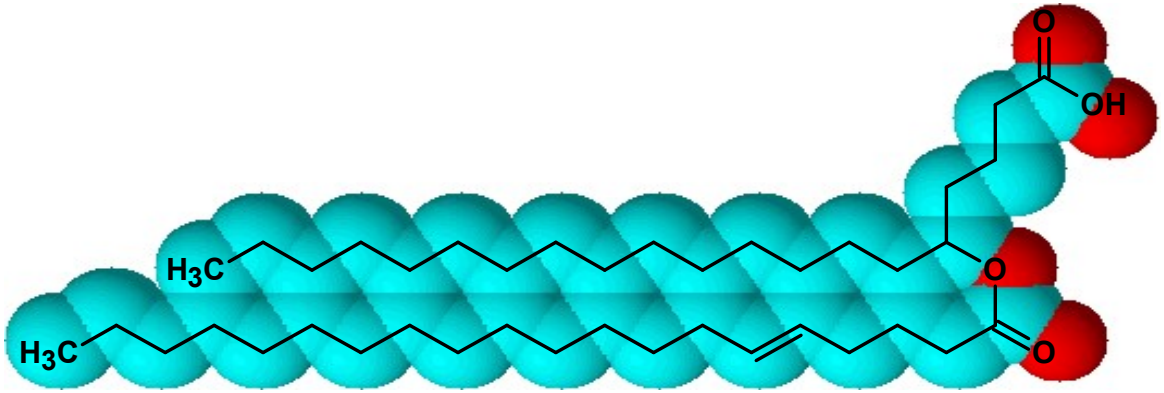
Ceramides make up 45 – 50% of the lipid content of a healthy epidermis.

Ceramide



Estolide



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STRONG WATER BINDING CAPABILITY

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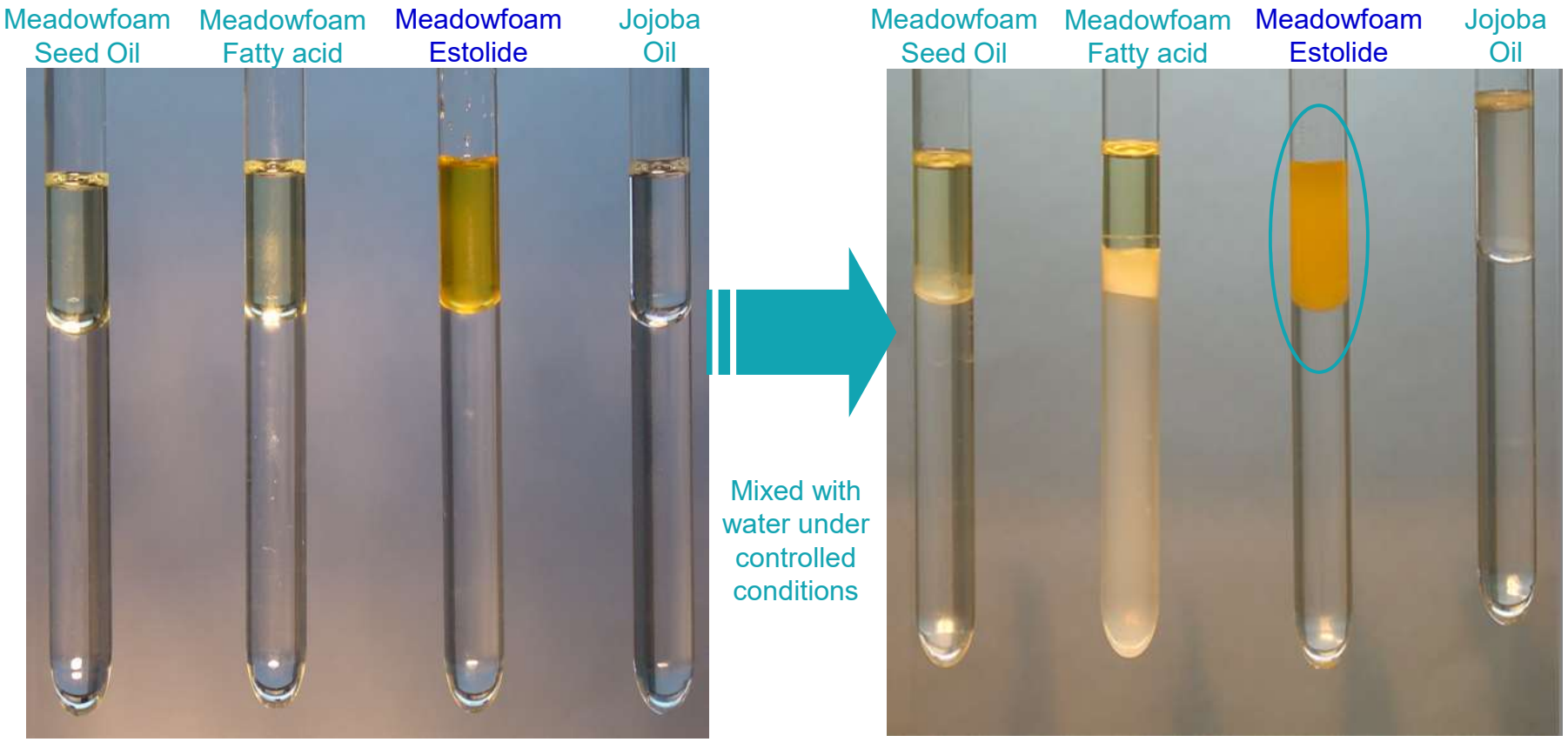
Due to the hydroxyl groups, MEADOWESTOLIDE® has strong water binding capability.



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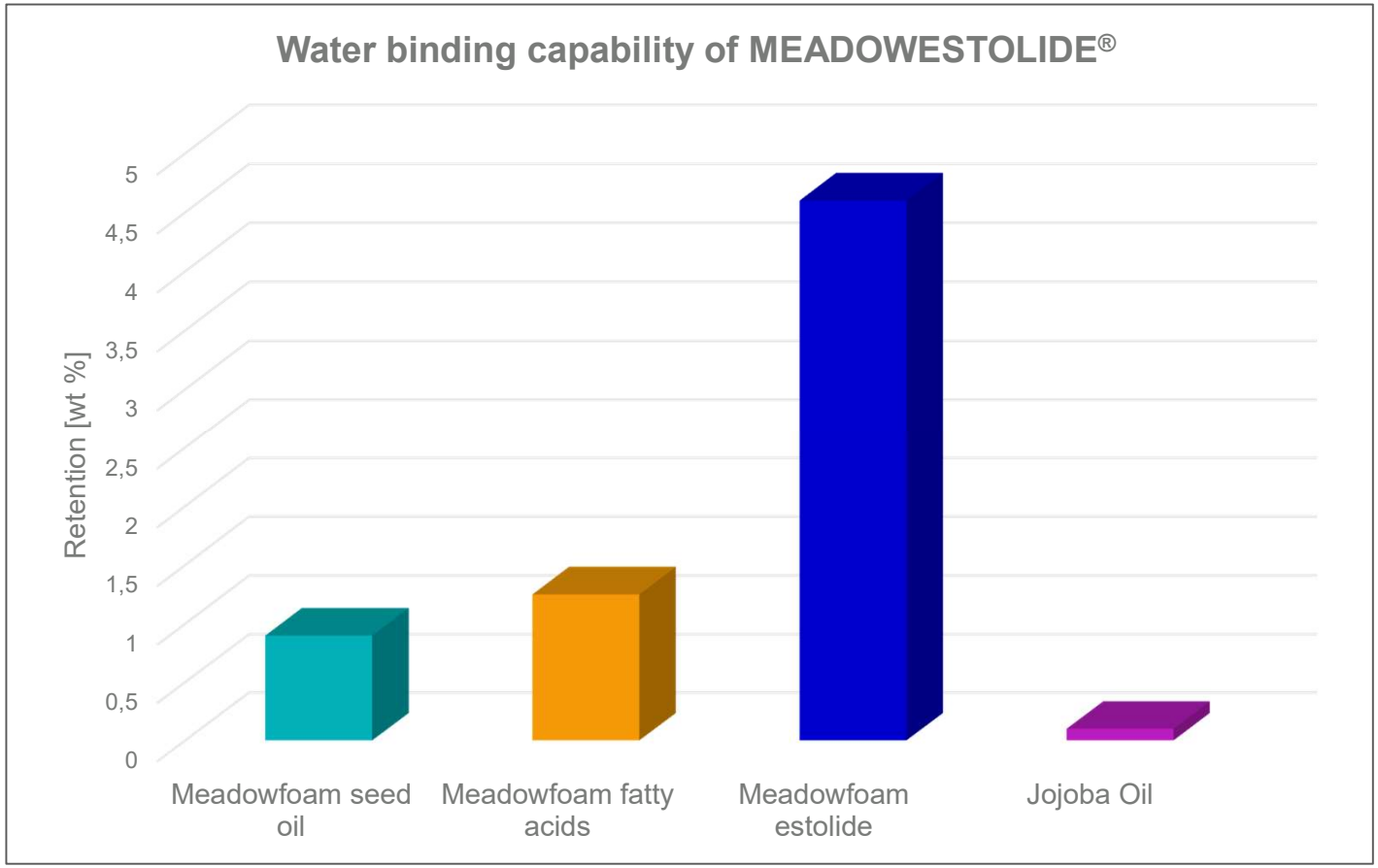
WATER BINDING CAPABILITY



With this excellent water binding capability MEADOWESTOLIDE® functions as effective barrier to water loss in the epidermis!

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In-Vivo Skin Hydration Study

MEADOWESTOLIDE®

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IN-VIVO SKIN HYDRATION STUDY - **SETUP**

- An in-vitro skin hydration study was conducted with 7 male and female participants
- A base cream was applied to the hand/forearm:
  - 1 application, measurement every hour for 4 hours
  - 5 applications over 2 days, final measurement
- Analysis of skin moisture content and moisture distribution with 2 different devices

Phase	Ingredient	Supplier	%w/w
A	Deionized Water		78.50
B	Mineral Oil		5.00
	Caprylic/Capric Triglyceride (Palmester 3595)	KLK Oleo	3.00
	Dimethicone (KF-96L-2s)	Shin Etsu	3.00
	Ceteareth-20 (Cremophor A 20)	BASF	3.00
	Cetyl Alcohol (Tego Alkanol 16)	Evonik	2.00
	Cetearyl Alcohol (Tego Alkanol 1618)	Evonik	2.00
	Meadowfoam Estolide Meadowestolide (**MEADOWESTOLIDE®**)	**Elementis**	2.00
	Caprylhydroxamic Acid (and9 Caprylyl Glycol (and) Glycerin (Spectrastat)	Inolex	1.00
	Stearic Acid		0.50
C	Citric Acid		q.s

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IN-VIVO SKIN HYDRATION STUDY

- An in-vivo experiment using an impedance based technology (Novameter DPM 9003BT™, NOVA Technology Corporation) was conducted to determine hydration of the skin
- The Novameter provides a relative measure of the retained water content of the skin as a function of the skin's dielectric value
- The higher the relative DPM values, the more moisture is in the skin

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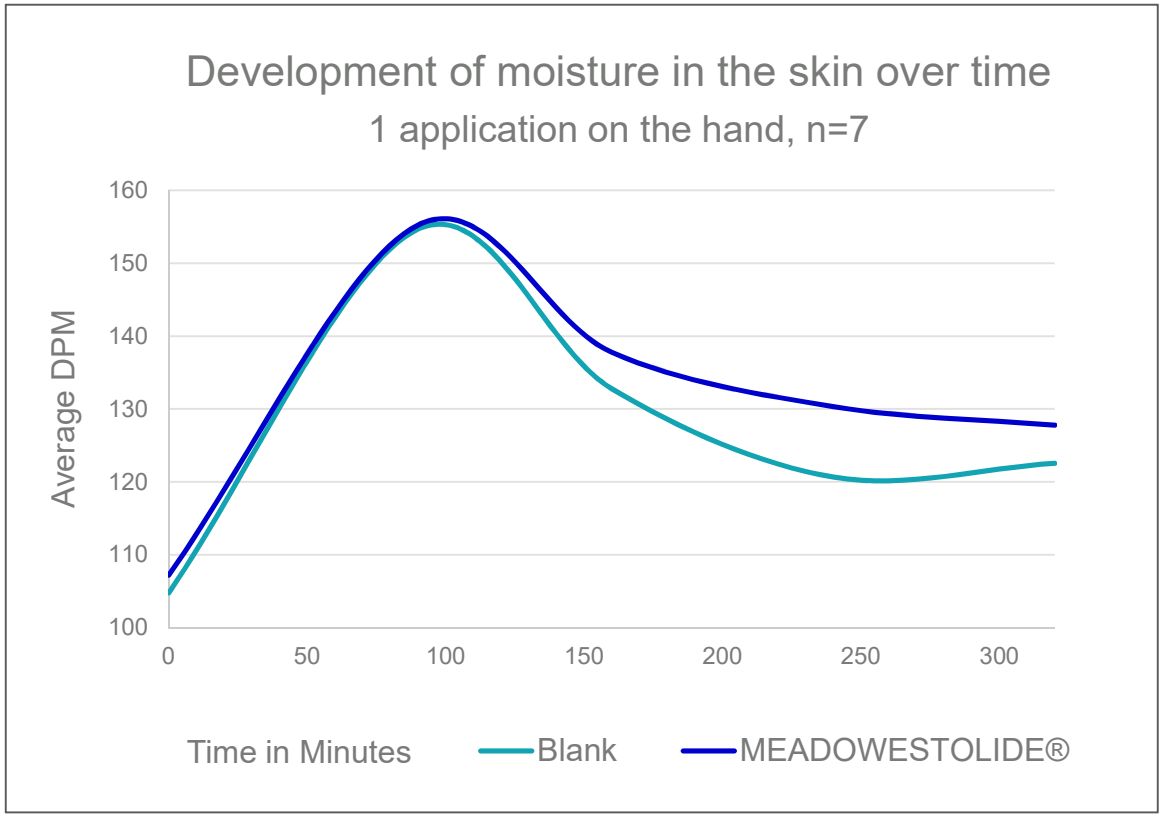
IMPROVED MOISTURE RETENTION IN THE SKIN



Development of relative DPM values over time after one application of a base cream without Meadwoestolide versus a cream with 2% MEADOWESTOLIDE® shows a higher moisture content of the skin with MEADOWESTOLIDE®!

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IMPROVED MOISTURE RETENTION IN THE SKIN

	% Increase in skin hydration				
Time [min]	**0**	**90**	**160**	**240**	**320**
Blank	**0**	**47,6**	**26,7**	**15,2**	**17,0**
MEADOWESTOLIDE®	**0**	**44,8**	**28,5**	**21,6**	**19,2**

Enhanced skin hydration with MEADOWESTOLIDE® over time in comparison to blank cream!

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IN-VIVO SKIN HYDRATION STUDY

- The MoistureMap MM100 (Courage + Khazaka electronic GmbH) was used in an in-vivo experiment to determine the distribution of moisture in the skin
- The sensor gives graphical and quantitative information on the near surface hydration distribution and the micro-topography of skin
- Darker areas indicate more moisture, light areas indicate dryness

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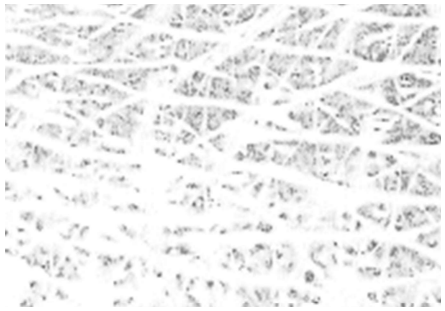
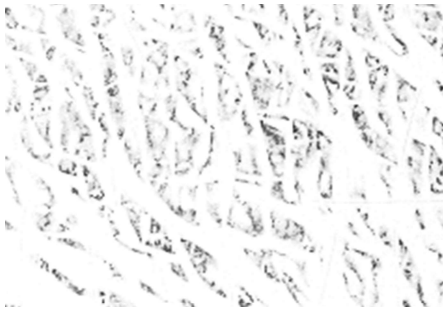
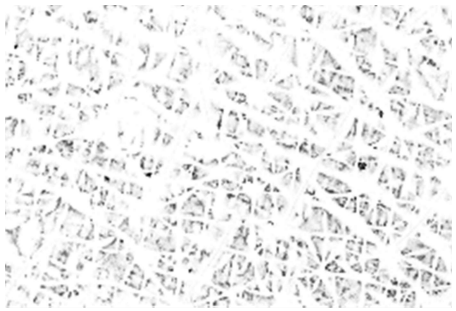
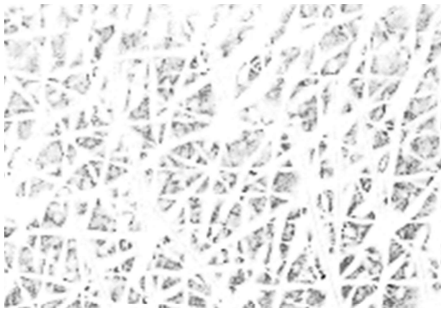
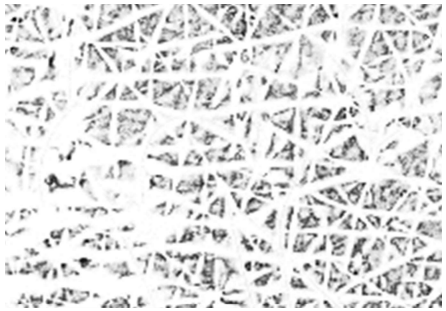
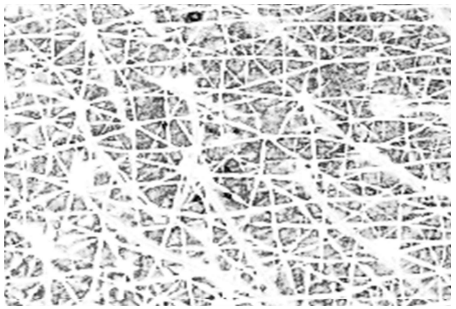
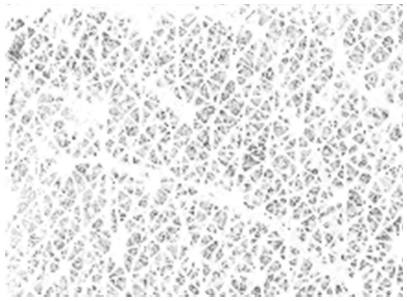
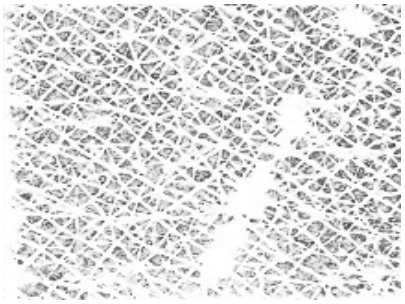
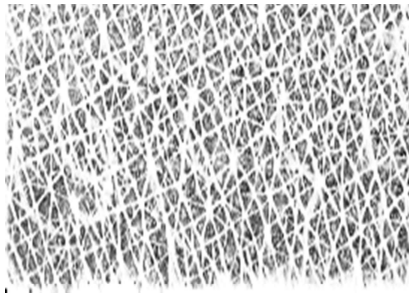
INCREASED HYDRATION DISTRIBUTION IN THE SKIN

	Pre Application	After 160 min	After 320 min
Blank			
With MEADOWESTOLIDE®			

Microphotographic images of the near skin surface after one application of a base cream without MEADOWESTOLIDE® versus a cream with 2% MEADOWESTOLIDE® on the *hand* show an increased hydration distribution in the skin with MEADOWESTOLIDE®!

MEADOWESTOLIDE®

VISUALIZATION OF ENHANCED WATER CONTENT – **EXAMPLE 1 - FOREARM**

	Pre Application	After 5 applications
Blank		
With MEADOWESTOLIDE®		

After 5 applications of a cream containing 2% MEADOWESTOLIDE® on the *forearm* over 2 days, a stronger increase of moisture in the skin could be seen with MEADOWESTOLIDE® in comparison to a blank cream without MEADOWESTOLIDE®.

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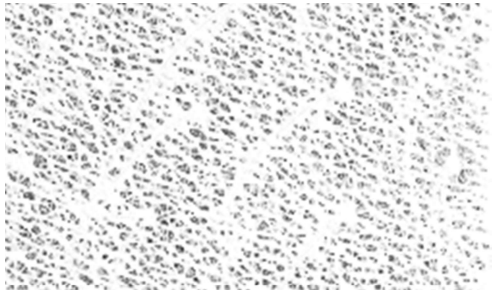
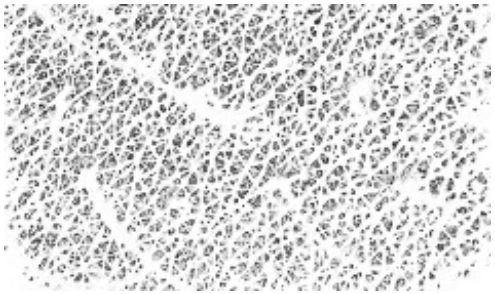
VISUALIZATION OF ENHANCED WATER CONTENT – **EXAMPLE 2 - FOREARM**

Blank

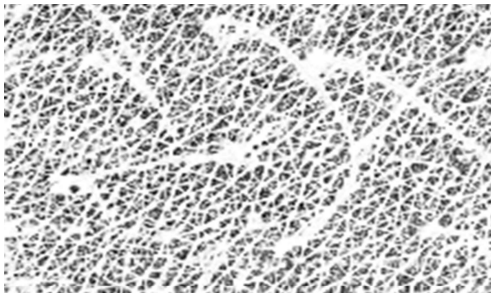
Pre Application



After 5 applications



With MEADOWESTOLIDE®



After 5 applications of a cream containing 2% MEADOWESTOLIDE® on the *forearm* over 2 days, a stronger increase of moisture in the skin could be seen with MEADOWESTOLIDE® in comparison to a blank cream without MEADOWESTOLIDE®.

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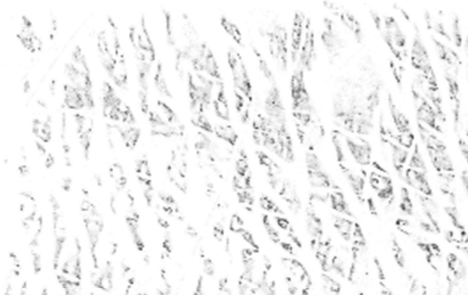
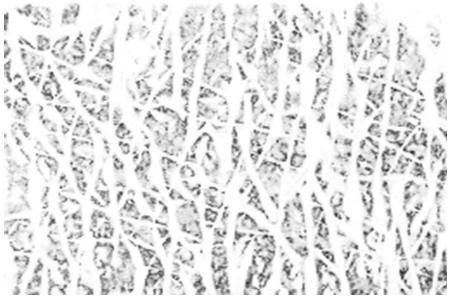
VISUALIZATION OF ENHANCED WATER CONTENT – **EXAMPLE 3 - HAND**

Blank

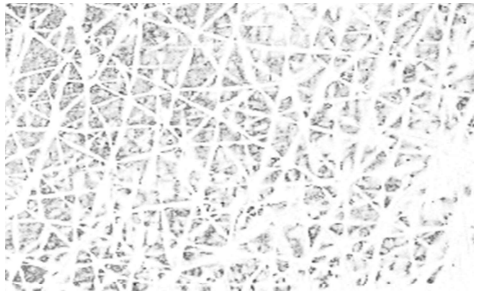
Pre Application

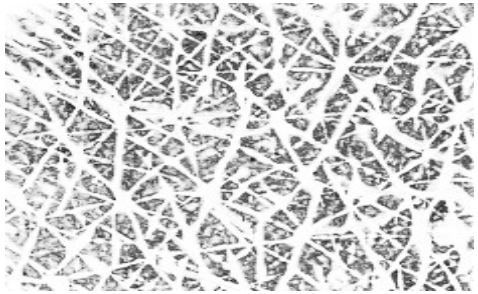


After 5 applications



With MEADOWESTOLIDE®





After 5 applications of a cream containing 2% MEADOWESTOLIDE® on the *hand* over 2 days, a stronger increase of moisture in the skin could be seen with MEADOWESTOLIDE® in comparison to a blank cream without MEADOWESTOLIDE®.

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Lip Moisturization Study

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IN-VIVO SKIN HYDRATION STUDY - **SETUP**

- Study comparing the difference in moisturization between a lipstick containing 3% MEADOWESTOLIDE® and the control without MEADOWESTOLIDE®
- 13 Female subjects, age 40-63 years old, mild to moderately dry lips

Phase	Ingredient	Supplier	%w/w
A	Crambe Abyssinian Seed Oil (**FANCOR® Abyssinian Oil**)	**Elementis**	25.00
	CI 15850:2 (Red 6 Lake)	Sun Chemical	6.00
B	Ricinus Communis (Castor) Seed Oil		22.85
	C12-15 Alkyl Benzoate (and) Stearalkonium Hectorite (and) Propylene Carbonate (**BENTONE GEL® TN V**)	**Elementis**	10.00
	C12-15 Alkyl Benzoate (Finsolve TN)	Innospec	7.75
	Euphorbia Cerifera (Candelilla) Wax	Koster Keunen	6.30
	Microcrystalline Wax (Multiwax 180-W)	Sonneborne	5.60
	Talc (J-68-BC)	US Cosmetics	5.00
	Copernicia Cerifera (Carnauba) Wax	Koster Keunen	4.00
	Meadowfoam Estolide (**MEADOWESTOLIDE®**)	**Elementis**	3.00
	Beeswax	Strah & Pitsch	2.00
	Mica (and) Titanium Dioxide (Mica S-12)	Kobo	2.00
	Phenoxyethanol (and) Ethylhexylglycerin (Euxyl PE9010)	Schulke Inc	0.50

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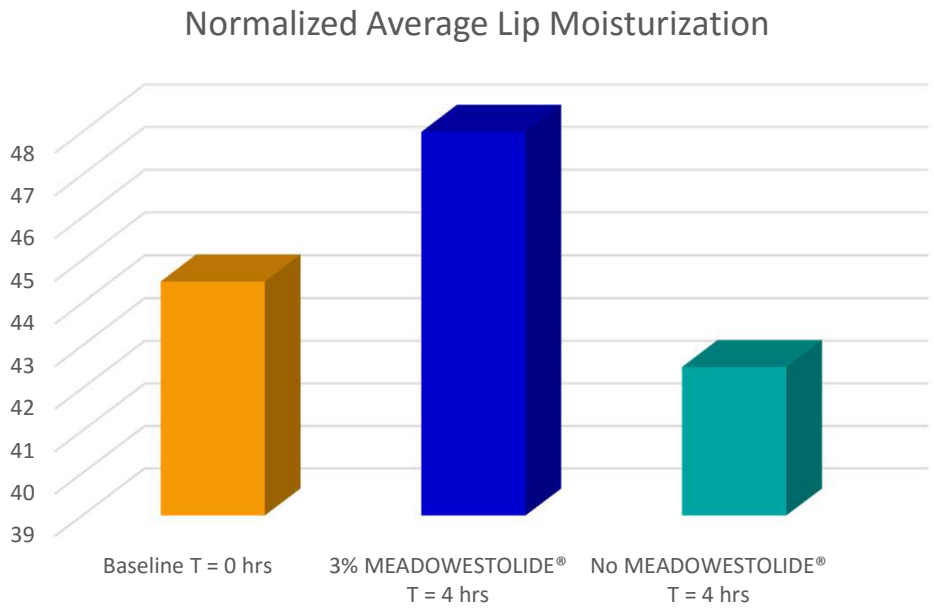
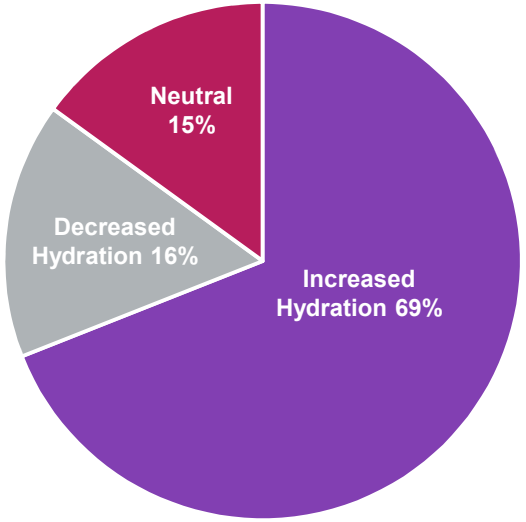
ADVANCED HYDRATION PERFORMANCE





- Lips remained hydrated over 4 hours after application of the lipstick with MEADOWESTOLIDE®

- Participant perception of lip hydration after single application

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ADVANCED HYDRATION PERFORMANCE

- MEADOWESTOLIDE® is a unique functionally active ingredient for the effective treatment of skin to provide anti-aging benefits
- MEADOWESTOLIDE® acts as a bioactive analogue of ceramides functioning as an efficient barrier to water loss
- Following the application of MEADOWESTOLIDE®, microphotographic images of skin provide clear visualization of improved tone, texture and overall appearance