LECITHIN:
purpose & function

ADM

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whatever your application or formulation needs, ADM has a lecithin for you

Looking for a versatile ingredient that functions in a variety of formulations and applications? Look no further than ADM's comprehensive line of lecithins.

Put them to work as emulsifiers to promote even blending and mixing, as release agents to ensure clean separation, as instantizers to help proteins and other materials disperse in aqueous systems, or as a nutritional source.

lecithin's key functions

- emulsifying
- releasing
- instantizing
- nutritional supplement

emulsifying with lecithin

Emulsion: a suspension of small droplets of one liquid in another liquid with which it is incapable of mixing. Two primary types of emulsions: oil in water and water in oil.

Emulsifier: a substance that assists the formation of an emulsion and stabilizes it when formed.

Lecithin's 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 by water).

BENEFITS

- Simultaneously interacts with oil and water to help form a stable emulsion
- Promotes even blending and mixing
- Facilitates even ingredient distribution

INCLUSION METHODS

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

confections

- Promotes even blending of all ingredients
- Increases softness and decreases tackiness in chewing gum
- Prevents sticking
- Cocoa butter (fat) replacer
- Rheology modifier

baked goods

- Ensures even mixing
- Facilitates moisture retention
- Is an egg yolk sparing agent
- Improves crumb texture in cakes

reduced-fat baked goods

- Improves moisture retention
- Increases the effects of shortening
- Decreases stickiness of doughs

dairy products

- Enhances structure and firmness of whipped products
- Improves dispersibility of coffee whiteners

snack foods

- Facilitates even distribution of ingredients
- Improves texture and mouthfeel

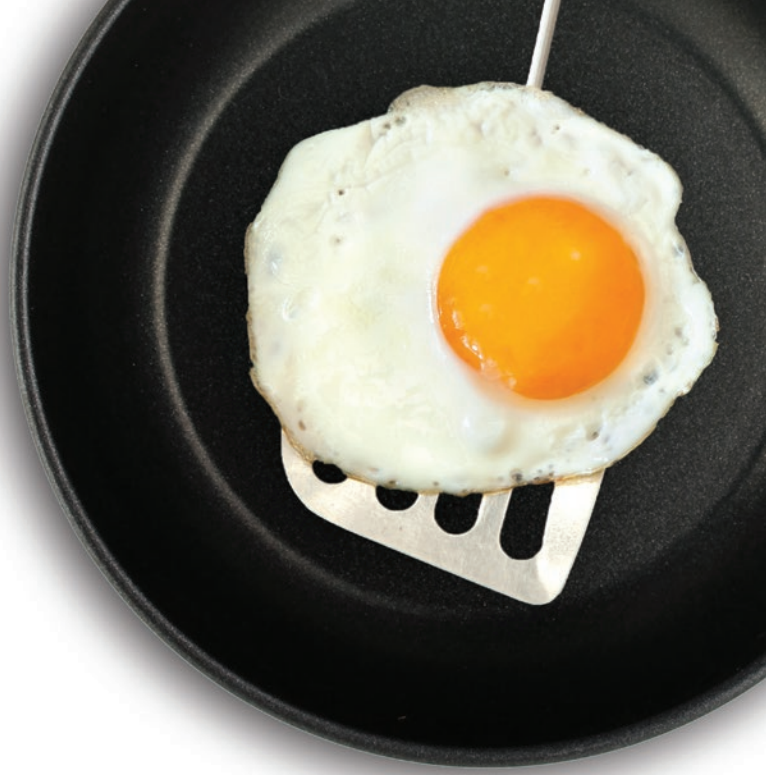
canned foods

- Reduces fat cap during retort process
- Helps bind fat and keep it in suspension

instant foods

- Improves dispersion of high-fat powders
- Enhances hydration of high-protein ingredients

improving release with lecithin



In food applications, release agents are most often used to ensure separation of a cooked product from the cooking surface. Lecithin is a label-friendly ingredient that enhances any food grade release agent, improving separation and lowering costs. This holds true for both in-home baking and cooking agents as well as food manufacturing production lines.

Lecithin has a simultaneous affinity for both oils and water, which makes it an effective ingredient in pan release and other lubricants.

APPLICATIONS

pan release

- Forms fluid lipid barriers
- Ensures quick, clean separation
- Bread pan formulas
- Cakes, cookies, and other high-moisture specialty product formulas

belt release

- Useful in continuous cooking and baking processes using belts or conveyors
- Typically included in oil or melted shortening
- Water-dispersible lecithin for use in dip tank systems
- Water-dispersible product provides release and assists in cleanup

product separation

- Prevents sticking in finished food products
- Allows for separation of slices of high-moisture pasteurized cheese

heat-resistant applications

- For use during prolonged heating periods
- Modified lecithin resists darkening and build-up
- Mold release, pan sprays, griddle and frying operations

BENEFITS

- Improves separation
- Reduces surface tension and product loss
- Creates thin, even barrier
- Lower overall input costs

METHODS

- Available for spray or brush applications
- Rewet agglomeration (water-dispersible lecithins only)
- Spray coating of powder in double-ribbon blender (or similar)
- Disperse
  - ✔ Into liquid slurry prior to spray drying (water-dispersible lecithins only)
  - ✔ Into oil for belt dip-tank or spray application
  - ✔ Into water for belt dip-tank or spray application
  - ✔ Into oil or form emulsion for canned spray release use

instantizing with lecithin

Producers of instant foods face a unique paradox: incorporating difficult-to-disperse materials (proteins, fibers, vitamins, and minerals) into a product that can be readily dissolved in cold water, milk, or other aqueous solutions.

High-fat powders are difficult to wet and disperse because they are hydrophobic (repel water). High-protein ingredients are hydrophilic (attracted to water) and can hydrate too quickly, forming clumps that do not hydrate internally. These instantizing problems can be solved with lecithin from ADM.

APPLICATIONS

- Beverage powders
- Meal replacement shakes
- Dry soups and mixes
- Gravy mixes
- Powdered dairy products

BENEFITS

- Enables difficult-to-disperse materials to dissolve in aqueous solutions
- Excellent for instantizing powders
- Maintains integrity of instant food products
- Function with either high fat or high protein applications

METHODS

- Available for spray or brush applications
- Rewet agglomeration (water-dispersible lecithins only)
- Spray coating of powder in double-ribbon blender (or similar)
- Disperse
  - ✔ Into liquid slurry prior to spray drying (water-dispersible lecithins only)

health & wellness

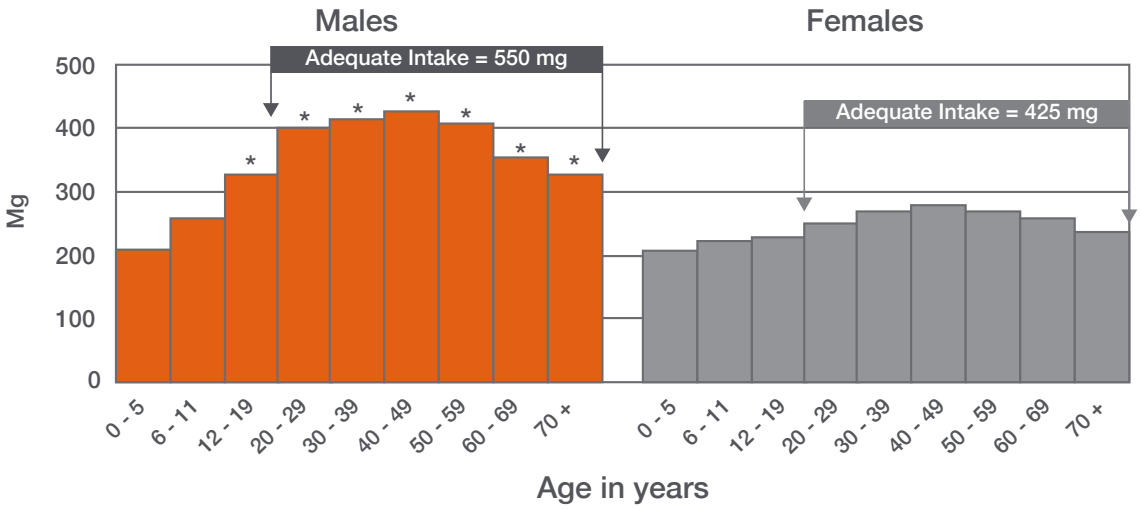
Lecithin is a complex mixture of phospholipids, triglycerides, and fatty acids that naturally occur in soybean oil. One of the phospholipids in lecithin is choline. Recent studies have demonstrated that choline is essential under certain dietary conditions as an important building block for human cells. The Food and Nutrition Board of the Institute of Medicine established a Daily Recommended Intake (DRI) for choline in 1998, based upon age, gender and physical condition.

Lecithin offers a fully bioavailable source of choline for human nutrition and can be taken as a nutritional supplement in the form of capsules or dry granules. Through a new ultrafiltration process, ADM's Ultralec deoiled lecithin is available in a convenient powder or granular form and is consumable in either its free-flowing form or in tablets. ADM also offers a superior line of fluid lecithin under the Capsulec series, specifically designed to meet the clarity and viscosity needs of the encapsulator.

BENEFITS

- Provides bioavailable choline, a required nutrient
- Offers essential polyunsaturated fatty acids
- Furnishes animal nutrition products with bioavailable inositol

MEAN DAILY CHOLINE INTAKE BY AGE AND GENDER



*male intakes are significantly higher than female intakes within age groups (p<0.001).
Source: What We Eat in America, NHANES, Day 1 dietary intake data, all individuals, weighted.

hydrophilic / lipophilic balance table (HLB)

Water in Oil (1-6) Favors Water-In-Oil Emulsions					Water in Oil or Oil in Water (6-8)			Oil in Water (8-12) Favors Oil-In-Water Emulsions			
1	2	3	4	5	6	7	8	9	10	11	12
	Beakin® LV3 Beakin LV8	Beakin LV1	Yelkin® T Yelkin TS Yelkin SS Yelkin DS Yelkin Gold Capsulec Series Beakin LV30 Yelkin Sun Yelkin Canola			Thermolec® 57 Thermolec 200 Utralec® F Ultralec P Ultralec G		Yelkin 1018	Thermolec WFC		Performix™ E Performix PS

Reference Emulsifiers

Monodiglycerides
Polyglycerol Esters
Sucrose Esters
Sorbitan Esters
Ethoxylated Monodiglycerides

usage

PRODUCT	Adds Lubricity	Dough Conditioner	Mixing Aid	O/W Emulsifier	W/O Emulsifier	Release Agent	Viscosity Modifier	Wetting Agent	Shelf-Life Enhancement	Nutritional Supplement
Beakin LV1	✓		✓		✓	✓	✓	✓		
Beakin LV3	✓		✓		✓	✓		✓		
Beakin LV30			✓	✓		✓		✓		
Yelkin T	✓				✓					
Yelkin TS & SS	✓		✓		✓					
Yelkin DS & Gold	✓		✓		✓	✓	✓			
Yelkin 1018				✓				✓	✓	
Performix E		✓		✓		✓		✓		
Performix PS		✓		✓		✓		✓		
Capsulec Series										✓
Ultralec P & F	✓	✓		✓	✓		✓	✓	✓	✓
Ultralec G										✓
Thermolec 57 & 200				✓		✓		✓		
Thermolec WFC			✓	✓		✓		✓	✓	

applications

APPLICATION	FLUID PRODUCTS	DEOILED PRODUCTS	USAGE
BAKERY			
Baked Goods	Thermolec WFC, Yelkin series	Ultralec P/F	0.2-1% flour basis
Bread/Yeast-Raised Products	Thermolec WFC, Yelkin series	Ultralec P/F	0.5-1% in flour
Cake & Donuts	Thermolec WFC, Yelkin series (including Yelkin 1018)	Ultralec P/F	0.2-0.5% formula or 1-3% fat basis
Cookies & Crackers	Thermolec WFC, Yelkin series	Ultralec P/F	application dependent
Dry Bakery Mixes	Thermolec WFC, Yelkin series	Ultralec P/F	0.5-1% flour basis
Icings & Fillings	Thermolec WFC, Yelkin series (including Yelkin 1018)	Ultralec P/F	0.2-1% formula basis
Low-Fat Cookies & Crackers	Thermolec WFC	Ultralec P/F	0.5-1% flour basis
Pie Crust	Yelkin series	Ultralec P/F	0.5-1% flour basis
Pizza Crust	Yelkin series	Ultralec P/F	0.2-0.5% flour basis
Tortillas & Flatbread	Yelkin series	Ultralec P/F	0.5-2% formula basis
Waffles & Pancakes	Yelkin 1018, Thermolec 57, Beakin LV30	N/A	0.5-2% formula basis
BEVERAGES			
Instant Beverages	Yelkin series	Ultralec P/F	application dependent
CHOCOLATES & CONFECTIONS			
Caramel Corn	Beakin LV1 & LV3	N/A	s/b 5-10% in coating oil
Chocolate & Compound Coatings	Yelkin series	Ultralec P/F	0.2-0.7% formula basis
Cocoa Powder	Yelkin series (including Yelkin 1018)	Ultralec P/F	1-3% spray coating by weight
DAIRY/NON-DAIRY			
Ice Cream (Waffle) Cones	Beakin LV1, LV3, LV30, Yelkin series	N/A	0.2-0.7% formula basis
Milk Powders	Yelkin 1018, Performix E/PS	Ultralec P/F	0.5-1% spray coating by weight
FATS & OILS			
Margarine/Spreads	Yelkin series	Ultralec P/F	0.3-1% formula basis
RELEASE			
Aqueous Release	Yelkin 1018, Performix E/PS	Ultralec P/F	10-15% of water
Belt Release	Beakin series, Thermolec series, Yelkin series	N/A	3-7% in oil
Release	Beakin Series, Thermolec series	N/A	5-15% oil basis
MISC. FOOD APPLICATIONS			
Colors & Flavors	Yelkin 1018, Thermolec WFC	Ultralec P/F	0.5-2% formula basis
Noodles	Yelkin series	Ultralec P/F	0.2-0.5% flour basis

typical analyses

PRODUCT	FLUID LECITHIN		
STANDARD LECITHIN			
Yelkin T	AI%, 65 min	Color, 17 max	Viscosity: N/A
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Opaque Plastic	
Yelkin TS	AI%, 62 min	Color, 17 max	Viscosity: 100 max
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Yelkin SS	AI%, 62 min	Color, 14 max	Viscosity: 100 max
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Yelkin DS	AI%, 62 min	Color, 12 max	Viscosity: 100 max
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Yelkin Canola	AI%, 62 min	Dilute Color, 14 max	Viscosity: 125 max
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.3 max	Form: Translucent Fluid	
Yelkin Sun	AI%, 60 min	Dilute Color, 14 max	Viscosity: 135 max
	% Moisture, 1.0 max	AV, 35 max	Stokes, 25C
	HI%, 0.3 max	Form: Translucent Fluid	
PURIFIED LECITHIN			
Yelkin Gold	AI%, 62 min	Color, 14 max	Viscosity: 100 max
	% Moisture, 0.5 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
COMPLEXED LECITHIN			
Beakin LV1	AI%, 50 min	Color, 14 max	Viscosity: 20 max
	% Moisture, 0.8 max	AV, 25 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Beakin LV2	AI%, 38 min	Color, 14 max	Viscosity: 450
	% Moisture, 0.8%	AV, 32 max	cP, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Beakin LV3	AI%, 32 min	Color, 14 max	Viscosity: 10 max
	% Moisture, 0.8%	AV, 25 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Performix E	AI%, 50 min	Color, 14 max	Viscosity: 30 max
	% Moisture, 0.8 max	AV, 26 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Performix PS	AI%, 50 min	Color, 14 max	Viscosity: 65 max
	% Moisture, 0.8 max	AV, 26 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Performix Canola	AI%, 35 min	Dil. Color, 14 max	Viscosity: 35 max
	% Moisture, 1.0 max	AV, 25 max	Stokes, 25C
	HI%, 0.3 max	Form: Translucent Fluid	

typical analyses

PRODUCT	FLUID LECITHIN		
COMPLEXED LECITHIN			
Capsulec 51-UB	AI%, 51 min	Color, 17 max	Viscosity: 20 max
	% Moisture, 0.5 max	AV, 36 max	Stokes, 25C
	HI%, 0.01 max	Form: Translucent Fluid	
Capsulec 51-SB	AI%, 51 min	Color, 13 max	Viscosity: 20 max
	% Moisture, 0.5 max	AV, 36 max	Stokes, 25C
	HI%, 0.01 max	Form: Translucent Fluid	
Capsulec 51-DB	AI%, 50 min	Color, 18 max	Viscosity: 18 max
	% Moisture, 0.5 max	AV, 36 max	Stokes, 25C
	HI%, 0.01 max	Form: Translucent Fluid	
Capsulec 62-UB	AI%, 61 min	Color, 17 max	Viscosity: 85 max
	% Moisture, 0.5 max	AV, 36 max	Stokes, 25C
	HI%, 0.01 max	Form: Translucent Fluid	
Capsulec 62-SB	AI%, 61 min	Color, 14 max	Viscosity: 85 max
	% Moisture, 0.5 max	AV, 36 max	Stokes, 25C
	HI%, 0.01 max	Form: Translucent Fluid	
MODIFIED LECITHIN			
Yelkin 1018	AI%, 58 min	Color, 17 max	Viscosity: 250 max
	% Moisture, 1.0 max	AV, 38 max	Stokes, 25C
	HI%, 0.05 max	Form: Opaque Fluid	
Beakin LV30	AI%, 32 min	Color, 14 max	Viscosity: 10 max
	% Moisture, 0.8%	AV, 25 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Thermolec 57	AI%, 56 min	Color, 14 max	Viscosity: 30 max
	% Moisture, 0.8 max	AV, 28 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Thermolec 200	AI%, 62 min	Color, 14 max	Viscosity: 100 max
	% Moisture, 0.8 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	
Thermolec WFC	AI%, 60 min	Color, 13 max	Viscosity: 100 max
	% Moisture, 1.0 max	AV, 30 max	Stokes, 25C
	HI%, 0.05 max	Form: Translucent Fluid	

PRODUCT	DEOILED LECITHIN		
ULTRA FILTERED DEOILED LECITHIN			
Ultralec P	AI%, 97 min	Color, Light Gold	Viscosity: N/A
	% Moisture, 1.5 max	Form: Powder	Stokes, 25C
Ultralec F	AI%, 97 min	Color, Light Gold	Viscosity: N/A
	% Moisture, 1.5 max	Form: Fine Granules	Stokes, 25C
Ultralec G	AI%, 97 min	Color, Light Gold	Viscosity: N/A
	% Moisture, 1.5 max	Form: Granules	Stokes, 25C

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