

Distinctive® Emul-Lipid BA & ST

Bio-Active Emulsifiers



PRODUCT: Distinctive® Emul-Lipid BA*

INCI NAME: Polyglyceryl-10 Mono/Dioleate (and) Polyglyceryl-3 Oleate (and) Glycerin (and) Phosphatidylglycerol

EINECS #: N/A, 251-749-7, 200-289-5, 296-212-8

CAS #: N/A, 33940-98-6, 56-81-5, 92347-24-5

PRODUCT: Distinctive® Emul-Lipid ST

INCI NAME: Glycine Soja (Soybean) Sterols (and) Glyceryl Cocoate

EINECS #: N/A, 263-027-9

CAS #: N/A, 61789-05-7

*China complaint version available.

THE CONCEPT

Emulsifiers are one of the most important raw materials used in formulations as they are the key building blocks of formulation chassis.

Similar to an automobile, there are several key performance indicators of formulation chassis. Building a stable emulsion is crucial to the success of any final formulation. Not only is the emulsifier the driver behind the stability, but it can also drive the texture and performance of the system. Developing a desirable and appealing texture, having an excellent sensory profile, being versatile and allowing the development of systems such as thin lotions to thick creams, ease of use, no need to adjust HLB, are all extremely important characteristics to emulsifiers. Equally important is the ability for an emulsifier system to be compatible with a broad range of ingredients such as silicones, natural oils, hydrocarbons and sunscreens. Additional benefits that are of growing industry importance are the ability to produce formulations using less energy, such as cold processing or no homogenization required. Achieving all of these attributes from naturally derived emulsifiers is even more challenging.

Ideally, all formulators would like to enhance their formulations beyond just the chassis. A new approach to the improvement of the building blocks of any formulation is the concept of adding active components directly into the emulsification system. At Vantage, we have accomplished this task with our line of bio-active emulsifiers- **Distinctive® Emul-Lipid BA** and **Distinctive® Emul-Lipid ST** allowing your formulation to operate at its ultimate performance.



KEY BENEFITS

- Natural Based Chemistry (PEG-free)
- Unique Sensory Properties
- 100% Plant Origin
- Cold-Process Emulsifier (Distinctive® Emul-Lipid BA only)
- Excellent Color Laydown

IDEAL FOR USE

- Color Cosmetics
- Creams & Lotions
- Sensitive Skin Formulations
- Sun Care



SPECIALTY EMULSIFIERS

RESOURCES OF NATURE  RESOURCES OF NATURE

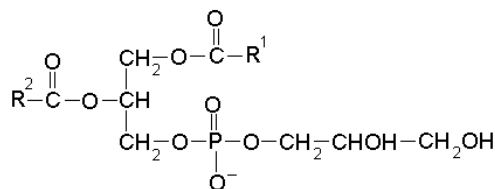
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WHAT IS DISTINCTIVE® EMUL-LIPID BA?

Distinctive® Emul-Lipid BA is a unique oil-in-water emulsifier based on naturally derived polyglyceryl chemistry. As a natural choice for improving product stability and performance while minimizing the potential of bio-incompatibility and irritation, this plant derived emulsifier can be formulated into a wide variety of oil-in-water emulsions. **Distinctive® Emul-Lipid BA** contains a unique plant based phospholipid, called Phosphatidylglycerol.



WHAT DOES DISTINCTIVE® EMUL-LIPID BA DO?

Distinctive® Emul-Lipid BA is a unique emulsifier and building block for oil-in-water formulations. It contains the unique plant derived phospholipid, Phosphatidylglycerol. Phosphatidylglycerol is an important constituent of cell membranes typically found in animal tissue at levels between 1-11% of the total lipid content. Research suggests Phosphatidylglycerol offers a regenerative signaling pathway that prompts skin cells to regulate cell proliferation and differentiation. (*Figure 1 below*) It is this important bio-identical constituent that helps make **Distinctive® Emul-Lipid BA** highly skin bio-available and allows it to replenish naturally occurring components to the skin, rebalancing cellular homeostasis and restoring barrier function to protect against drying and environmental stress.

This unique biomimetic skin compatibility makes it a perfect ingredient for use in color cosmetics that contain high levels of pearls and pigments, as it provides excellent color laydown on the skin. This aspect makes it the perfect emulsifier for buildable color with a smooth finish while providing moisturization and hydration.

EPIDERMAL HUMAN KERATINOCYTES GROWN TO A DIFFERENTIATED STATE

Epidermal human keratinocytes grown in the presence of (A) Control and (B) **Distinctive® Emul-Lipid BA**.

Note the organized tight junctions between cells grown in the presence of **Distinctive® Emul-Lipid BA** suggestive of a differentiated state, while cells in (A) are more scattered and isolated from each other, possibly geared towards further migration and/or proliferation (original mag. X100).

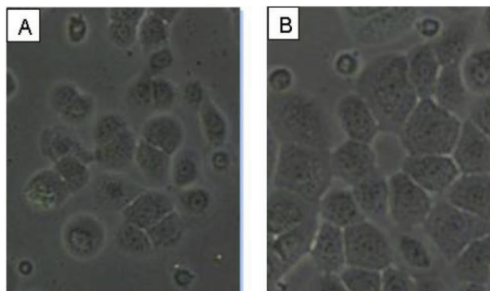


Figure 1

IN-VITRO STUDIES

DISTINCTIVE® EMUL-LIPID BA VS. EMUL-LIPID CONTROL (NO PHOSPHATIDYLGLYCEROL)

Human Gene Expression of Distinctive® Emul-Lipid BA

In the Human Gene Expression study of **Distinctive® Emul-Lipid BA**, 8 out of 84 genes on the Wnt PCR array panel were differentially expressed by **Distinctive® Emul-Lipid BA**. The directionality of the modulation indicates a controlled increase of expression of Wnt genes involved in proliferative/pro-regenerative progenitor cell homeostasis (FZD8, WNT7B, WNT10A), as well as cell differentiation (FZD2, JUN), consistent with the morphological changes observed microscopically (**Figure 1**). This increase may be balanced by the negative regulator SFRP1, itself a powerful pro-differentiation effector.

In conclusion, **Distinctive® Emul-Lipid BA** is a bioactive material with progenitor (basal layer stem) cell - normalizing and skin - regenerative benefits, which could result in improved overall skin homeostasis.

Modulation of wnt pathway genes by 0.05% EMU-BA with phosphatidylglycerol, as compared to EMU-CTR (without phosphatidylglycerol).			
Position on array	Symbol	Fold Regulation vs. EMU CTR	Comments
C06	FRAT1	C06	Activator of Wnt canonical signaling through inhibition of GSK-3.
C10	FZD2	C10	Increased in differential tissues (Choi et al., 2008). Accordingly, Frizzled 2 increases the intracellular Ca ²⁺ level, consistently with the role of this ion in keratinocyte differentiation (Niu et al., 2012).
D03	FZD8	D03	Frizzled 8 decreases with age in progenitor cells. Its upregulation may "rejuvenate" these cells, making them more capable of tissue regeneration (Brunt et al., 2012).
D06	JUN	D06	Jun is a target of Wnt canonical pathway. Jun is an early differentiation marker (Blatti & Scott, 1992; Murry et al., 2013) and an effector of TGF-beta - a key effector in skin homeostasis.
D07	KREMEN 1	D07	Kremen1 (Krm1) is a negative regulator of the canonical Wnt signaling pathway.
E09	SFRP1	E09	SFRP1 Induces differentiation, inhibits proliferation of epithelial cells and negatively regulates Wnt pathway.
F10	WNT10A	F10	Induced by TGF-beta. Activator of WNT/ -catenin signaling. WNT10A, in addition to the formulation of teeth and hair follicles, is of importance for the formulation of nails, regeneration of the epidermis, papillae of the tongue and sweat gland function. Loss of function results in dry skin, abnormal hair patterns and nail malformations (Nawaz et al., 2009).
G10	WNT7B	G10	Wnt7b plays an important role in stem cell homeostasis and in the tissue repair and regeneration (Lin et al., 2010; Kandyba et al., 2013).

MODULATING HYDRATION RELATED AND INFLAMMATORY GENES

While the constitutively-expressed COX1 was not affected by **Distinctive® Emul-Lipid BA**, the inducible proinflammatory COX2 was inhibited by **Distinctive® Emul-Lipid BA**, while AQP3 was upregulated, as compared to the phosphatidylglycerol-free placebo Control.

Modulating Hydration Related and Inflammatory Genes

Gene expression in EMU-BA relative to EMU-CTR	AQP3	COX1	COX2 (PGS2)
Fold Regulation	1.68	-1.07	-2

DISTINCTIVE® EMUL-LIPID BA VS. POLYSORBATE 80

Collagen I Stimulation & Mitochondrial Metabolism in Human Dermal Fibroblasts

Distinctive® Emul-Lipid BA is a non-disruptive emulsifier.

Test Material	Type I Collagen (% Control)	p value	Mitochondrial Metabolism (% Control)	p value
H2O	100	1	100	1.000
Emu-BA 0.5% (5mg/ml)	60	0.000	84	0.028
Emu-BA 0.1% (1mg/ml)	51	0.000	81	0.007
Emu-BA 0.02% (200µg/ml)	102	0.712	107	0.202
PS80 0.5% (5mg/ml)	3	0.000	N/A	0.000
PS80 0.1% (1mg/ml)	3	0.000	12	0.000
PS80 0.02% (200µg/ml)	4	0.000	42	0.000
MAP	156	0.000		0.069

WHAT IS DISTINCTIVE® EMUL-LIPID ST?

Distinctive® Emul-Lipid ST is a unique “bio-mimetic” co-emulsifier, rich in phytosterols and humectants.

WHAT DOES DISTINCTIVE® EMUL-LIPID ST DO?

Distinctive® Emul-Lipid ST is the perfect co-emulsifier to utilize with **Distinctive® Emul-Lipid BA** allowing the creation of creams and lotions with excellent skin compatibility and delivery properties. With its outstanding mildness, superb conditioning benefits, smooth texture and enhanced lubricity, **Distinctive® Emul-Lipid ST** is ideal for numerous skin and hair care applications.

HOW DO I USE DISTINCTIVE® EMUL-LIPID BA AND DISTINCTIVE® EMUL-LIPID ST?

Distinctive® Emul-Lipid BA is recommended for use in thin/low-viscosity emulsions with small droplet size (*Figure 2 below*) where stability may be challenging. Recommended use level is from 2-6% when added to the oil phase. **Distinctive® Emul-Lipid BA** has an HLB of 9 and can emulsify a wide range of oils up to 30%. It is also compatible with UV sun filters. Ideal formulation pH range is between 4.5 - 6.5.

Distinctive® Emul-Lipid BA is not compatible with cationics.

Distinctive® Emul-Lipid ST is recommended as a co-emulsifier and should be used in conjunction with **Distinctive® Emul-Lipid BA**. It can be easily added to the oil phase along with **Distinctive® Emul-Lipid BA**. When preparing the emulsion, heat the oil phase to 75°C. The ideal pH range is between 4.5-6.5.

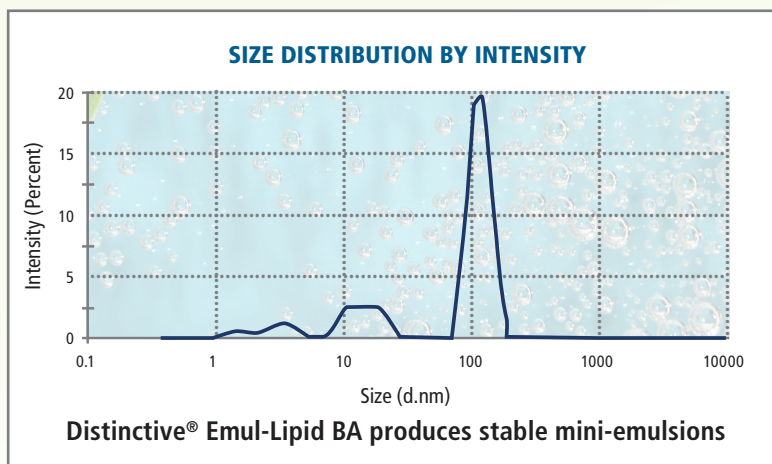


Figure 2

TYPICAL PROPERTIES OF DISTINCTIVE® EMUL-LIPID BA

Appearance @25°C

Dark Yellow to Light Brown Liquid

Odor

Characteristic

Recommended Use Level

2-6%

DISTINCTIVE® EMUL-LIPID ST

Soft Yellow to Orange Wax

Characteristic

0.5-1% in combination with 5 -6% Distinctive® Emul-Lipid BA



All data, including the formulations and procedures discussed herein, to the knowledge of Vantage, are believed to be correct, reliable and accurate. Please note, however, that Vantage does not warrant or guarantee any accuracy, reliability or completeness of the information contained herein. It is the user's responsibility to determine the suitability and completeness of such information for the user's particular use (including performing any necessary confirmatory tests). Vantage is not responsible or liable for any loss or damage that may occur from the use of this information, nor do we warrant against any patent infringement. Nothing contained herein shall be construed as providing any permission, recommendation, or inducement to practice any patented invention without permission of the patent owner.