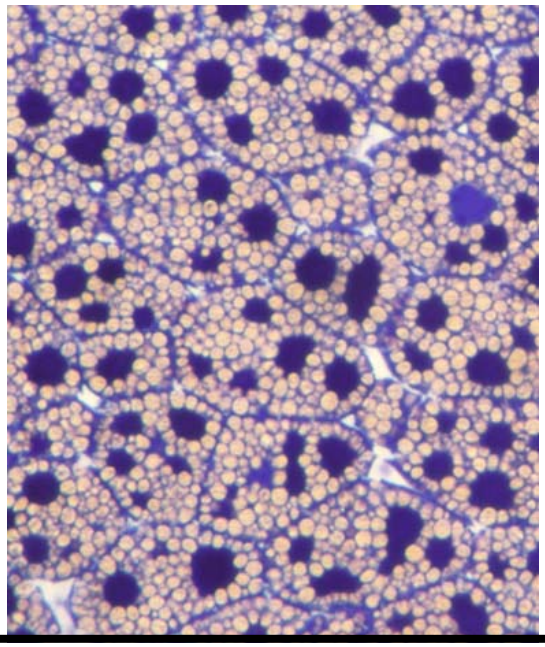




OLEOSOME TECHNICAL BULLETIN

Raising the Bar in Going Green

Oleosomes are found in a variety of oil bearing seeds and function as storehouses for oil, used as an energy source during germination. Botaneco isolates these microspheres using a patented solvent-free process, to yield the most natural, effective emulsification and delivery system on the market today.

END-CONSUMER BENEFITS

Oleosomes offer customers a "difference you can feel" in an *all-natural* format

Improved Skin Health: Rebuilds the skin barrier faster by retaining skin lipids, therefore improving moisturization twice as fast as standard, irritating non-ionic emulsions

Outstanding Aesthetics: Customers prefer Oleosome-based formulations and their aesthetic characteristics, "a difference you can feel"

MANUFACTURER BENEFITS

Oleosomes allow you to formulate better products while increasing manufacturing efficiencies

Increased Throughput: Enables you to make a formulation in the lab or the plant quicker and with less energy (i.e. cold process)

Upgraded Formulations: Replace synthetic emulsifiers and barrier agents, while extending the release of actives, fragrances and other oil soluble ingredients

VERSION 4 – 05/01/09

BOTANECO
THE OLEOSOME COMPANY

OLEOSOMES : END-CONSUMER BENEFITS

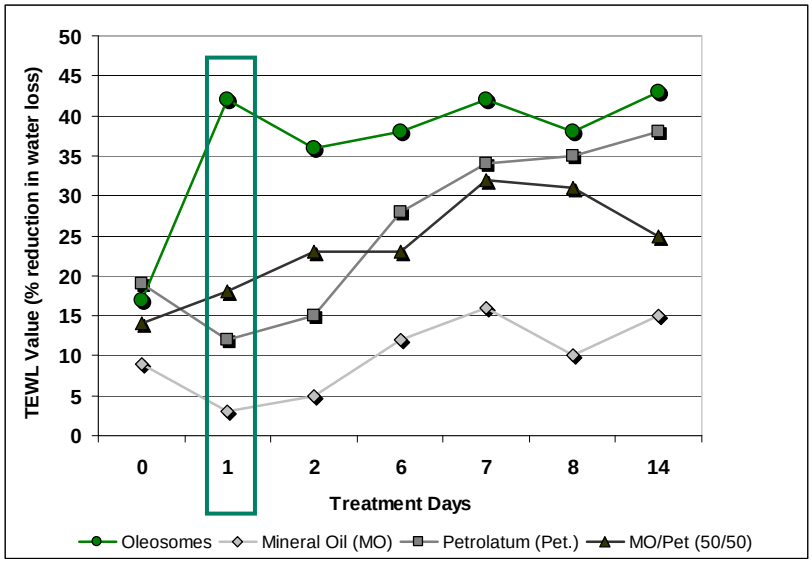
➢ Improved Skin Health: Oleosomes rebuild the skin barrier faster by preventing the disruption of skin lipids, thereby improving moisturization twice as fast as irritating non-ionic emulsifiers.

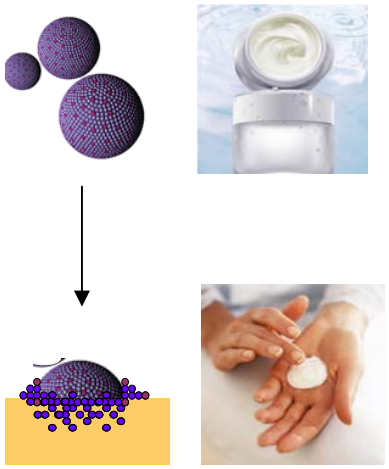
Non-ionic emulsifiers are disruptive and irritating to the skin

- ✓ Several recent research studies have shown that ethoxylated non-ionic emulsifiers cause skin irritation and increased moisture loss (as measured by TEWL) upon application, by disrupting the protective lipids surrounding skin cells (Barany et al, Int J Pharmaceutics 195 (2000)).
- ✓ As depicted in the graph below, disruption of the skin biofilm by standard non-ionic emulsifiers retards the ability of petrolatum / mineral oil to reduce moisture loss and delays barrier formation on the skin.

Oleosomes are a significantly milder, more moisturizing alternative to ethoxylated non-ionic emulsifiers

- ✓ Oleosomes have a unique mechanism that does not disrupt skin cells, therefore reducing the irritancy potential. While in a formulation, the Oleosome structures are intact and able to function as efficient emulsifiers. When the formulation is applied to the skin, Oleosomes collapse and lose their emulsification ability without deleterious effects on the skin. This mechanism is called transient emulsification and is unique to Oleosomes.
- ✓ This combination of transient emulsification and safflower oil release allows Oleosome-based formulations to achieve maximum reduction in water loss (moisturization) and barrier formation on the skin in the first 24 hours.





The Effect of Transient Emulsification

➢ Outstanding Aesthetics: Customers prefer Oleosome-based formulations and their aesthetic characteristics, "a difference you can feel"

Natural formulations with an Oleosome base were preferred over a natural prestige moisturizer containing a traditional non-ionic emulsifier base

- ✓ Single blinded consumer panel studies (n=20) demonstrated that the aesthetics of moisturizers made with Oleosomes were equivalent to or preferred overall and had better perceived skin conditioning than a national prestige moisturizer made with ethoxylated non-ionic emulsifiers

Parameter	Both Formulations are equivalent	Preference for Oleosome based moisturizers	Preference for non-ionic based moisturizer
Perceived skin conditioning (after 4 hours)	35%	50% (10 / 20)	15%
Overall Preference	40%	40% (8 / 20)	20%

OLEOSOMES : MANUFACTURER BENEFITS

➢ Increased Throughput: Enables you to make a formulation in the lab or the plant quicker and with less energy (I.e. cold process)

Formulate up to 6 times faster in the lab with Oleosomes compared to traditional hot process approach

- ✓ Oleosomes are very efficient cold-process emulsifiers with an operational HLB range of 5 – 15. This allows emulsification of most oil-phase ingredients used in personal care products without the need for secondary emulsifiers.
- ✓ Thickeners are required to build viscosity, and a variety of thickening systems are compatible including water-phase thickeners (gums, celluloses, clays) and oil-phase thickeners (cetyl alcohol, beeswax, esters). Acrylates are also compatible.
- ✓ Typical Oleosome-based formulations take 30 minutes to 1 hour to prepare, and can be entirely cold-process or a modified hot-process (≤55°C to incorporate high melting oil phase ingredients). This is compared to 3 or 4 hours using traditional hot process.

Manufacture up to 3 times faster in the plant with Oleosomes compared to traditional hot processing

- ✓ Oleosomes formulations can significantly reduce manufacturing cycle time, while lowering energy consumption, thereby saving money. Below is a real example of the type of savings realized by one of our customers;

Product Line: Skincare lotions	Oleosome Cold-process (Now)	Traditional Hot-process (Before)
Manufacturing Production Time (per batch)	6 hours	16 hours
Energy Consumption (Heating, per batch)	0 BTUs	2,500,000 BTUs

➢ Upgraded Formulations: Replace synthetic emulsifiers and barrier agents, while extending the release of actives, fragrances and other oil soluble ingredients.

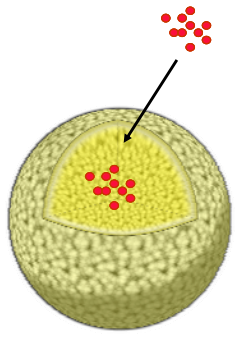
Convert traditional formulations to natural ones without sacrificing performance

- ✓ Oleosomes can completely replace or supplement several ingredient classes in a formulation, including all emulsifiers (non-ionic, anionic and amphoteric), occlusive agents (petrolatum, mineral oil), emollient esters and anti-oxidants.

Extend release of actives, fragrances and other ingredients for better activity

- ✓ Oil-soluble actives (MW <3000) can be directly loaded into Oleosomes, where they will be protected from oxidation and then be released to the skin upon collapse of the structure.
- ✓ Double blinded studies demonstrated that consumers can detect continuous fragrance release over 8 hours with Oleosome formulations that is superior to the fragrance detected from traditional hot process emulsions.
- ✓ A variety of oil soluble actives have been successfully loaded into Oleosomes at varying efficiencies

Oil Phase Ingredient	% Loading Percentage into Oleosomes
Tocopherol Acetate (Vitamin E)	30 %
Octyl-p-methoxycinnamate (UVB)	30 %
Octyl Salicylate (UVB)	25 %
Diethyl Toluamide (insect Repellant)	10 %



OLEOSOME INGREDIENT OFFERINGS

	DESCRIPTION	FEATURES	IDEAL PRODUCT APPLICATIONS
Hydresia PE NEW !	INCI – Carthamus Tinctorius (Safflower) Oleosomes + Water ➢ 75% Oleosomes + Phenoxyethanol preservative system	➢ Formulation pH range of 5.5 – 9.0 ➢ High active concentration for excellent skin feel	➢ Mass market skincare ➢ Traditional color cosmetics ➢ Inorganic sunscreens
Hydresia SF2 NEW !	INCI – Carthamus Tinctorius (Safflower) Oleosomes + Water ➢ 65% Oleosomes + EcoCert® preservative	➢ Formulation pH range of 3.5 – 9.0 ➢ Stable in high-alcohol formulations ➢ EcoCert® compliant	➢ Natural skin care ➢ All low pH formulations (e.g. exfoliant, acne product) ➢ All high alcohol formulations (e.g. hand sanitizer, wipes)
Hydresia G2	INCI – Carthamus Tinctorius (Safflower) Oleosomes + Water + Glycerin ➢ 60% Oleosomes + EcoCert® preservative	➢ Formulation pH range of 3.5 – 9.0 ➢ Glycerin for foam boosting and increased humectancy ➢ EcoCert® compliant	➢ Natural skin care ➢ All cleansers (e.g. bodywash, scrub, facial care) ➢ All haircare (e.g. conditioner, treatments)
Hydresia Dulcé	INCI – Prunis Dulcis (Sweet Almond) Oleosomes + Water + Glycerin ➢ 60% Oleosomes + EcoCert® preservative	➢ Formulation pH range of 3.5 – 9.0 ➢ Glycerin for foam boosting and increased humectancy ➢ EcoCert® compliant	➢ Premium personal care ➢ Secondary ingredient in other Oleosome formulations to boost aesthetics

For more information, including a list of distributors, please visit us at www.botaneco.ca

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