



# An Assessment of Natural and Synthetic Emollients in Facial Serums

## OBJECTIVES:

### 1. QUANTITATIVE:

Understand the sensory characteristics of facial serums incorporating different emollients when evaluated by descriptive analysis with an expert panel.

### 2. QUALITATIVE:

Begin to understand the consumer sensory experience specific to facial serums containing different emollients.

## MATERIALS AND METHODS:

<b>QUANTITATIVE ANALYSIS - Trained Descriptive Analysis Panel</b>	<b>QUALITATIVE ANALYSIS - SCAN Consumer Sensory Experience</b>
Objective descriptive analysis with trained experts was conducted to understand the difference between emollients using defined descriptors.	A pilot consumer qualitative study (SCAN) was conducted in which panelists used products at home and/or in a qualitative research session.

The technical descriptive analysis provided an understanding of the sensory cues of individual products and the pilot consumer qualitative panel provided a contextual basis for understanding the descriptive analysis language.

## PRODUCTS TESTED:

8 facial milk\* serums prepared by Natural Plant Products, composed of a single emollient, emulsifier, and water.

### NATURALS

- Meadowfoam Seed Oil (MSO)
- Daikon Seed Extract (DSE)
- Meadowfoam Seed Oil/Daikon Seed Extract blend (MSO/DSE)
- Argan Oil (ARG)

### SYNTHETICS

- Pentaerythrityl Tetraethylhexanoate (PET)
- Cetyl Ethylhexanoate (CET)
- Dimethicone 100 cst (DMC100)
- Dimethicone 350 cst (DMC350)

\* A category of facial serums characterized by light, "milky" consistency.

# Results

## QUANTITATIVE ASSESSMENT:

The perceptual map is created from the quantitative descriptive analysis and shows the relationships among the attributes that define the sensory space and where the products fall in that space. A multivariate factor analysis (FA) was conducted on the average sensory profiles of the samples to identify key dimensions of sensory variability. The map shows meaningful groupings of products that take all sensory attributes into account. Meaningfulness is determined by natural groupings of products on the map.

### OBSERVATIONS:

- DSE, MSO/DSE and PET are similar in having a higher amount of residue/greasy residue than other products.
- CEH, and to a lesser extent ARG and MSO, have low residue with silicone & powdery character.
- The two dimethicone samples are similar to one another with low residue which is not oily or powdery but more waxy.

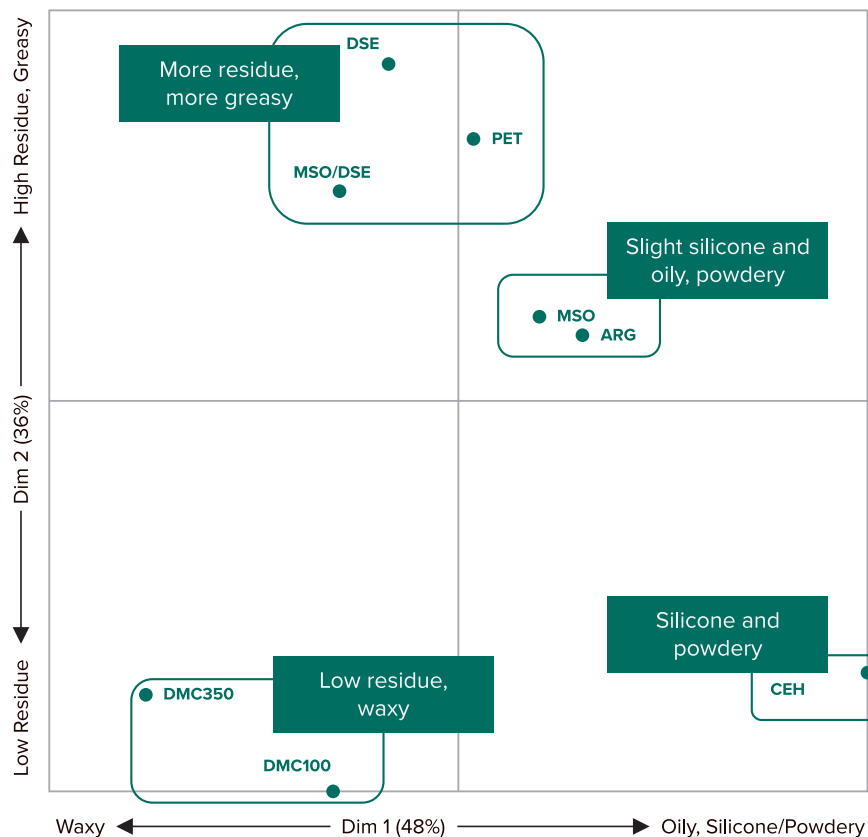


Fig.1 Quantitative analysis perceptual map

### CONCLUSIONS:

1. **NATURALS PROVIDE VIABLE SYNTHETICS SUBSTITUTES** - Based on comparative characteristics in the expert descriptive analysis panel, there may be an opportunity for natural ingredients to serve as substitutions for synthetic ingredients in simple systems or finished formulations.

#### Specifically:

- **MSO (or ARG) for CEH** - Meadowfoam seed oil is quick absorbing and leaves skin with a powdery feel with a touch of oil resulting in a lightweight finish. MSO may be a natural alternative to CEH and a less expensive option than Argan Oil.
  - **DSE and MSO/DSE for PET** - Both the daikon seed extract and the DSE/MSO blend perform similarly to PET and may be natural alternatives to this popular emollient.
2. **MSO PROVIDES MORE COST EFFECTIVE NATURAL ALTERNATIVE TO ARGAN** - MSO performed very similarly to the more expensive ARG so could provide a more cost-effective alternative where similar characteristics are desired.

# Language Matters - More About the Descriptors Used

Obviously, the specific language used by the panel of experts in this descriptive analysis is hugely important. The expert panel received Sensory Spectrum protocol training to maximize consistency in the definitions of language used. The following describes each characteristic included in the expert panel analysis to help guide the reader through the results.

TYPE OF RESIDUE	DESCRIPTION OF CHARACTER	REMINISCENT OF
<b>Oily</b>	A thin, pliable coating that is slippery and provides a smooth, continuous feel. May be described as fluid.	Baby oil, light mineral oil, some vegetable oils
<b>Waxy</b>	A thin, stiff, coated feel that is draggy/not slippery. Provides a smooth feel on the skin with an occlusive barrier. May feel sticky, especially when grease or wetness is present.	Wax or soy wax candle, hair styling wax
<b>Greasy</b>	A comparatively thick, cushiony coating that is somewhat draggy. Provides a heavy, sticky feel on the skin with a somewhat occlusive barrier.	Petrolatum, Shea Butter
<b>Silicone feel</b>	A very thin, slippery, pliable coating that is similar to oil. May feel very dry and generate a silky, powdery character.	Silicone oils, dimethicone hair products, some facial serums
<b>Powdery</b>	A thin, slippery coating that is very dry and has very small rounded particles having an almost continuous feel. Provides a smooth, silky feel on the skin similar to silicone oils.	Baby powder, cornstarch

# Results

## QUALITATIVE ASSESSMENT:

The descriptive analysis “language” identified by the trained expert panel in the quantitative analysis has limits. In a pilot study, exploratory qualitative discussions with highly articulate consumers (N=7) suggest they can both perceive and describe the differences found in the quantitative descriptive analysis. While some of the consumer assessments mirror the quantitative descriptive analysis, there are some variations in language used. The chart below summarizes recorded consumer perceptions of fit-to-benefit from the SCAN consumer panel in their qualitative home-use and group session assessments.

	NATURALS				SYNTHETICS (ESTERS and DMC)		
	MSO	DSE	MSO/DSE BLEND	ARG	CEH	PET	DMC350
Brightening	X		X	X	X		X
Hydrating	X				X		X
Easy to apply	X		X				
Good absorption	X		X	X	X		
Primed skin	X			X	X	X	X
Cushy “silicone feel”	X						
Matte finish	X					X	
Long-lasting	X		X				X
Powdery	X		X		X		
Smoothing	X		X			X	X
Dewy	X						
Pore minimizing		X					X
Velvety		X					
Good for oily skin					X		
Waxy							X

### OBSERVATIONS:

- Consumer vernacular used to describe various characteristics is very different than standard industry descriptors used in quantitative analysis (more on that on the next page).
- With the exception of “waxy” and “good for oily skin” the natural samples, MSO in particular, hit many or all of the same consumer benefits identified by consumers for the synthetic samples.
- The MSO formulation was perceived as having more of the benefits consumers had identified than the Argan formulation.
- Consumer favorites for “smoothing” and “long-lasting” were the MSO/DSE blend and MSO for being “fast-absorbing”.
- SCAN identified DMC350 as a concentrated product that smooths and tightens skin.

### FUTURE RESEARCH:

For statistical consumer data, future research will expand upon this current work with a larger quantitative consumer study to further explore the connection between the technical and consumer language use and correlations between the two.

# More About Natural Plant Products Emollients



## STUDY HIGHLIGHT:

MSO was assessed as having more combined consumer benefits in the pilot SCAN qualitative analysis than any of the other samples, natural OR synthetic.

## MEADOWFOAM SEED OIL

- Odorless & light-colored
- Superior stability
- Luxurious skin feel

### ADDITIONAL PRODUCT NOTES:

Meadowfoam Seed Oil is a fully refined triglyceride composed of approximately 95% fatty acids with chain lengths of 20 carbons or more. The oil is a light-colored, odor free product prized for its exceptional oxidative stability and functionality in a wide range of cosmetic and personal care formulations.

Meadowfoam Seed Oil is derived from the seeds of commercial meadowfoam (*Limnanthes alba*) fields in Oregon's Willamette Valley. It is extracted and refined to Natural Plant Products' exacting specifications which have been developed over 30 years of production experience.

SEE ALSO PRODUCT DATA SHEET AND OXIDATIVE STABILITY STUDIES at [www.meadowfoam.com/products/meadowfoam-seed-oil](http://www.meadowfoam.com/products/meadowfoam-seed-oil)



## STUDY HIGHLIGHT:

DSE was uniquely assessed in the consumer benefits assessment as having a "velvety" and "silky-smooth skin feel."

## DAIKON SEED EXTRACT

- Odorless & extremely light-colored
- Unique sensory profile
- Expeller-pressed

### ADDITIONAL PRODUCT NOTES:

Daikon Seed Extract is derived from the seeds of commercial daikon radish fields. Daikon Seed Extract is extremely light-colored and odorless.

Like Meadowfoam Seed Oil, its fatty acid composition differs greatly from the C16 and C18 dominated fatty acid composition that typifies so many edible and cosmetic grade botanicals.

The product imparts a delicate slip with good absorption, and presents a sensory profile more closely associated with esters and silicone type emollients. Daikon Seed Extract can also be used in the formulation of cosmetics certified according to the Ecocert, COSMOS and NPA standards.

SEE ALSO PRODUCT DATA SHEET AND EFFICACY STUDIES at [www.meadowfoam.com/products/daikon-seed-extract](http://www.meadowfoam.com/products/daikon-seed-extract)

# Study Results Summary for Natural Plant Products Emollients

## DSE/MSO BLEND

This 50/50 blend was tested to see if the unique attributes of each rendered different results than the straight MSO and DSE samples.

### STUDY HIGHLIGHTS:

- THE MSO/DSE seemed to hit a happy medium with consumers in the pilot qualitative study and was the consumer favorite for “smoothing” and “long-lasting” out of all the samples tested.
- The blend was also found in the quantitative analysis to leave skin feeling similar to the DSE sample but with longer playtime and more substantive, long-lasting connotation with consumers.



### ABOUT SENSORY SPECTRUM:

Sensory Spectrum is an innovative, multi-disciplinary team of experts in the field of sensory and consumer science. By linking advanced sensory methods to consumer research with the latest statistical analysis procedures, they provide business and technical solutions for industry, academia, and government.

### ABOUT NATURAL PLANT PRODUCTS:

The Original Producers of Meadowfoam Seed Oil, Natural Plant Products' 48 member farms in the Willamette Valley of Oregon, USA have produced botanical oils/extracts for the personal care industry for over 30 years. NPP's high integrity raw materials are sustainably sourced, with stable pricing and availability and are preferred by formulators of the world's leading personal care brands.

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