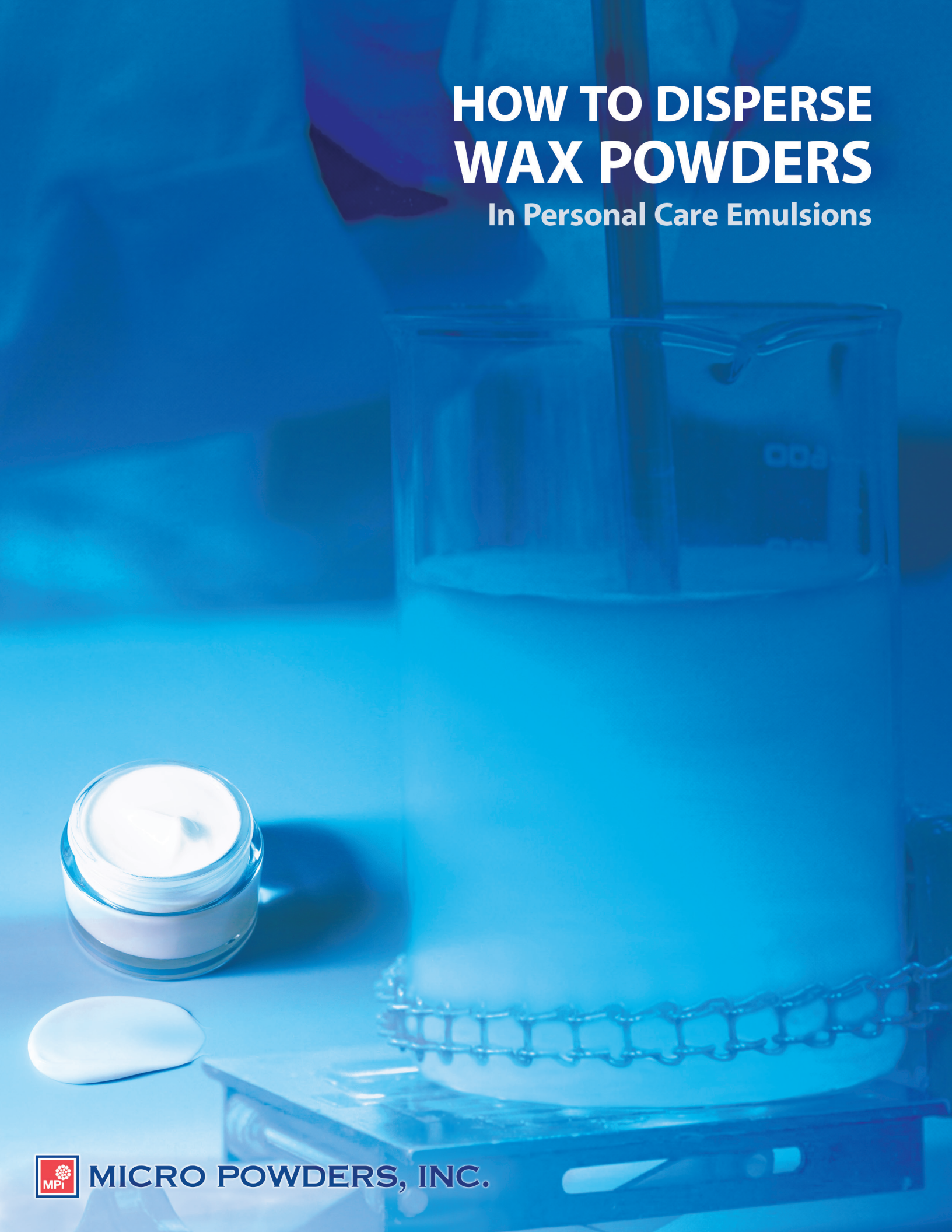


HOW TO DISPERSE WAX POWDERS

In Personal Care Emulsions

MICRO POWDERS, INC.

INTRODUCTION

Micro Powders develops and sells cosmetic additive powders based on a variety of natural and synthetic raw materials. Choosing a powdered ingredient influences and enhances various performance factors in emulsion products, including:

- **Lubricity**
- **Soft focus**
- **Oil absorption & oil binding**
- **Aesthetics & sensorial properties**
- **SPF boosting**
- **Emolliency**
- **Texture enhancements**
- **Transfer resistance & long wear properties**

It is important to understand the proper techniques to use when adding powders to a lotion, cream, emulsion, or other liquid personal care system. Without proper incorporation, the full benefits of these additive powders will not be achieved.

POWDER SURFACE ENERGY

Our cosmetic powders can be classified in two ways that differentiate how they will behave in liquid systems: hydrophilic and hydrophobic.

Hydrophilic powders are generally much easier to incorporate into either the oil or water phase as they require less energy to wet and disperse the individual particles. Our cellulosic products (Naturesoft 800, Naturecel Series) are examples of hydrophilic powders.

The majority of products in our portfolio are based on hydrophobic (lipophilic) materials that require a bit more attention to properly incorporate, especially in the water phase. These include popular products based on carnauba wax, rice bran wax, and synthetic wax.

POWDER MELTING POINT

Powder Type	Examples	Melting Point (°C)
Rice Bran Wax	Naturesoft 860R/S	77-82
Synthetic Wax	Microease Series	108-113
Polyhydroxybutyrate (PHB)	Biosoft 915	170-180
Cellulose Microcrystalline Cellulose Cellulose Acetate	Naturesoft 800 Naturecel 750 Naturecel 793	Does not melt

POWDER DENSITY

The density of a powder additive affects how the particles behave once dispersed into a liquid. If the density of the powder is lower than the density of the liquid, the powder will want to rise to the surface and float. If the density of the powder is higher than the density of the liquid, the particles will want to sink. Examples:

Powder Type	Examples	Density	Formula Type	Result
Synthetic	Microease Series	0.93-0.95	Waterbased (density 1.0)	Float
Natural	Microcare 350	1.00		Stable
Cellulose-based	Naturesoft 800	1.50		Sink

Viscosity will strongly affect the rate of this flotation or settling; higher viscosity systems will respond much more slowly than lower viscosity systems. In most skincare systems, density (and migration of particles) will not be an issue.

HOW TO DISPERSE - STEP BY STEP

1. Find your product on the table below
2. Determine if the powder is hydrophobic or hydrophilic
3. Review the options for order of addition and select based on your formulation design
4. Confirm that your process will not approach or exceed the powder melting point
5. Gradually add the powder to the formulation with mixing and shear energy to wet, disperse, and homogenize the powder into the liquid

Note: typical dosage levels can range from 1-10% depending on the formulation and desired effect

Powder Type	Melting Point °C	Surface Energy		Pre-Emulsification		Post-Emulsification
		Hydrophobic	Hydrophilic	Water Phase	Oil/Silicone Phase	
Biosoft 915	170-180	●		●	●	●
Ecosoft 608	170-180	●				●
Ecosoft 608XF	170-180	●			●	●
Ecosoft 611	83-86	●			●	●
Ecosoft 627S	150-160	●			●	●
Mattewax 511	160-170	●			●	●
Microcare 325	107-113	●			●	●
Microcare 350	83-86	●		●	●	●
Microcare 350S	83-86	●			●	●
Microease 110S	108-113	●			●	●
Microease 110XF	108-113	●			●	●
Microease 114S	110-116	●			●	●
Micropoly 1160S	109-112	●			●	●
Micropoly 200	110-116	●			●	●
Micropoly 220	123-125	●			●	●
Micropoly 220L	123-125	●			●	●
Micropoly 250S	129-131	●			●	●
Microsilk 422	110-116	●			●	●
Microsorb 988S	110-114	●		●		●
Naturecel 750	–		●	●		●
Naturecel 793	–		●	●		●
Naturesoft 800	–		●	●		●
Naturesoft 810	85-88	●			●	●
Naturesoft 860R	77-82	●		●	●	●
Naturesoft 860S	77-82	●			●	●
Naturesoft 880GT	82-86	●			●	●
Naturesorb 1000	83-86	●		●		●

RECOMMENDED EQUIPMENT

A variety of mixers and blades may be used to disperse dry wax powders. The following is a general guide, and not a limited list, of acceptable equipment. Optimal mixing equipment will vary by formulation.

High Shear Mixer with Homogenizing Mixer Shaft and Slotted Workhead (Ross, others)

OR

Impeller Mixer and Dispersion Blade (Caframo, others)

OR

ConnBlade Type ITT

HOW TO VERIFY PROPER POWDER DISPERSION

It is recommended to check the quality of the powder incorporation into an emulsion system to verify that it was well-dispersed and properly wetted. This is a relatively easy procedure using a spatulation method.

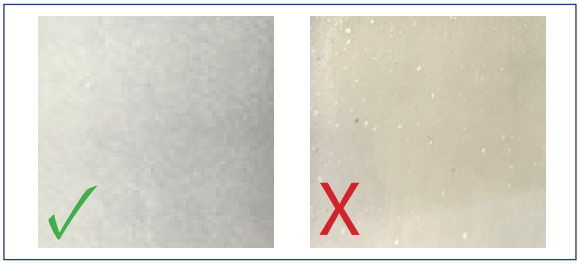
Spatulation Testing Method

Required Items:

- Finished product
- 3" wide spackling blade (stiff)
- Black cardstock paper
- 1" wide stainless steel spatula

Instructions:

1. Fasten cardstock with tape on the benchtop surface
2. Using the stainless steel spatula, pick up about 10-15g of finished product and place on top center of cardstock
3. Gently use the edge of the spackling blade to evenly spread out the product mass, then clean the blade
4. Place the wide/flat surface of the spackle blade on the spread out product, and at a 20-30° angle, very slowly and gently drag the blade down over the product through the entire length of the paper so it spreads in a very thin even layer
5. Inspect the drawdown for any undispersed white particles/agglomerates



THE GELSPERSION OPTION

If you prefer to use pre-dispersed wax in an anhydrous gel instead of a dry powder, Micro Powders offers NatureGel MC750, GelMatte 511, and GelCream 114S. These products are easy to add directly to your formulation and may even be used as a base. Contact us for more information.

HAVING PROBLEMS?

Micro Powders' Technical Support Staff are just a phone call or e-mail away and are always available to help. If you are facing challenges with your application and need assistance, please contact us.