

# SOY PRODUCT FACT SHEET: SOY LECITHIN

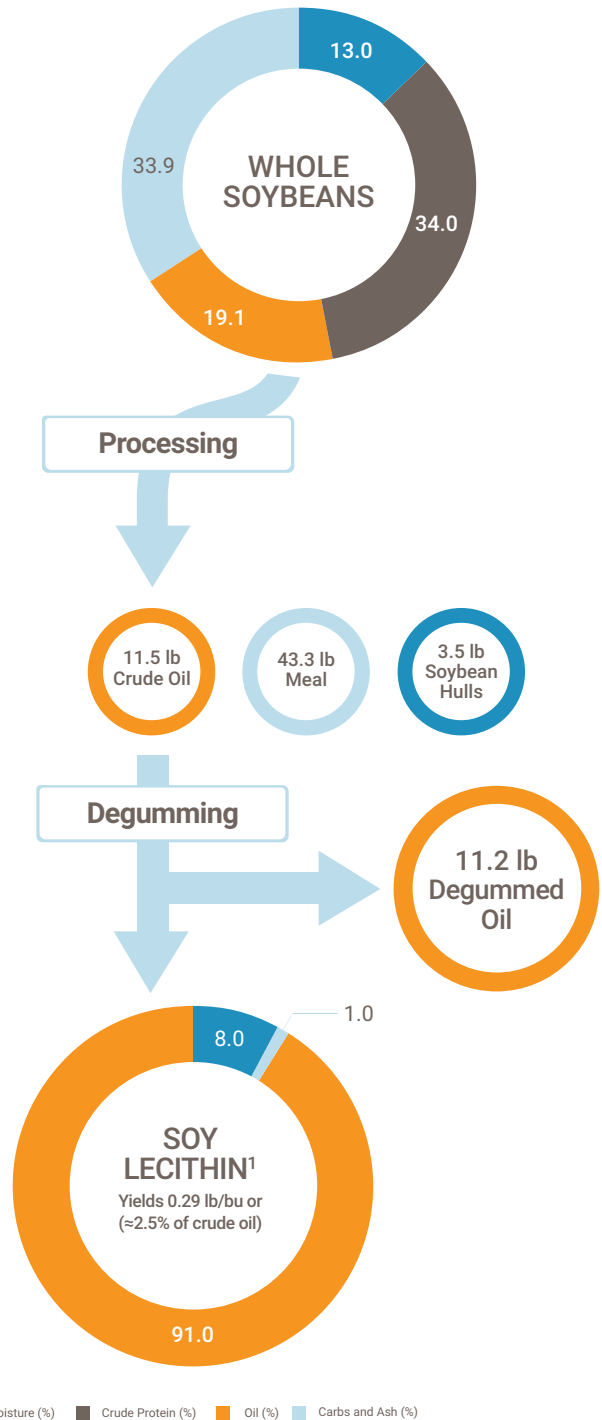
## Overview

Soy lecithin is the general term for the mixture of phosphatides or phospholipids removed from crude soybean oil during the degumming process.<sup>1</sup> 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.<sup>2</sup>

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 emulsification<sup>3</sup> 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.<sup>4</sup>

### Product Fatty Acid Profile Comparison<sup>4</sup>

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

## Product Market

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

<sup>1</sup>Lecithin 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.

<sup>2</sup>The 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.

<sup>3</sup>Emulsifiers 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.

<sup>4</sup>The 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>.

<sup>5</sup>Van 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.

<sup>6</sup>Siyal, 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.

<sup>7</sup>Overland, 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>

<sup>8</sup>Samocho, 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\\_vanamei.pdf](https://ussec.org/wp-content/uploads/2019/10/evaluation_of_soy_lecithin_and_soy_oil_in_the_diet_of_L_vanamei.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 U.S. Soybean Export Council (USSEC):** The U.S. Soybean Export Council (USSEC) focuses on differentiating, elevating preference, and attaining market access for the use of U.S. Soy for human consumption, aquaculture, and livestock feed in 80+ countries internationally. USSEC members represent the soy supply chain including U.S. Soy farmers, processors, commodity shippers, merchandisers, allied agribusinesses, and agricultural organizations. USSEC is funded by the U.S. soybean checkoff, USDA Foreign Agricultural Service (FAS) matching funds, and industry. Please visit [www.ussec.org](http://www.ussec.org) for the latest information, resources, and news about USSEC and U.S. Soy internationally.