

# Comparison of the Quality of Soybean Meal and Oil by Soybean Production Origin

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## Abstract

Previous reports indicate variable soybean quality parameters exported from different geographic regions. This review compares soybean and soybean co-products grown under diverse environmental conditions. While numerous studies have been conducted on whole soybean and soybean meal (SBM) composition by origin, similar analysis of soybean oil is lacking. This review has two objectives: 1) summarize soybean and SBM quality by origin using a meta-analysis approach, and 2) analyze collected crude degummed soybean oil samples that originate from the US, Brazil and Argentina for key quality attributes. Soybeans from Brazil have higher levels of protein ( $P < 0.05$ ) than US soybeans, but US soybeans have lower heat damage ( $P < 0.05$ ) and total damage ( $P < 0.05$ ) than soybeans from Brazil. US and Brazil SBM have higher crude protein (CP) ( $P < 0.05$ ) than SBM from Argentina. At equal CP content, US SBM had less fiber ( $P < 0.0001$ ), more sucrose ( $P < 0.0001$ ) and lysine ( $P < 0.0001$ ) and better protein quality than South American SBMs. Methionine, threonine, and cysteine levels were similar in soybean protein from US and Argentina and higher than that in soybean protein from Brazil. Crude degummed soybean oil from Brazil had more ( $P < 0.05$ ) free fatty acids, neutral oil loss, phosphorus, calcium and magnesium than crude degummed soybean oil from the US or Argentina. Our analysis suggests that environmental conditions under which soybeans are grown, stored, and handled can have a large impact on chemical composition and nutrient quality of soybean meal and soybean oil.

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