

# Economic Impacts of Biodiesel Production on the Beef Sector (2018)

## Highlights

Biodiesel's increase in production over the last 15 years, and its diverse mix of feedstocks, has created an interrelationship between biodiesel and the beef sector. This analysis summarizes biodiesel's impact on prices, both market and input, as well as the net economic benefit to beef producers.

The interrelationship comes down to two basic areas of focus – tallow and soybean meal prices:

- Use of animal fats and tallows for biodiesel production increased inedible tallow prices by approximately **13 percent** from 2009 to 2017, which led to increased drop values, as well as increased prices received by cow-calf producers.
- Independent analysis showed that if biodiesel production was one-half 2017 production levels, the cost of soybean meal could have increased by **\$21/ton**, driving up feed prices.

## Biodiesel's Role in Value

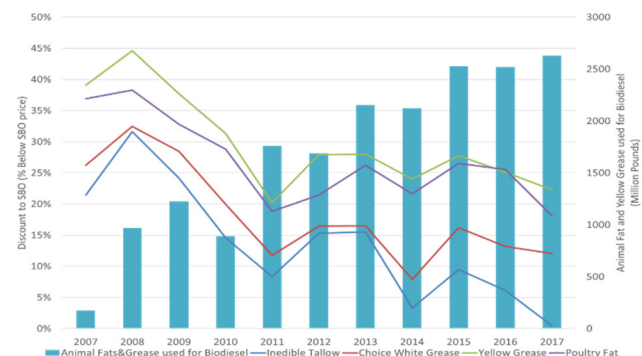
It's basic supply and demand. When demand increases for a product, prices for that product increase. When direct demand increases for products like beef, the increased price leads to increased supply.

However, animal fats and tallow are by-products of livestock production. Increased demand for fats and tallow does not stimulate any appreciable increase in supply. But, that does not mean biodiesel has no impact on price.

While these by-products are not primary drivers in determining the price paid for fed cattle, they do in fact affect profit margins by increasing the by-product drop value. As a result, the increased prices received for animal fats and tallow help support the prices paid at the farm level. This is demonstrated through a positive price correlation between inedible tallow prices and slaughter steers.

## Aligning Prices

Animal fats and tallow prices have a strong correlation with the price of crude soybean oil. Historically animal fats and tallow prices are at a discount relative to soybean oil prices. However, as biodiesel increased usage of animal fats and tallow as a feedstock the prices have converged to the point that inedible tallow prices in 2017 were no longer at a significant discount relative to soybean oil.

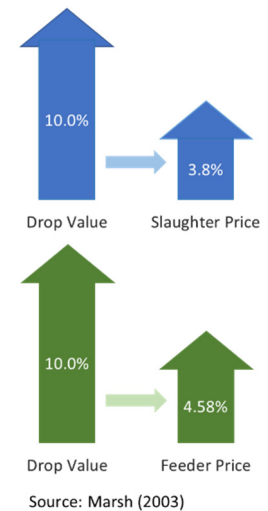


Source: 2007-2008 Census Bureau (2007-2008 biodiesel input), 2009-2017 Render Magazine (2009-2017 biodiesel input), Jacobsen (prices)

## What Does That Mean at the Farm Level?

Biodiesel's impact on drop value was evaluated using regression analysis, taking into consideration other demands for tallow and animal fats, as well as substitutions for those demands. The total impact on animal fats and tallow prices equated to approximately \$9 per head drop value, which includes a 13 percent increase in inedible tallow value from January 2009 – December 2017.

What's more important, the analysis also showed that the increased value translated to increased prices at the producer level. Previous peer-reviewed analysis (Marsh 2003, among others) evaluated by-product flexibility coefficients and slaughter price transmission coefficients. The former measures the impact a change in by-product drop value has on slaughter steer prices, while the latter measures the impact changes in slaughter steer prices have on feeder steer prices, thus allowing measurement of drop value on feeder steer price (1.2x). For example, if there is a 10% increase in drop value, the cow-calf operator receives 4.58% of additional value for a feeder steer.



Bottom line: given the information on tallow available and based on price transmission effects – cow-calf operators received up to \$20 more per head for their feeder steers thanks to biodiesel's demand for animal tallow from 2009 - 2017.

The magnitude of the benefit of increased tallow use on the beef supply chain will vary, depending on many factors such as size of increased use of tallow, price levels, and current market conditions impacting the price transmission. However, regardless of possible variations of increased tallow use, price levels, and/or market conditions, the key takeaway is all segments of the beef supply chain benefit when more tallow is used for biodiesel production.

## Soybean Meal Prices and Biodiesel

Unlike beef's relationship to tallow, soybean meal and soybean oil are co-products and have an inverse relationship. When the demand for one co-product (in this case, oil) increases, the price for that product increases prompting an increase in crush. Thus, creating an increase in supply for both oil and meal. If meal demand does not also increase, the increased supply of meal causes meal prices to decline.

Using the Value Chain Analysis, a single market econometric model created by the United Soybean Board, scenarios were assessed where biodiesel production was 50 percent lower than levels achieved in 2017. With this scenario of lower demand in soybean oil, the shift in soybean meal prices was an increased price of \$21 per ton.

## Conclusions

Beef producers are impacted positively by biodiesel production. An increase in tallow prices from 2009-2017 translated into an increase of approximately \$20 per head received by cow-calf producers.

While there are number of members in the beef supply chain, peer-reviewed research has demonstrated the impact of increased drop value to various members of the supply chain – including that of the producer.

In addition to increased revenue, biodiesel's demand for soybean oil positively impacts cost of production by reducing the relative price per ton of soybean meal.