

Case story

North Dakota, US

Prodec Oil Plus technology turbocharges lucrative corn oil extraction for a US ethanol plant

Introducing a new patented way of processing at elevated temperatures using Alfa Laval's Prodec Oil Plus technology on whole stillage, has had a transformative effect on corn oil yields.

One example out of many that can testify to the merits of the Oil Plus technology is a US-based distillery, which is now able to extract up to 30% more valuable distillers' corn oil (DCO) from their ethanol production.



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Dakota Spirit Ethanol, based in Spiritwood, North Dakota, made the switch from extracting the DCO from the syrup after it has been concentrated in the evaporator, to focus instead on the whole stillage directly after the beer column – i.e. before stillage dewatering – so as to capture the oil that would otherwise be lost in the cake from the decanters.

That switch was the result of a long-standing relationship and discussions with Alfa Laval, who were already supplying other technology at the plant, but had identified an opportunity that they believed would deliver a rapid and highly beneficial return on investment.

“Why not get that oil before it goes to the whole stillage decanter and becomes impregnated, and before you start creating unnecessary losses on the back end?” says Dennis Schoenwald business development manager – Ethanol and Biofuels Technologies with Alfa Laval.



The Alfa Laval solution is easy to use and simple to install as it doesn't require complicated bolt-on technology, and helps ethanol producers collect up to 99% of the free DCO found in the whole stillage. Unlike the stillage decanters, which are purpose-built to dewater the stillage and produce the driest possible cake, the Oil Plus decanters are designed to ensure that the solids are kept in suspension in the decanter so that the oil is not captured in a solids/cake layer, but rather makes its way to the top of the slurry and then that oil layer is carefully skimmed off, leaving a de-oiled stillage slurry to be dewatered in the subsequent stillage decanters with minimum oil loss in the cake.

The installation of the equipment in 2024 came after rigorous testing and analysis that confirmed the extensive benefits that would be delivered by Prodec Oil Plus.

“The reason for the large-scale test was that everybody had been dealing with the syrup, which is like 70 to 100 gallons a minute per machine,” says Stephen Ludes, a sales manager focused on agricultural processing at Alfa Laval.

“By putting it through the full whole stillage flow, if you're a 100 million-gallon plant, that's 1,000 gallons a minute, so it represents significant capital expenditure up front and the customer needed to justify the recovery and return in order to make the investment.”

“This oil capture is super critical to the plant because it is paying lots of bills, and previously distillers would only be getting, at most, an additional 5% by adding an additional oil centrifuge at the syrup stage.”

Dennis Schoenwald
Business Development Manager
Ethanol and Biofuels Technologies, Alfa Laval



Improved oil yield and economics:

Removing corn oil before the stillage decanters reduces oil losses to the cake and limits oil recycling in the back-set, increasing overall oil yield and enabling higher ethanol production. This also improves plant profitability, as corn oil has higher value than distiller's dried grains with solubles (DDGS) while reduced fouling and improved fermentation efficiency further enhance economics.



Clean energy:

Extracted corn oil serves as a valuable feedstock for Sustainable Aviation Fuel (SAF) and biodiesel, reducing reliance on fossil fuels and supporting a more sustainable energy future.



Water and chemical savings:

Extracting oil at the stillage position decreases oil oxidation in the evaporator and reduces fouling. This leads to savings in water and chemicals, as less fouling means less frequent cleaning, especially in the final effects of the evaporator. Furthermore, removing more oil before the dryer reduces the risk of fouling in the dryer as well.

The testing confirmed the major benefits, and there followed a year-long onsite test with a full-size machine before purchase, which gave the plant the opportunity to create mass balance and assess if and how the technology would impact the production process.

Results can differ from plant to plant, depending on factors such as temperature, whether a demulsifier is used, the amount of oil present in the corn crop and the set-up of the fermentation process, but Alfa Laval estimates DCO boosts of between 25 to 40% by using the Prodec 65 Oil Plus skimmer at the front end.

Installation requirements are basic and include the decanter, as well as a surge tank to hold the whole stillage and a surge tank for storing corn oil, in addition to some pumps and venting equipment. Through testing and analysis, Alfa Laval can give producers an accurate estimate of the oil yield increase with Prodec Oil Plus, which helps them determine whether the investment makes sense financially.



Contact Alfa Laval

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