

SOY PRODUCT FACT SHEET: SOY LECITHIN

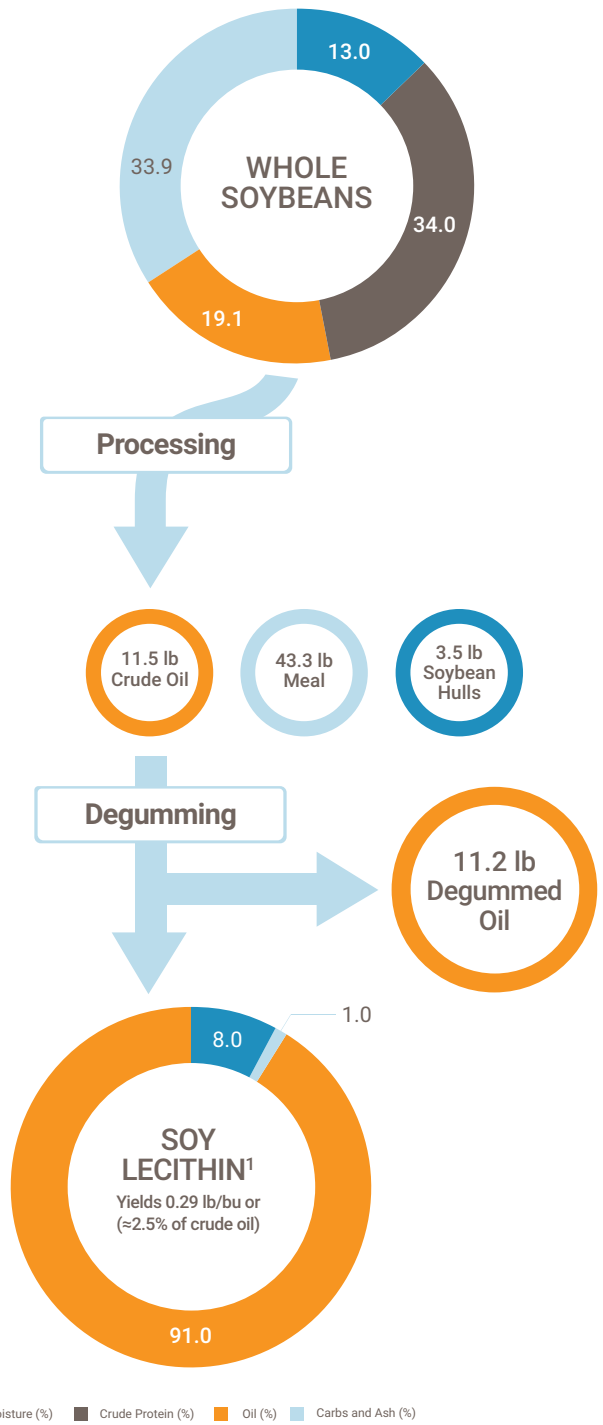
Overview

Soy lecithin is the general term for the mixture of phosphatides or phospholipids removed from crude soybean oil during the degumming process.¹ Phosphatides are amphiphilic, meaning that the head of the molecule attracts water while the tail repels water and attracts oils. These amphiphilic properties make crude soybean oil both absorb water from air to form sludges and bond with oil to increase neutral oil loss during refining. For these reasons, crude soybean oil typically undergoes a degumming process to remove phosphatides prior to chemical refining or export. The degumming process leverages the hydrophilic properties of phosphatides. Water is added to the heated crude soybean oil in proportion to the phosphate content of the oil.²

The hydrated gums, the mixture of phosphatides bound with water, can then be separated from the neutral oil using a centrifuge to create crude soy lecithin, which can then be dried. Along with the phosphatides, soy lecithin contains varying levels of neutral oil, tocopherols, complex sugars and pigments. The soy lecithin can also be further refined to remove neutral oil.

Form & Functional Properties

Soy lecithin is available as a liquid or dried into granules or powders. Its emulsification³ properties help suppress dust in feeds, reduce feed waste and environmental footprint, decrease energy use, improve the performance of pellets, and improve fat digestibility and absorption of fat-soluble vitamins.






Nutritional Attributes

While often used in feeds for functional purposes, soy lecithin possesses a fatty acid profile similar to soybean oil, making the ingredient a dense source of energy. Neutral oil may also represent over one-third of soy lecithin before it is refined to remove the neutral oil.⁴

Product Fatty Acid Profile Comparison⁴

Fatty Acid	Soy Lecithin (%)	Soybean Oil (%)
Palmitic	15.8	9.4
Stearic	6.3	4.0
Oleic	13.0	22.0
Linoleic	57.3	51.0
Linolenic	1.8	6.8

Species	Metabolizable Energy (kcal/kg) ⁴	Maximum Recommended Inclusion Rate ⁵	Feeding Advantage
 Poultry	7780	3%	Use as feed supplement improved broiler performance ⁶ Diets containing lecithin did not hinder performance ⁷ Improves shrimp performance, capable fish oil replacement ⁸
 Swine	6720	3%	
 Aquaculture	7209	3%	

Product Market

Soy lecithin is available globally since it is a common co-product of soybean oil refining.

¹Lecithin is common term for phosphatidylcholine, the most abundant phosphatide in crude soybean oil. However, lecithin is often used in practice to refer to the collection of phosphatides contained in crude vegetable oil.

²The degumming process can also be done using water and an organic acid, such as citric acid. The acid helps condition nonhydratable gums into hydratable gums so that more phosphatides can be extracted. The acid degumming process tends to darken the extracted lecithin. Gums separated using this process are generally added back to the soybean meal or used in other feed applications. For more information regarding the degumming process see: Johnson, Lawrence A., Pamela J. White, and Richard Galloway, eds. *Soybeans: Chemistry, Production, Processing, and Utilization*. Elsevier, 2015, 377-380.

³Emulsifiers reduce the surface tension of lipid droplets and allow physical agitation by the gastrointestinal tract to break them into smaller particles, increasing lipid digestion. Emulsifiers are involved in micelle formation, which facilitates the absorption of dietary lipids. Nutritional emulsifiers are classified based on their hydrophilic-lipophilic balance.

⁴The International Aquaculture Feed Formulation Database, Feed Ingredient Composition Database (FICD), has composition information for both dry and crude soy lecithin. The dry matter percentages for crude and dry soy lecithin are 60% and 99%, respectively. The composition of dry soy lecithin is reported. The database containing this composition data can be accessed at <https://www.iaffd.com/home.html?v=4.1.2>.

⁵Van Eys, J. E. and Ruiz, Nelson. 2021. *Quality Manual and Analysis for Soybean Products in the Feed Industry*. Third Edition, U.S. Soybean Export Council, Chesterfield, Missouri, page 23.

⁶Siyal, Farman Ali, et al. "Effect of soy lecithin on growth performance, nutrient digestibility and hepatic antioxidant parameters of broiler chickens." *International Journal of Pharmacology* 13.4 (2017): 396-402.

⁷Overland, M., Tokach, M. D., Cornelius, S. G., Pettigrew, J. E., Rust, J. W. Lecithin in swine diets: I. Weanling pigs, *Journal of Animal Science*, Volume 71, Issue 5, May 1993, pages 1187–1193, <https://doi.org/10.2527/1993.7151187x>

⁸Samocha, T. "Evaluation of Soy Lecithin and Soy Oil in the Diet of *L. vannamei*." *Soy-in-Aquaculture Research Program-Shrimp*. U.S. Soybean Export Council, Reports and White Papers, 2005. https://ussec.org/wp-content/uploads/2019/10/evaluation_of_soy_lecithin_and_soy_oil_in_the_diet_of_L_vannamei.pdf

To learn more about how U.S. Soy can enable your business, please contact your U.S. Soybean Export Council (USSEC) region or country representative; or submit your contact details via <https://ussec.org/contact/>.

ABOUT THE U.S. SOYBEAN EXPORT COUNCIL (USSEC)

Soybeans are the United States' number one food and agricultural export. The U.S. Soybean Export Council (USSEC) is devoted to building preference, improving the value, and enabling market access for the use of U.S. Soy for human consumption, aquaculture, and livestock feed in 82 countries across the world. USSEC is a dynamic partnership of U.S. soybean producers, processors, commodity shippers, merchandisers, allied agribusinesses, and agricultural organizations; and connects food and agriculture industry leaders through a robust membership program. USSEC is farmer-funded by checkoff funds invested by the United Soybean Board, various state soybean councils, the food and agriculture industry, and the American Soybean Association's investment of cost-share funding provided by U.S. Department of Agriculture's (USDA) Foreign Agricultural Service (FAS). To learn more, visit www.ussoy.org and www.ussec.org, and engage with us on [LinkedIn](#), [Twitter](#), [Facebook](#), [Instagram](#) and [YouTube](#).