

Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester Moisturizing Emulsifier for Low Viscosity Formulations



INCI Name: Polyglyceryl-10 Oleate

SAP Code#: 1007182

Versatile O/W Emulsifier

- Non-ionic emulsifier with HLB value of 12
- Superior product aesthetics with great long-term stability
- Provides long-lasting moisturization to skin
- Excellent PEG alternative, EO-free emulsifier

Naturally Derived

- ECOCERT and Soil Association approved
- Manufactured from 100% plant-derived raw materials

High Flexibility

- In conjunction with Polyaldo® HGDS KFG (6-2-S), forms highly stable, low viscosity emulsions
- Efficient in concentrations from 1–3%
- Suitable for a wide range of formulation types

Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester: Plant-Based Emulsifier for Low Viscosity Emulsions

Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester is an ester emulsifier derived from 100% plant-origin raw materials. In conjunction with Polyaldo® HGDS KFG (6-2-S) Polyglyceryl Ester, this versatile emulsifier forms stable, O/W emulsions with low viscosities suitable for skin and hair care applications. In addition, Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester has been shown to provide enhanced moisturization to the skin. Due to the non-ionic character of Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester, it is compatible with a broad range of co-emulsifiers. Furthermore, it is ECOCERT and Soil Association approved which makes Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester the smart choice for green and PEG-free formulations.

Low Viscosity Emulsions with Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Esters!

Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester is composed of two parts; a hydrophilic head group and hydrophobic tail group. The hydrophilic head group consists of ten (10) units of glycerin while the hydrophobic tail group is made of one (1) molecule of oleic acid, a fatty acid (fig. 1).

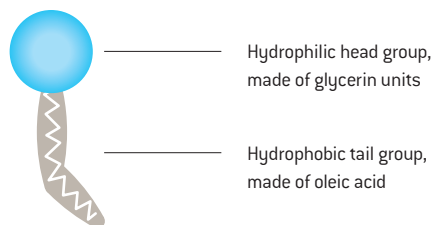


Fig. 1
Molecular representation of Polyaldo® 10-1-0 KFG (NON-GMO). The red represents the hydrophilic head group. The yellow represents the hydrophobic tail group.

Your Special Emulsifier Blend for Low Viscosity Emulsions: Polyaldo® 10-1-0 KFG (NON-GMO) and Polyaldo® HGDS KFG (6-2-S) Polyglyceryl Esters!

When combined with Polyaldo® HGDS KFG (6-2-S), a twin-tailed polyglyceryl ester made with stearic acid, Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester creates stable, low viscosity emulsions. This is due to the synergies between their molecular structures and the inherent nature of oleic acid.

Polyaldo® 10-1-0 KFG (NON-GMO) contains oleic acid, a monounsaturated fatty acid. Oleic acid contains a double bond in its fatty acid chain, causing the tail section of Polyaldo® 10-1-0 KFG (NON-GMO) to “kick” outwards. This causes Polyaldo® 10-1-0 KFG (NON-GMO) to form a trapezoidal packing structure (fig. 2a).

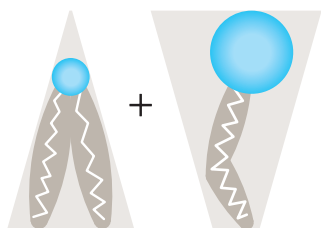


Fig. 2a

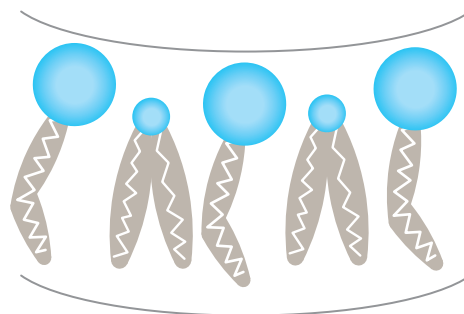


Fig. 2b

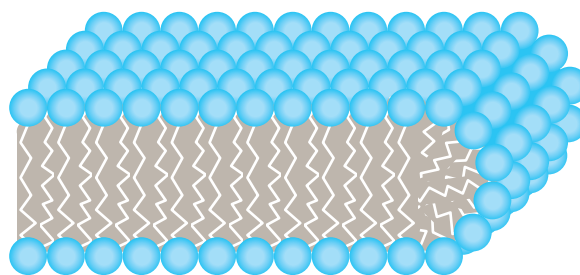


Fig. 2c
Fig. 2a, b, c The combination of Polyaldo® HGDS KFG (6-2-S) and Polyaldo® 10-1-0 KFG (NON-GMO) form a novel order at the oil/water interface, creating curved lamellar structures.

Polyaldo® HGDS KFG (6-2-S), on the other hand, has a twin tail molecular structure, with a smaller hydrophilic head and larger hydrophobic tails, forming a triangle packing structure. When the two emulsifiers are combined in a formulation, they create a novel order at the oil/water interface (fig. 2b). The packing of these Polyaldo® emulsifiers creates curved lamellar structures (fig. 2c), which are ideal for forming quality emulsions with improved stability but have lower viscosities.

To confirm the efficacy of Polyaldo® 10-1-0 KFG (NON-GMO) and Polyaldo® HGDS KFG (6-2-S), a base emulsion was created utilizing the two emulsifiers and compared against a traditional emulsifier system, Steareth-2 and Steareth-21. The combined emulsifiers were used at a 2% use level in the presence of 15% oil phase and 3% fatty alcohol. The emulsions were created under identical conditions and evaluated concurrently.

Evaluation of Polyaldo® 6-2-S + Polyaldo® 10-1-0 vs. Traditional Emulsifier Base

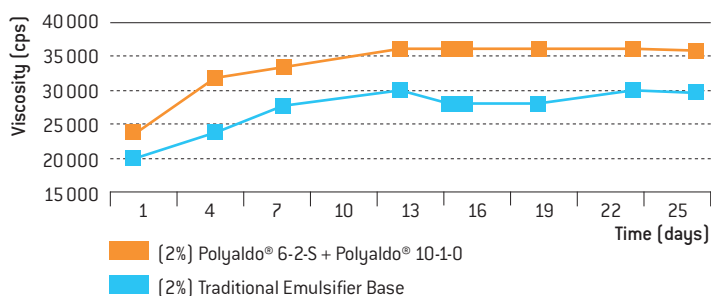


Fig. 3
Evaluation of Polyaldo® 10-1-0 KFG (NON-GMO) + Polyaldo® HGDS KFG (6-2-S) formulation versus a traditional emulsifier base (Stearth-2 + Steareth-21)

The results in figure 3 show the emulsion base made with Polyaldo® 10-1-0 KFG (NON-GMO) and Polyaldo® HGDS KFG (6-2-S) had a higher viscosity compared to the traditional emulsifier system. The combined Polyaldo® emulsifier system had a 23% higher overall viscosity compared to the traditional emulsifier system, a perceivable difference.

When we compare the Polyaldo® 10-1-0 KFG (NON-GMO) + Polyaldo® HGDS KFG (6-2-S) base to a base containing another polyglyceryl ester blend [Polyaldo® 10-1-S Pastillated + Polyaldo® HGDS KFG (6-2-S)], we see the Polyaldo® 10-1-0 KFG (NON-GMO) + Polyaldo® HGDS KFG (6-2-S) base has a lower viscosity (fig. 4).

Evaluation of Polyaldo® 6-2-S + Polyaldo® 10-1-0 vs. Polyaldo® 6-2-S + Polyaldo® 10-1-S Emulsion Bases

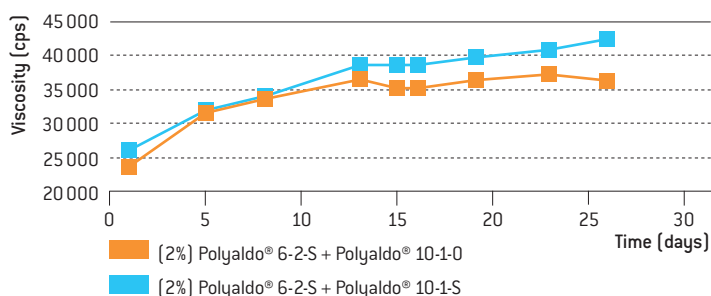


Fig. 4
Evaluation of Polyaldo® 10-1-0 KFG (NON-GMO) + Polyaldo® HGDS KFG (6-2-S) formulation versus Polyaldo® 10-1-S Pastillated + Polyaldo® HGDS KFG (6-2-S)

These polyglyceryl ester combinations provides formulators a variety of emulsifier systems to utilized for different finished products. For example, if a formulator were interested in making a sprayable emulsion, the recommendation is to utilize the Polyaldo® 10-1-0 KFG (NON-GMO) + Polyaldo® HGDS KFG (6-2-S) emulsifier blend. If a formulator were interested in creating a daily face lotion, the recommendation is to utilized the Polyaldo® 10-1-S Pastillated + Polyaldo® HGDS KFG (6-2-S).

Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester is your emulsifier solution for lower viscosity formulations. This naturally-derived, plant-based emulsifier provides you an EO-free option and an alternative to PEG-based chemistries. When combined with Polyaldo® HGDS KFG (6-2-S), Polyaldo® 10-1-0 KFG (NON-GMO) Polyglyceryl Ester creates formulations with excellent stability and enhanced formulation aesthetics.

Polyaldo® 10-1-0 KFG (NON GMO) In Vivo Dry Skin Clinical Study

Objective

To measure the moisturization efficacy of Polyaldo® 10-1-0 KFG (NON GMO)

Clinical Testing Protocol:

- 5 female subjects with moderate to severe skin dryness (Grade 3)
- Efficacy was measured using the Nova DPM 9003
- Both legs were treated with 4 mg/cm² twice daily for 2 weeks, one leg with the polyglyceryl ester (PGE) lotion and the other leg with the control
- Measurements were taken prior to the start of treatment and daily for 5 days post-treatment

Test Formulations and Controls:

- Control (without Polyaldo® 10-1-0 KFG (NON GMO))
- Test formulation with 5% Polyaldo® 10-1-0 KFG (NON GMO)

Conclusion

The results demonstrate the ability of Polyaldo® 10-1-0 KFG (NON GMO) to bind moisture within the epidermis thereby increasing skin moisturization. The test formulation containing 5% Polyaldo® 10-1-0 KFG (NON GMO) continues to outperform the control formulation five days post treatment as demonstrated in Figure 5 below.

Polyaldo® 10-1-0 KFG (NON GMO) Skin Moisturization

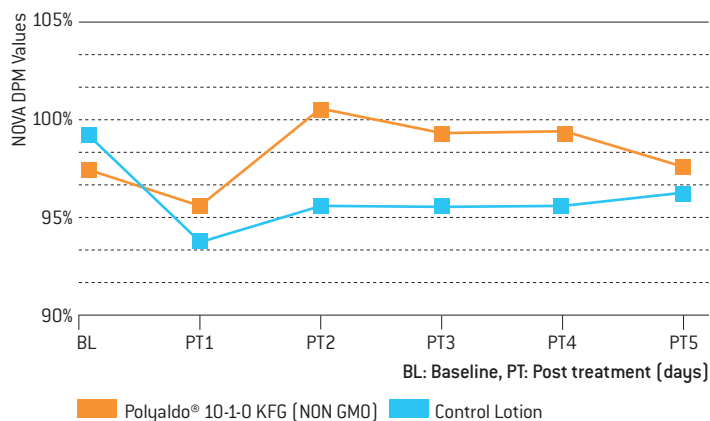


Fig. 5
5% Polyaldo® 10-1-0 KFG (NON GMO) improves skin's barrier properties providing long lasting moisturization even five days post treatment.

Polyaldo® 10-1-0 KFG (NON GMO) Thickening Properties in Surfactant Systems

Table 1

Product	INCI Nomenclature	Control (% w/w)	Shampoo w 3% Polyaldo® 10-1-0 KFG (NON GMO) [% w/w]	Shampoo w 6% Polyaldo® 10-1-0 KFG (NON GMO) [% w/w]
Phase A				
Texapon N70 NA	Sodium Laureth Sulfate	15	15	15
PlantaCare 818UP	Coco-Glucoside	8	8	8
Dehyton PK45	Cocamidopropyl Betaine	8	8	8
Deionized Water	Deionized Water	q.s.	q.s.	q.s.
Glydant™	DMDM Hydantoin	0.75	0.75	0.75
Phase B				
Polyaldo® 10-1-0 KFG (NON GMO)	Polyglyceryl-10 Oleate	–	3	6
Phase C				
NaCl	Sodium Chloride	1	1	1
		100%	100%	100%
Viscosity #6, 5rpm (cps)		8,200	12,600	65,000

Polyaldo® 10-1-0 KFG (NON GMO) Desorption Rate Constant

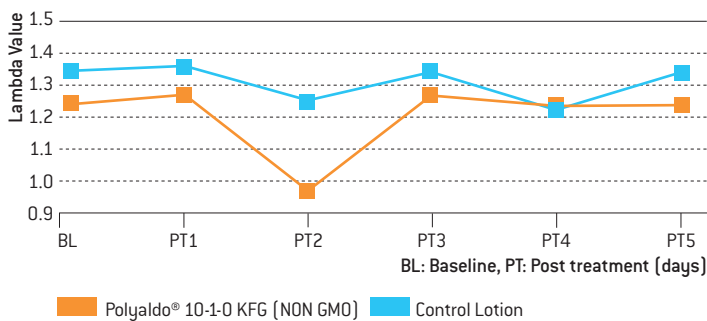


Fig. 6
Five days post treatment, Polyaldo® 10-1-0 KFG (NON GMO) continues to decrease skin's epidermal water loss potential.

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