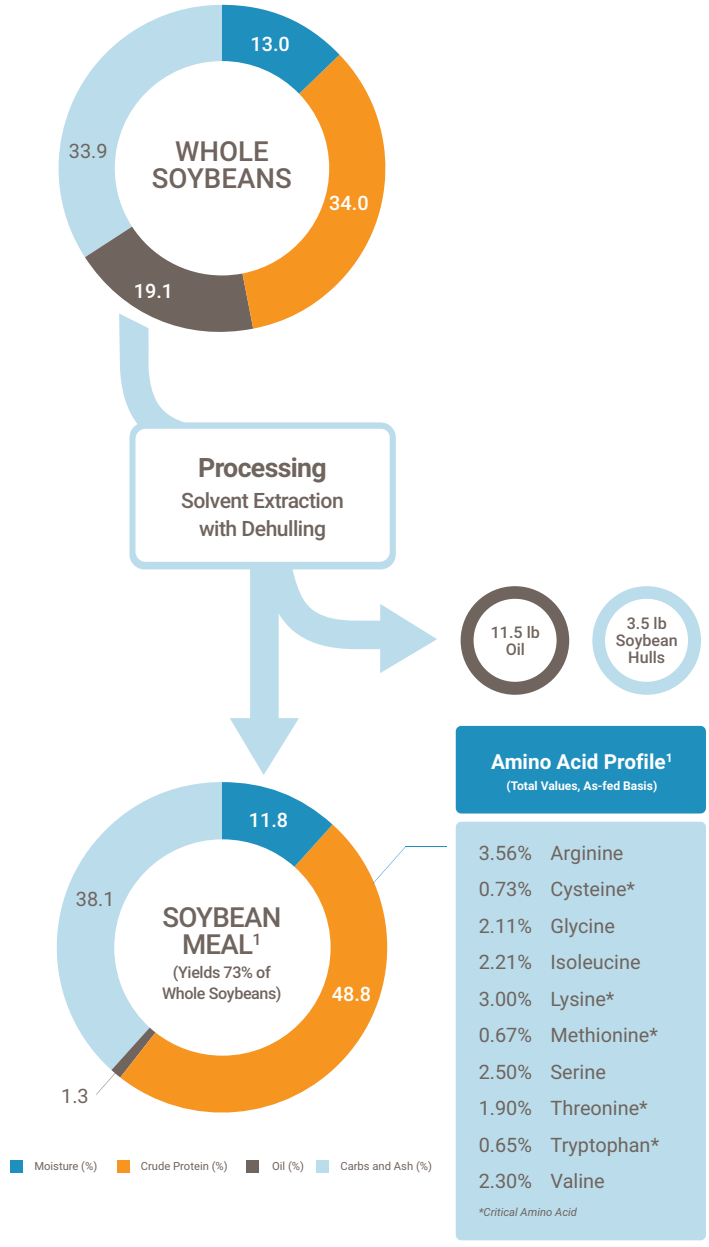
SOY PRODUCT FACT SHEET: SOYBEAN MEAL

Overview

Soybean meal (SBM) is produced by flaking, extruding or grinding whole soybeans, then using a mechanical press or a solvent to remove most of the oil component. Regardless of the oil extraction method, the product is heat-processed to deactivate anti-nutritional factors present in raw soybeans and improve protein digestibility. SBM, particularly solvent-extracted SBM, is also delineated based on whether the soybean hulls, or outer coverings, were removed during processing. Soybean hulls generally contain 34 to 35% crude fiber and 12% crude protein.[1] Therefore, removing hulls during processing reduces crude fiber and increases protein content in the resulting SBM. Dehulled SBM generally has less than 3.5% crude fiber while SBM may have up to 7% crude fiber when hulls are not removed.[2] However, hull removal rates vary, making it important to recognize the guaranteed maximum crude fiber and minimum protein offered by processors.

Form & Functional Properties

High-quality SBM is free flowing, with no lumps, cakes or dust. Calcium carbonate or silica is often added as an anticaking agent to improve flowability, but the added amount must not exceed 0.5 percent.[1]



Amino Acid Profile[1]
(Total Values, As-fed Basis)

3.56%	Arginine
0.73%	Cysteine*
2.11%	Glycine
2.21%	Isoleucine
3.00%	Lysine*
0.67%	Methionine*
2.50%	Serine
1.90%	Threonine*
0.65%	Tryptophan*
2.30%	Valine

**Critical Amino Acid*

Nutritional Attributes

The intrinsic nutritional value of SBM is driven by its well-balanced amino acid profile, energy and digestibility. Along with the underlying quality of the whole soybeans, value is also influenced by the degree of heat treatment applied during processing. Too little heat fails to deactivate heat-labile anti-nutritional factors such as trypsin inhibitors, while excess heat reduces the digestibility of key amino acids. Buyers should consider the role that processing has on SBM nutritional value, as diets are formulated based on the quality and availability of nutrients.

Soybean Meal Nutritional Properties[1]

Gross Energy	Oligosaccharides	Trypsin Inhibitors
4226 kcal/kg	15%	1.6-5.0 mg/g

Species	Metabolizable Energy (kcal/kg)[2]	Σ5 Critical AAs (SID Values)[2]	Maximum Recommended Inclusion Rate[1]	Feeding Advantage
Poultry	2250	5.91	35%	SBM provides quality protein and high ME vs. other meals
Swine	4200	6.41	35%	High digestible amino acids, specifically in finishing rations
Aquaculture	2923	6.29	<20%/>50%[4]	SBM capable fishmeal replacement for certain species

Product Market

Along with superior nutritional qualities relative to other protein meals, SBM availability is another key trait. SBM is the leading source of protein meal for animal feed worldwide, representing over 70% of total protein meal consumption in marketing year 2021 in terms of metric tons.[5]

---

[1] *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, pages 23, 26-27, 31. Note that this source reports the composition of several types of SBM. This fact sheet uses "SBM: solvent extracted 50" when reporting SBM composition data. The crude protein on an as-fed basis of this ingredient is 48.8%.*

[2] *Trading Rules for the Purchase and Sale of Soybean Meal, National Oilseed Processors Association; Washington, DC, 2015. Section 3. Standard specifications for 44% and "High Protein" meal.*

[3] *This fact sheet reports the composition of 48% crude protein, dehulled SBM from the United States in the International Aquaculture Feed Formulation Database, Feed Ingredient Composition Database (FICD). The database containing this composition data can be accessed at https://www.iaffd.com/home.html?v=4.1.2.*

[4] *Inclusion rates dependent on species. Species with a high tolerance for soybean antigens include catfish, tilapia and pacific white shrimp. Diets for these species may include over 50% SBM. Diets for species with a low tolerance for soybean antigens, such as salmonids, may contain up to 20% SBM, but other soy products undergoing further processing to reduce or remove soybean antigens may be more beneficial to incorporate into the diet. Maximum inclusion rates obtained from the following source: Davis, D. Allen, Evaluation of Soy Optimized Feeds for Warm Water Fish and Shrimp. Written in cooperation with the U.S. Soybean Export Council, Chesterfield, MO. Technical bulletin, USSEC SEA 06/2021, AQ2021-05.*

[5] *The components of the protein meal category were determined by the data available from the USDA/FAS PS&D database. The protein meals contained in this database include soybean meal, peanut meal, cottonseed meal, palm kernel meal, fish meal, rapeseed meal, copra meal and sunflower seed meal. In terms of protein meal, distillers dried grains with solubles, a key form of protein meal especially in the United States, is not included in this dataset.*

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/.