

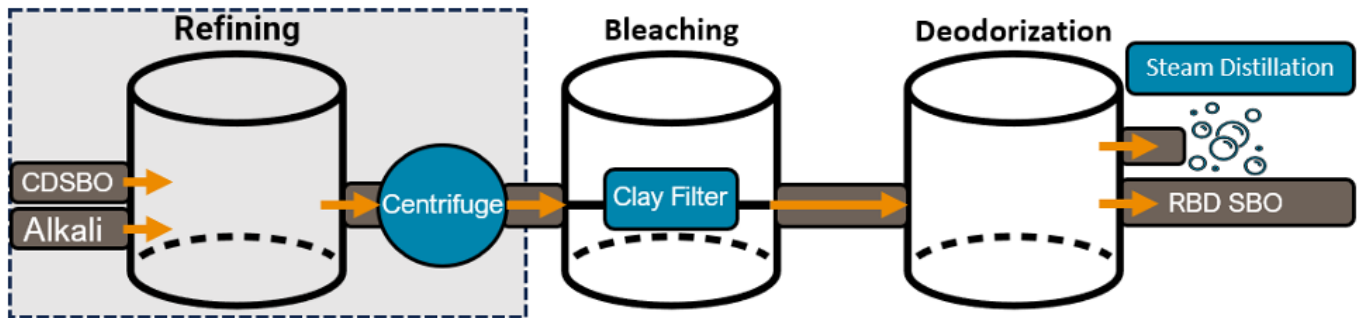
SOYBEAN OIL QUALITY FACT SHEET - FREE FATTY ACIDS

Overview

Free fatty acids (FFA) are naturally present in soybeans and impact the quality of refined, bleached and deodorized soybean oil (RBD SBO). The concentration of FFA in crude degummed soybean oil (CDSBO) is a function of whole soybean quality, including damage, splits and moisture, storage conditions and handling post-harvest. FFA impacts the odor, flavor, rancidity and shelf life of RBD SBO. These adverse effects make it necessary to eliminate FFA during the refining process.

Soybean Oil Refining

In caustic refining, an alkali solution¹ is mixed into CDSBO during the refining stage. The alkali combines with FFA to form soaps. Alkali combines magnesium, calcium and phosphorus compounds to form gums. Soaps and gums, which are denser than neutral oil, are predominantly expelled through a centrifuge, leaving mostly neutral oil.



Refining Cost and Yield Implications

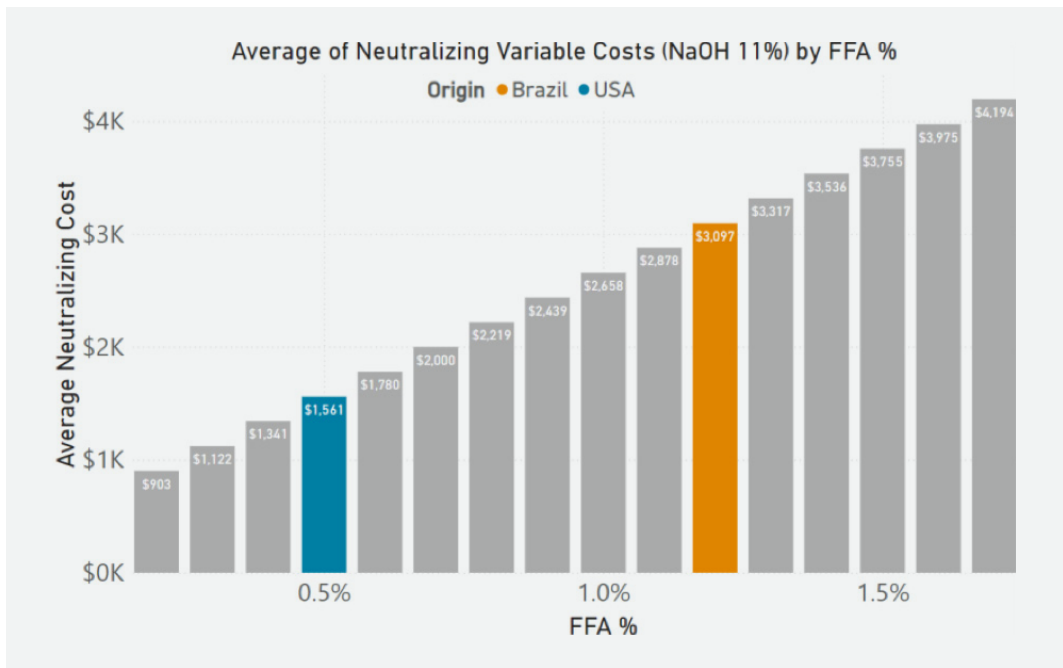
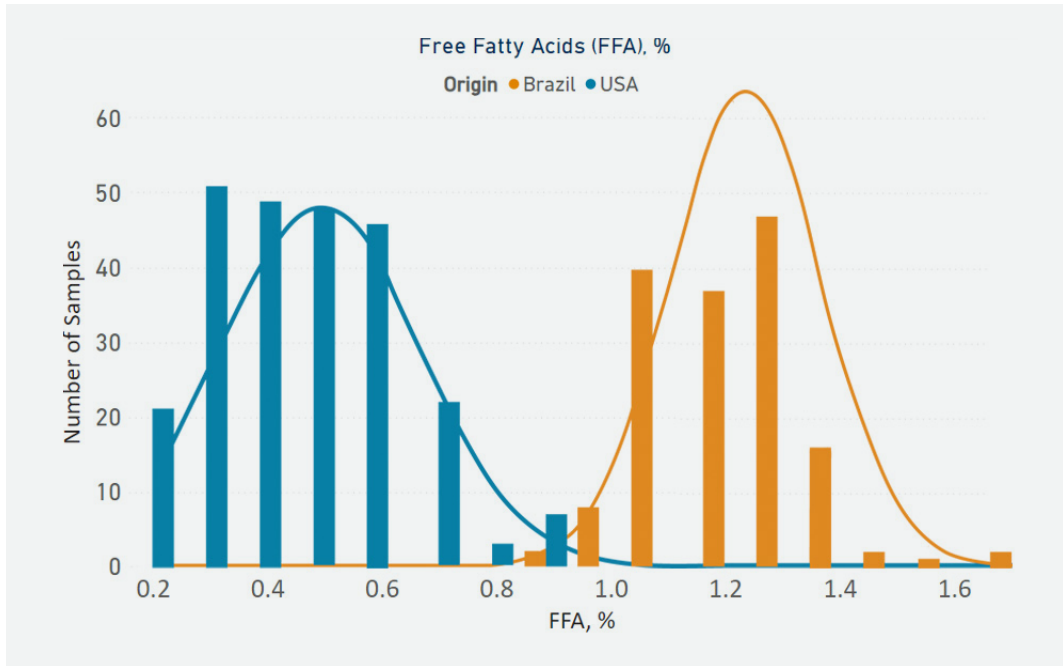
The higher the FFA content, the higher the alkali dosage required and the higher the neutral oil loss. A high FFA content leads to an increase in refining cost and refining yield loss.

U.S. Soy Advantage

CDSBO derived from U.S. Soy has lower FFA concentrations compared to soybean oil of other origins.² Lower FFA concentrations reduce cost during the refining stage, improving profit margins for the final refined oil.

Daily Soybean Oil Refining Cost (1,000MT)	U.S. Soy	Brazil
Median FFA, %	0.50%	1.20%
Neutralizing Agent, %	11.00%	11.00%
Excess in Caustic, %	0.03%	0.03%
Treat, % ([FFA%*0.142+Excess] / NaOH%)	0.92%	1.82%
Caustic Solution (kg/MT)	9.18%	18.22%
Est. Price/Unit of NaOH	\$0.17	\$0.17
Total, \$	\$1,561	\$3,097
U.S. Soy Advantage	\$1,536	

FFA, % = AOCS method Ca 5a-40
 0.142 = Ratio of NaOH molecule weight to Oleic acid (40/282)
 Total, \$ = (Caustic Solution)*(1000 MT)*(\$0.17/Unit)



¹Common industry practice is to use sodium hydroxide (NaOH).

²[Soybean Oil Value Calculator](#), U.S. Soy.

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 for the latest information, resources, and news about USSEC and U.S. Soy internationally.