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What are Lecithins for the food industry

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What is lecithin ?

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Processing excellence to extract and create valuable ingredients

- 100 MT of Soybeans yields ~500 Kg of lecithin, which is (0.5%)
- The typical inclusion rate for final products is also 0.5%

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What is Lecithin?

Lecithin is named after the ancient Greek word 'lékithos' which means egg yolk.

Product definition: a complex mixture of phospholipids combined with various amounts of other substances, including triglycerides, fatty acids and glycolipids.

Legislative landscape:

Parameter	Unit	FAO/WHO Codex Alimentarius	Joint Expert Committee for Food Additives (JECFA)	European Union E322	Food Chemical Codex
Acetone insolubles	%	>60	>60	>60	>50
Toluene insolubles	%	<0.3	<0.3	<0.3	-
Hexane insolubles	%	-	-	-	0.3
Loss on drying	%	<2.0	<2.0	<2.0	-
Moisture	%	-	-	-	<1.5
Acid value	mg KOH/kg	<36	<36	<35	<36
Peroxide value	meq/kg	<10	<10	<10	<100
Arsenic	mg/kg	-	-	<3	-
Lead	mg/kg	<2	<2	<2	<1
Mercury	mg/kg	-	-	<1	-

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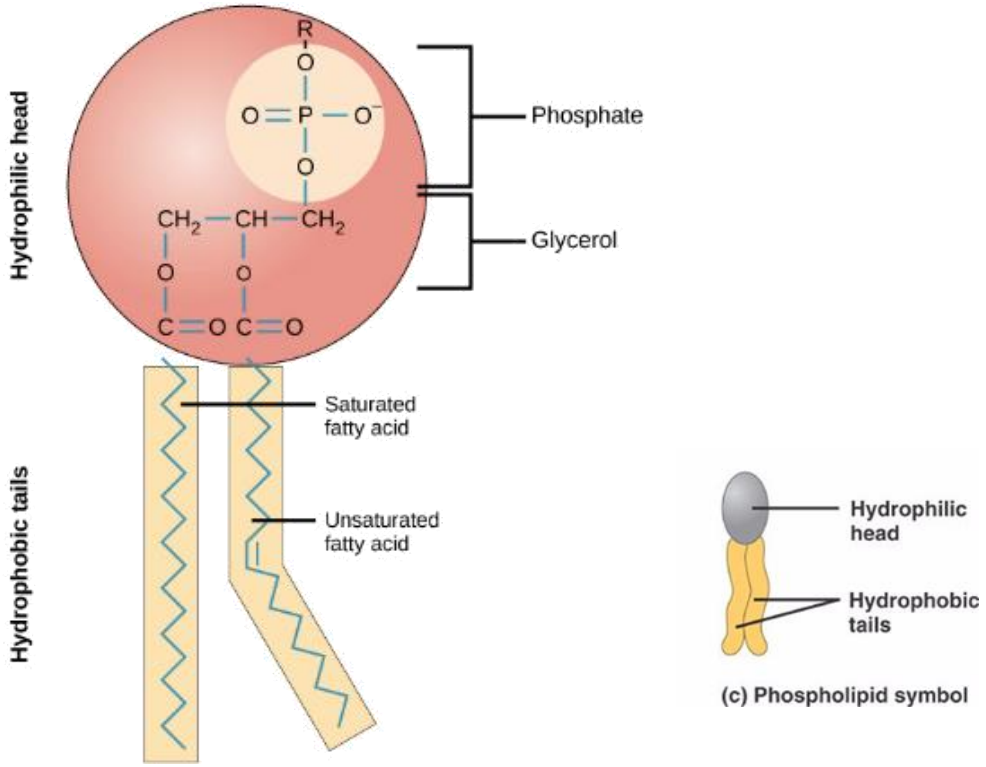
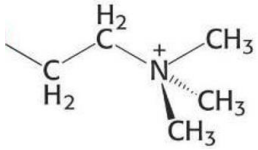
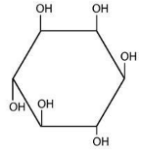
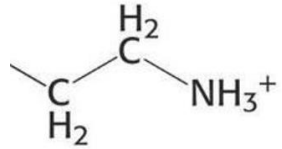
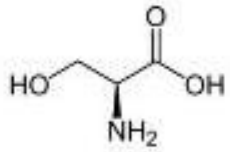
The science behind a Natural Emulsifier

Phospholipid: The main active agent of lecithin.
Amphipathic molecule

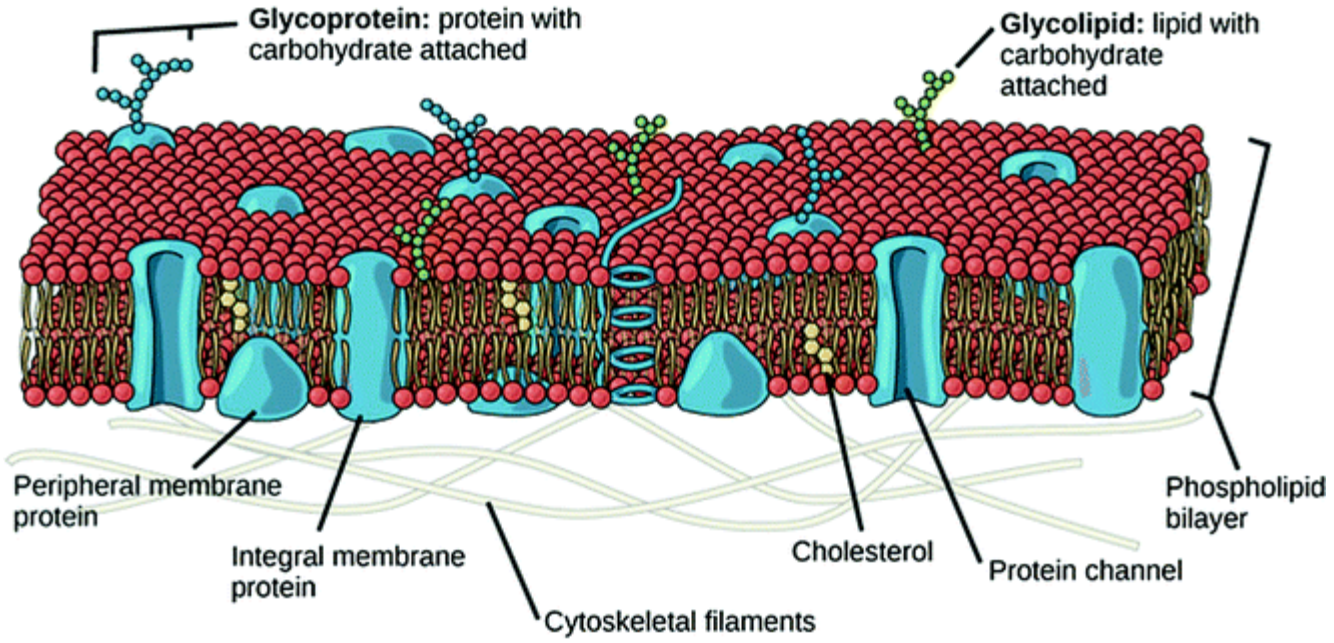


Phospholipid	Functional group
Phosphatidylcholine (PC)	
Phosphatidylinositol (PI)	
Phosphatidylethanolamine (PE)	
Phosphatidic acid (PA)	-H
Phosphatidylserine (PS)	

Role of phospholipids in living organizms

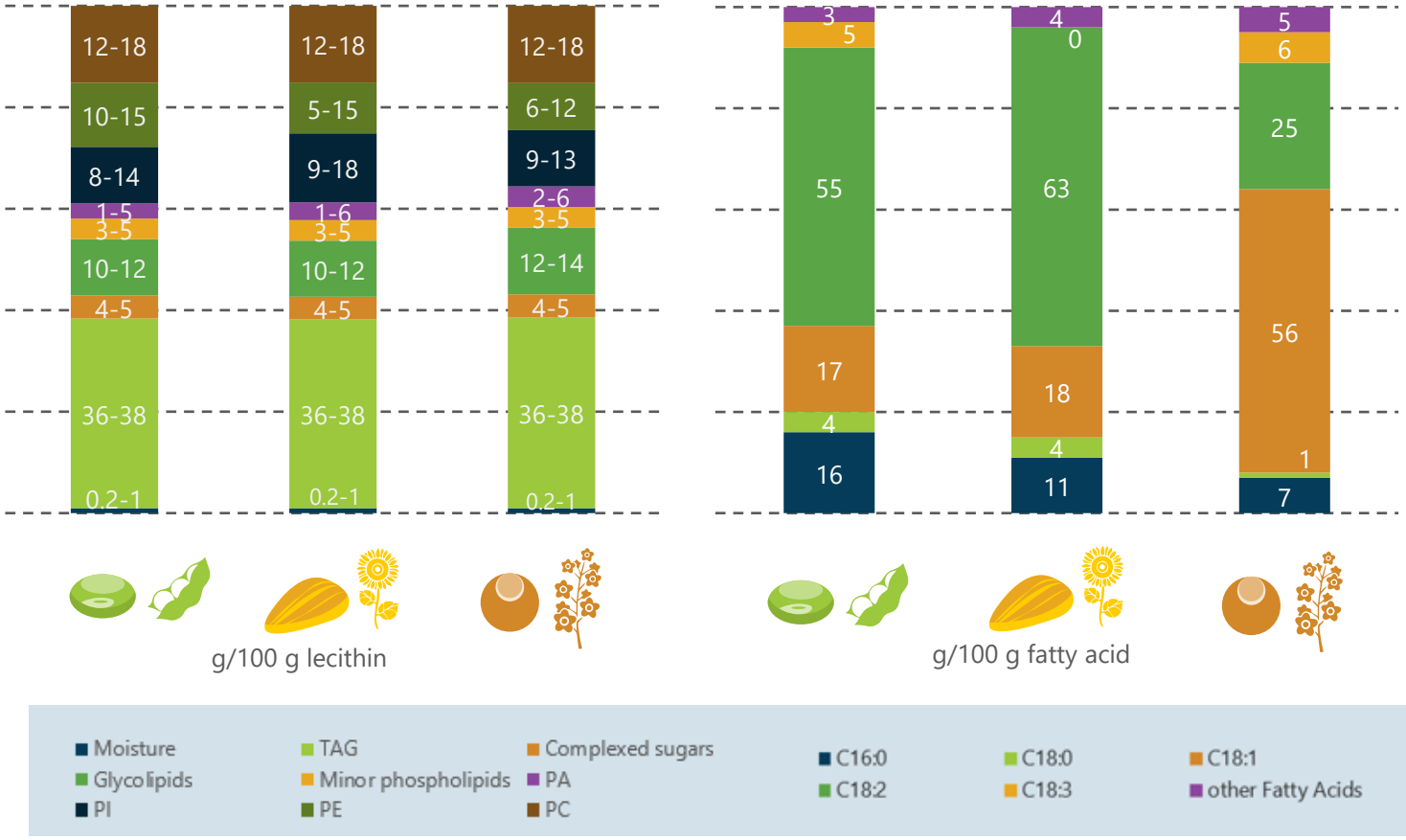
Can be found in all living cells

- Building blocks of cell membranes (stabilization and compartmentalization)
- Induce immune response due to their cell recognition ability
- Protect the cells against oxidation
- Improve blood circulation (Emulsification)
- Improve brain functions (Stimulus transmission)



Source: Wardhan R., Mudgal P. (2017) Introduction to Biomembranes. In: Textbook of Membrane Biology. Springer, Singapore. https://doi.org/10.1007/978-981-10-7101-0_1

Different origins, different options for your product

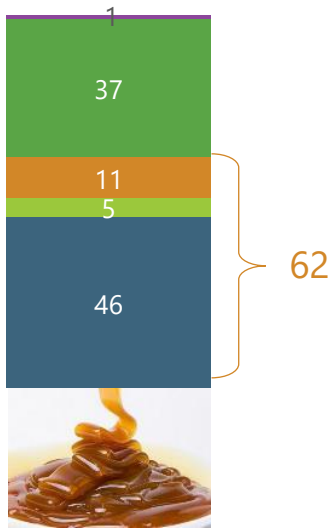


What makes up different types of Lecithin

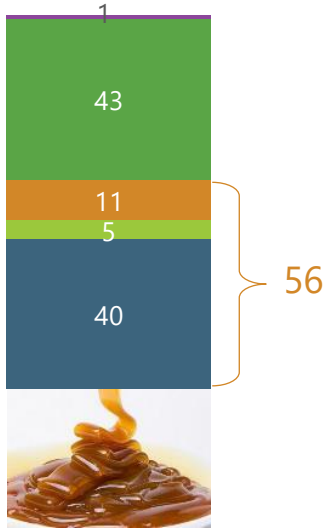
Water
Oil
Glycolipids
Carbs/Sugars
Phospholipids

Acetone Insolubles =AI-value

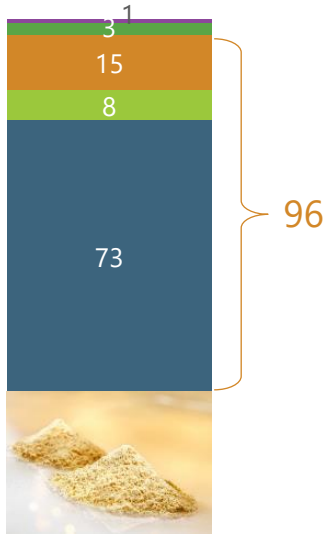
Standardized



Hydrolyzed



De-oiled



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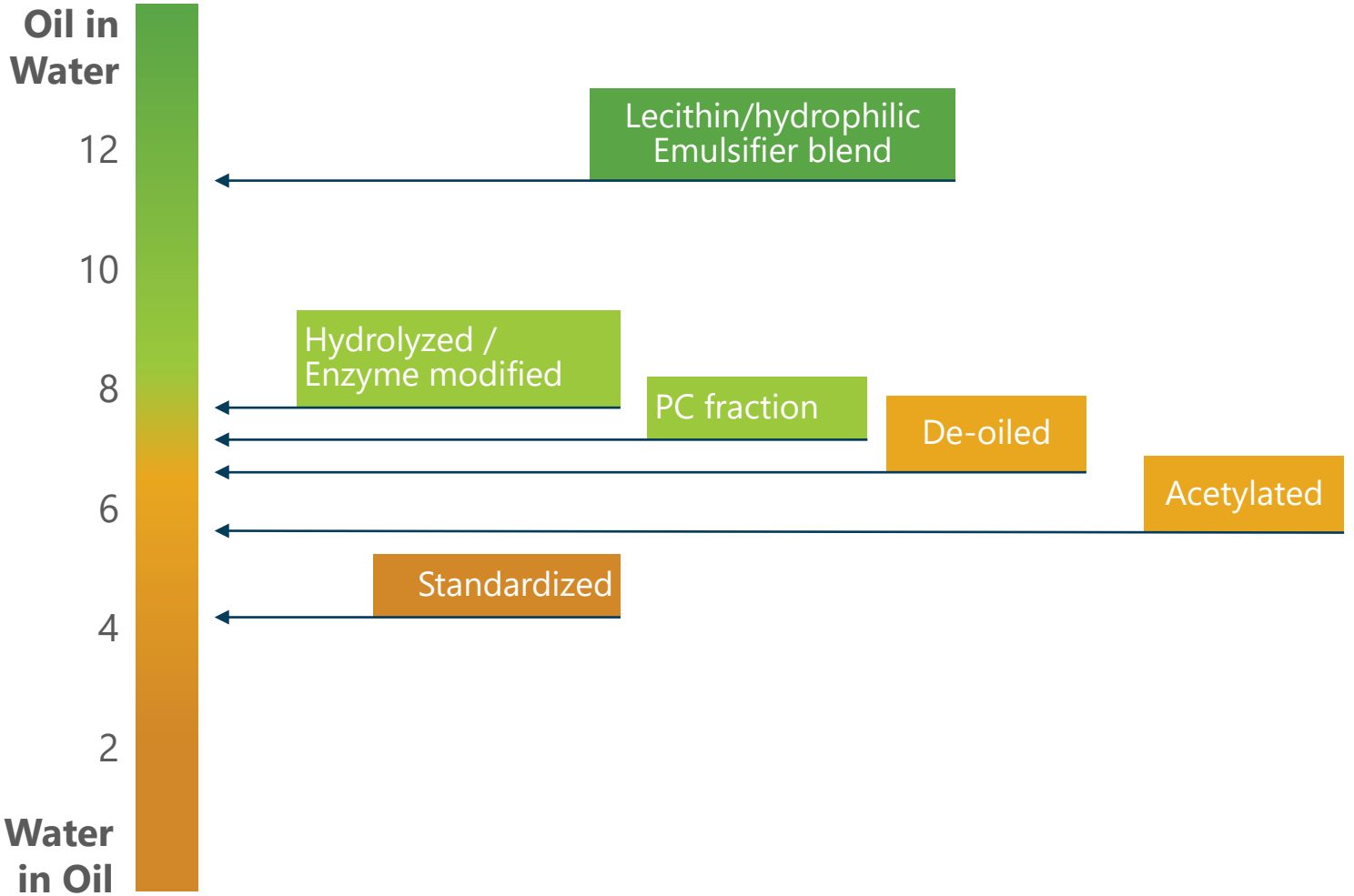
HLB value explained



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*HLB: Hydrophilic-Lipophilic Balance

Comparing emulsions with different- HLB

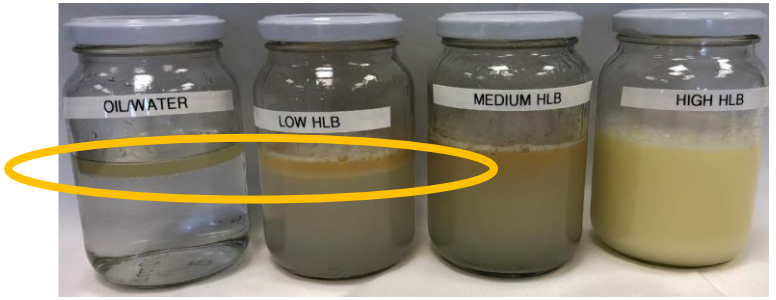
Before shaking

Separated oil and water

Right after shaking

Mixed

After 3 minutes



The separation soon returns in the control and low HLB example

Lecithin, the magic ingredient

Source: PHOSPHOLIPIDS | Properties and Occurrence by B.F. Szuhaj, in Encyclopedia of Food Sciences and Nutrition (Second Edition), 2003

Lecithin, Brings it together.

Emulsification

Keeps oil and water combined.

Instantizing

Improves dispersibility of difficult to disperse powders such as cocoa powder, dairy proteins, and hydro colloid. Also acts as an anti-dusting agent for powdered applications.

Release Agent

Prevents sticking at food contact surfaces in applications like pan sprays, cheese slices, and sugar syrup coated snacks and bars.

Mixing and blending

Decreases time and increases efficiency of mixing of unlike ingredients such as sugar and shortening by providing lubricity as well as viscosity reduction at the contact surfaces of the incompatible solids.

Lubricity

Aids in sheeting and extrusion of products such as crackers, potato chips, cereal, and pasta.

Viscosity modification

Reduces viscosity by coating particles to reduce particle–matrix friction such as in chocolates.

Antidusting

Reduces static electricity by wetting dusty particles. They can be used alone or in conjunction with vegetable oils. Oils can be selected for the degree of shelf-life required.

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Source: PHOSPHOLIPIDS | Properties and Occurrence by B.F. Szuhaj, in Encyclopedia of Food Sciences and Nutrition (Second Edition), 2003

BungeMaxx Lecithin Quality

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Small inclusion, large impact and huge consequences

25 MT of Lecithin
55,000 LBS of Lecithin

5,000 MT of Chocolate
11,000,000 LBS of Chocolate

50,000,000 Chocolate
bars of 100 grams!

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Raising The Bar On Quality

Main tasks to ensure Quality and Safety:

- Risk Assessment and Risk-based Monitoring Plan.
- Setting specifications.
- Certifications to comply customer demands.
- Traceability/Transparency.
- Supplier Verification/Approval.
- Release BungeMaxx products.
- Legislation and Customer requirements
- Food safety culture and awareness.

Certificates

ISO 22000:2018

HALAL QUALITY CONTROL HALAL HQC حلال

K

FOODCHAIN ID CERTIFIED NON-GMO STANDARD

USDA ORGANIC

SQF CERTIFIED

Lecithin applications

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A world of lecithin

Confectionery		• Improves handling and machinability by impacting chocolate rheology • Effectively lowers Viscosity and Casson Yield Value • Facilitates even mixing of ingredients • Improves mouthfeel and eating experience • Works against coalescence to prevent sugar crystallization and oil migration.
Bakery and snacks		• Even mixing of ingredients • Improves machineability and crumb structure • Extends shelf life via improved water absorption and retention and retarding starch retrogradation • Eliminates sticking during sheeting and cutting • Reduces friction and creates distinct die shapes. Acts as release agent.
Emulsions		• Stabilizes emulsions by decreasing the surface tension between immiscible liquids, preventing coalescence over shelf life. Improves the mouthfeel and texture by creating a smoother and creamier texture • Reduces fat separation, regulates viscosity • Reduces spattering in margarine, furthermore increases water holding capacity and moisture retention
Instantization		• Achieves proper rehydration of powders into aqueous solution where lecithin improves the reconstitution properties like wettability and dispersibility
Plant based food		• Improves overall mouthfeel by impacting texture and flavour release • Helps with emulsification, moisturizing, stabilizing and viscosity modification • Emerging category with plenty of opportunity in alt meat, dairy alternatives, egg replacement
Human nutrition		• Phospholipids deliver specific health benefits including positive implications for cell membranes, the cardiovascular system, central nervous system, and immune system • Improves powdered nutritional supplement reconstitution via better wettability properties and dispersibility.
Animal nutrition / Feed		• Source of energy and valuable phospholipid molecules • Contributes to improved fat digestion • Effective in calf milk replacement and actively used in aquaculture.
Non-Food - Industrial		• Lecithin can be used in multiple ways: as a lubricant, grinding aid, emollient and softening agent, anticorrosive or anti-dusting agent

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Applications and benefits for standardized lecithin

Benefits

- Ready to use
- Easily soluble in oils and fats
- Long shelf life
- Versatile packaging options (1-25000kg)

Applications

Bakery

Confectionery

Dressings and sauces

Spreads

Extruded snacks and cereal

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Applications and benefits for hydrolyzed lecithin

Benefits

- Medium HLB – easier water dispersibility
- Instantization of lipophilic powders
- Anti-spattering effect
- Improved emulsion stability of oil-in-water emulsions or high water content water-in-oil emulsions

Applications

Low salt frying margarine

Dressings and sauces

Margarine spreads

Powdered drinks

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Applications and benefits for de-oiled lecithin

Benefits

- Highly concentrated active components
- Low dosage rate
- Neutral flavor
- Easy and accurate dosing
- User friendly packaging (20kg)

Applications

Bakery

Confectionery

Dressings and sauces

Spreads

Powdered drinks

Extruded snacks and cereals

Supplements

Sports nutrition

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Let's create together