ADM Food Ingredients

Emulsifying

ADM Lecithin

As an emulsifier, soya bean 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.

For confectionery
- Promotes even blending of all ingredients
- Increases softness and decreases tackiness in chewing gum
- Prevents sticking

For baked goods
- Ensures even mixing
- Facilitates moisture retention
- Egg yolk sparing agent
- Improves crumb texture in cakes

For reduced-fat baked goods
- Improves moisture retention and aeration
- Increases shortening effect
- Decreases stickiness of doughs

For dairy products
- Enhances structure and firmness to whipped products
- Improves dispersibility in coffee whiteners

For snack foods
- Facilitates even distribution of ingredients
- Improves texture and mouthfeel

For canned foods
- Reduces fat cap during retort process
- Helps bind fat and keep it in suspension throughout the process

Recommended ADM lecithins

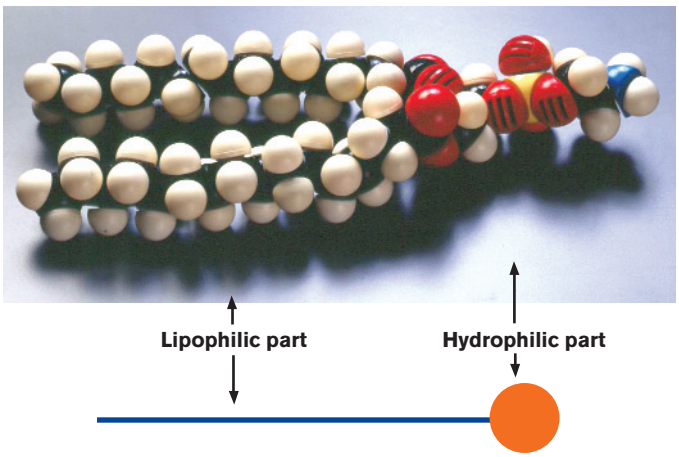
Adlec™ and Yelkin®: A series of standardised lecithins that provide moisture retention and emulsification in high-viscosity applications.

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.

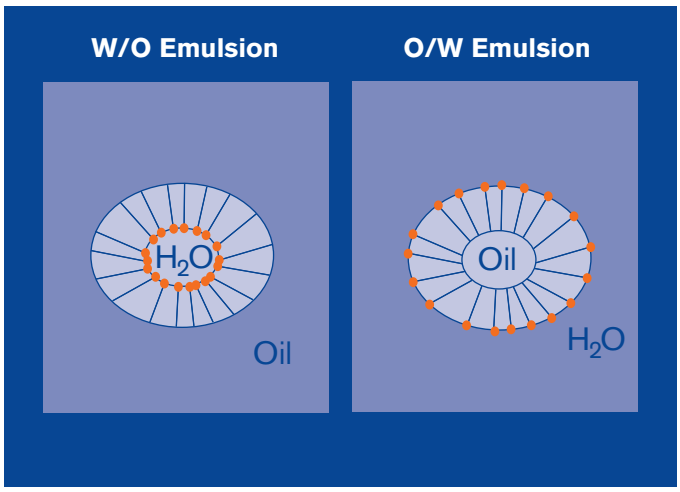
Beakin™: A series of complexed lecithin products with low viscosity, sprayable at ambient temperature, and used in lipophilic instantising applications.

Adlec™ E: An enzymatically hydrolised, water-dispersible lecithin.

Space-filling model of a phosphatidylcholine molecule.



Symbol for a phospholipid molecule.



Lecithin molecules align to the surface of a water/oil droplet, suspending it in the oil/aqueous media and forming an emulsion.

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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 hydrophilic (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

Effect of lecithin in creating an oil-in-water emulsion.

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

HLB TABLE FOR ADM LECITHIN

W/O–1-6 W/O or O/W–6-8 O/W–8-18

1	2	3	4	5	6	7	8	9	10	11	12
Favours Water-in-Oil Emulsions							**Favours Oil-in-Water Emulsions**				
Beakin LV1			**Adlec**	**Adlec E**		**Ultralec F**					
Beakin LV2			**Yelkin T**			**Ultralec P**					
Beakin LV3			**Yelkin TS**			**Ultralec G**					
Beakin LV4			**Yelkin DS**			**Yelkinol F**					
			Yelkin Gold			**Yelkinol P**					
			Performix A			**Yelkinol G**					
			Capsulec			**Yelkinol AC**					
			Series								

Reference Emulsifiers

Monodiglycerides **Sorbitan Esters** **Glycerol Esters**