

LECITHIN EMULSIFYING

ADM LECITHIN

As an emulsifier, soy lecithin is used in food applications as an aerating agent, viscosity modifier, dispersant and lubricant.

Typically, an emulsion is a suspension of small droplets of one liquid in another liquid with which it is incapable of mixing. Oil-in-water (O/W) and water-in-oil (W/O) are the two primary types of emulsions.

Lecithin's molecular structure makes it an effective emulsifier for the interaction of water and oil. Phospholipids, the major component of lecithin, are partly hydrophilic (attracted to water) and partly hydrophobic (repelled from water). It is lecithin's ability to simultaneously interact with both oil and water that makes it such an effective and stable emulsifier.

When introduced into a system, an emulsifier such as lecithin acts to help maintain a stable emulsion between two unmixable liquids. The emulsifier decreases the surface tension between the two liquids and allows them to mix and form a stable, heterogeneous dispersion.

GRAVIES & SAUCES

- Reduces fat separation
- Reduces formulation costs
- Improves product consistency, texture/mouth feel



TACO MEAT

- Reduces fat separation
- Helps bind fat and keep it in suspension throughout the process

BEVERAGES & NUTRITIONAL BEVERAGES

- Improve stability & viscosity
- Improving dispersion of protein
- Functional at low levels
- Enhanced mouth feel (less gritty)



For customers around the world, ADM draws on its resources—its people, products, and market perspective—to help them meet today's consumer demands and envision tomorrow's needs.

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LOW FAT DRESSINGS

- Emulsifies, replaces both mono- and diglycerides and polysorbates
- Improves viscosity

MARGARINES & SPREADS

- Water in oil emulsifier
- Improves stability
- Stabilizes shelf life
- Promotes easier ingredient blending

INFANT FORMULA

- Oil in water emulsifier
- Aids in proper blending and mixing

RECOMMENDED ADM LECITHINS

- Yelkin™: Series of standardised lecithins that provide moisture retention and emulsification in high-viscosity applications
- Ultralec™: ADM's exclusive, ultrafiltered, deoiled lecithin is used in hydrophilic instantising applications, and it provides excellent emulsification properties in reduced-fat and flavour-sensitive applications
- Beakin™: A series of complexed lecithin products with low viscosity, sprayable at ambient temperature, and used in lipophilic instantising applications
- Performix™: Edible blends of soy lecithin and other surface-active ingredients. Products available for low, as well as, high HLB applications
- Thermolec™: Modified lecithins with enhanced oil-in-water emulsification performance



EMULSIFYING METHODS

- Mechanical mixing with a high shear mixer
- High pressure extrusion
- Sonic vibration
- Static mixing
- Colloid milling

HYDROPHILIC-LIPOPHILIC BALANCE

THE HLB CHART

The HLB chart illustrates the approximate hydro-philic (water loving)-lipophilic (oil loving) balance value of our lecithin products in relation to other commonly available emulsifiers. HLB is an index of the predicted preference of an emulsifier for oil or water—the higher the HLB, the more hydrophilic the molecule; the lower the HLB, the more hydrophobic the molecule.

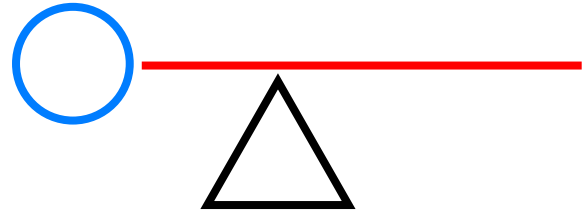
The values expressed in the table can serve as a useful guideline in helping you select the most appropriate ADM lecithin for your emulsification purposes.

DETERMINING THE PROPER USAGE LEVEL

Typical usage levels of lecithin in an emulsion system are:
 1-5% of the fat for W/O
 5-10% of the fat for O/W

The amount of lecithin used is dependent upon factors such as the pH, the inclusion of proteins and gums and the salt concentration.

HLB Hydrophilic/Lipophilic Balance



- HLB Scale 0 to 20
- $\text{Wt \% hydrophilic} / 5 = \text{HLB}$
- Low HLB favor W/O Emulsions
- High HLB favor O/W Emulsions

HLB Table for ADM Lecithin

Water in Oil (1-6)			Water in Oil or Oil in Water (6-8)						Oil in Water (8-12)			
1	2	3	4	5	6	7	8	9	10	11	12	
Favors Water-in-Oil Emulsions									Favors Oil-in-Water Emulsions			
	BEAKIN LV3	BEAKIN LV1 LV1.5	YELKIN T TS SS DS GOLD									
			PERFORMIX A CAPSULEC SERIES BEAKIN LV30 PERFORMIX CC			ULTRALEC F P G			THERMOLEC 57 200	THERMOLEC WFC	YELKIN 1018	PERFORMIX E PERFORMIX PS
Reference Emulsifiers												
MONODIGLYCERIDES			SORBITAN ESTERS						ETHOXYLATED MONODIGLYCERIDES			
POLYGLYCEROL ESTERS						SUCROSE ESTERS						

FLUID LECITHINS				
Product	Typical Analyses		Applications	
STANDARD LECITHINS				
Yelkin® T	AI, % 65 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 17 max. AV: 30 max. Form: Opaque plastic	Viscosity: N/A	Baked goods, cheese products, confections, dairy products, icings, frostings, instant beverage mixes, instant foods, margarines, and release agents
Yelkin TS	AI, % 62 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 17 max. AV: 30 max. Form: Translucent fluid	Viscosity: 100 max. (Stokes, 25°C)	
Yelkin SS	AI, % 62 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 14 max. AV: 30 max. Form: Translucent fluid	Viscosity: 100 max. (Stokes, 25°C)	
Yelkin DS	AI, % 62 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 12 max. AV: 30 max. Form: Translucent fluid	Viscosity: 100 max. (Stokes, 25°C)	
PURIFIED LECITHIN				
Yelkin Gold	AI, % 62 min. H2O, % 0.5 max. HI, % 0.05 max.	Color: 14 max. AV: 30 max. Form: Translucent fluid	Viscosity: 100 max. (Stokes, 25°C)	Baked goods, confections, instantized foods, instant beverage mixes, and dairy products
COMPLEXED LECITHINS				
Beakin® LV1	AI, % 50 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 25 max. Form: Translucent fluid	Viscosity: 20 max. (Stokes, 25°C)	Instant beverage mixes, instant foods, release agents, and spray oils
Beakin LV3	AI, % 32 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 25 max. Form: Translucent fluid	Viscosity: 10 max. (Stokes, 25°C)	
Beakin LV30	AI, % 32 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 25 max. Form: Translucent fluid	Viscosity: 10 max. (Stokes, 25°C)	
Performix™ CC	AI, % 50 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 28 max. Form: Translucent fluid	Viscosity: 30 max. (Stokes, 25°C)	Agglomerated powders, aqueous release agents, instant beverage mixes, and instant foods
Performix™ E	AI, % 50 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 26 max. Form: Translucent fluid	Viscosity: 30 max. (Stokes, 25°C)	
Performix PS	AI, % 50 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 26 max. Form: Translucent fluid	Viscosity: 65 max. (Stokes, 25°C)	
MODIFIED LECITHINS				
Yelkin 1018	AI, % 58 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 17 max. AV: 38 max. Form: Opaque fluid	Viscosity: 250 max. (Stokes, 25°C)	Baked goods, dairy products, instant beverage mixes, instant foods, release agents, and confections
Thermolec® 57	AI, % 56 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 28 max. Form: Translucent fluid	Viscosity: 30 max. (Stokes, 25°C)	
Thermolec 200	AI, % 62 min. H2O, % 0.8 max. HI, % 0.05 max.	Color: 14 max. AV: 30 max. Form: Translucent fluid	Viscosity: 75 max. (Stokes, 25°C)	
Thermolec WFC	AI, % 60 min. H2O, % 1.0 max. HI, % 0.05 max.	Color: 13 max. AV: 30 max. Form: Translucent fluid	Viscosity: 100 max. (Stokes, 25°C)	
DEOILED LECITHINS				
Product	Typical Analyses		Applications	
ULTRA-FILTERED DEOILED LECITHINS				
Ultralec® P	AI, % 97 min. H2O, % 1.5 max.	Color: Light gold Form: Powder	Viscosity: N/A	Baked goods, confections, dairy products, ice cream stabilizers, icings, frostings, instant beverage mixes, instant foods, and meat in sauces and gravies
Ultralec F	AI, % 97 min. H2O, % 1.5 max.	Color: Light Gold Form: Fine granules	Viscosity: N/A	

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