

# Distillers Grain Byproducts as a Phosphorus Source in Wheat

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**A**t the Carrington Research Extension Center (CREC), we have been conducting studies using corn distillers byproducts in corn and wheat. Farmers that cultivate land close to ethanol plants have expressed interest in using these byproducts as fertilizer sources. Condensed distillers solubles (CDS) is a liquid that can be injected into the ground, and wet distillers grains (WDG) can be applied using a manure spreader. As with any fertilizer material, effectiveness needs to be assessed and rates need to be established. Both CDS and WDG provide multiple nutrients.

In our study we wanted to look at the applicability of these by-products as phosphorus sources, by controlling for other nutrients based on soil test levels.

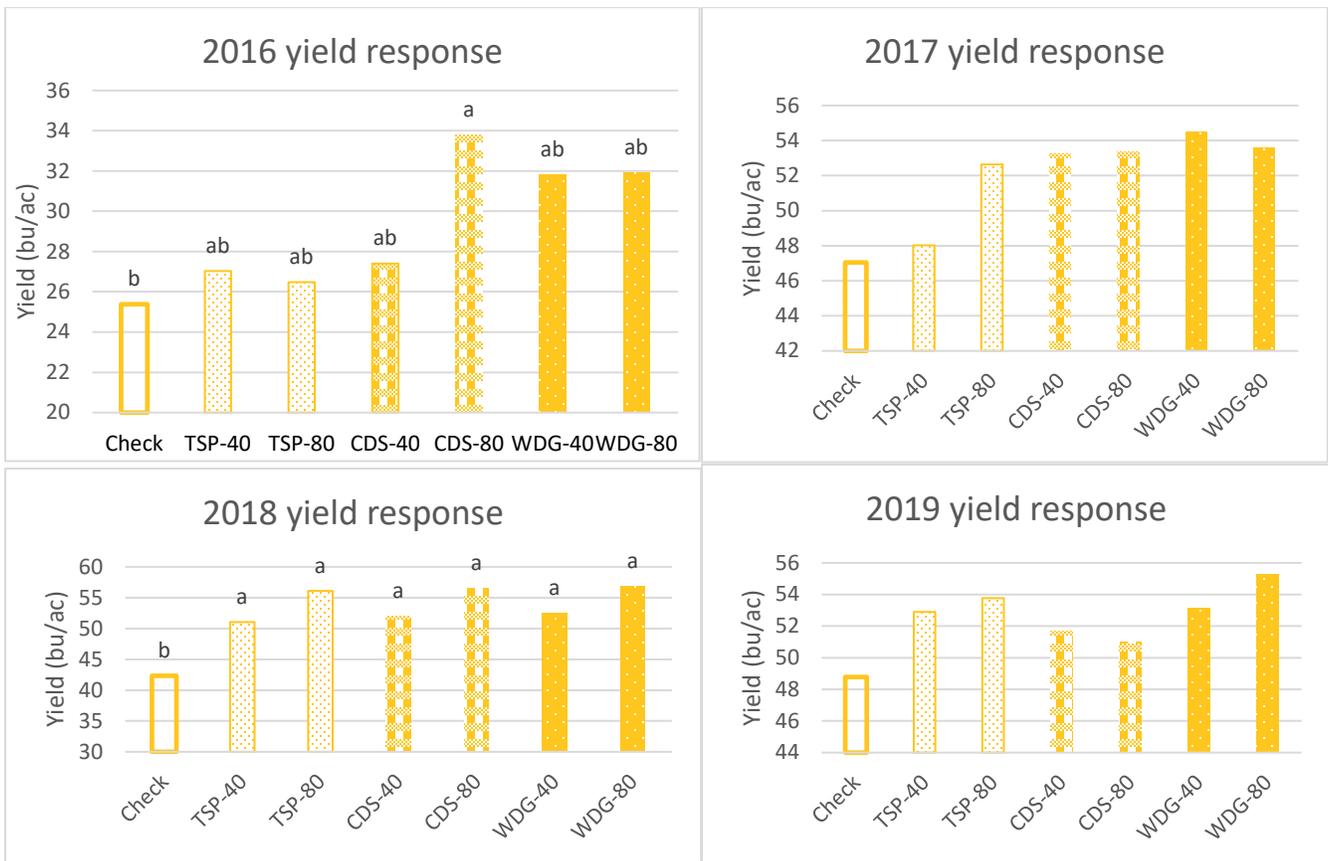
At the CREC there was a trial conducted in wheat for four years between 2016 and 2019. There were two phosphorus (P) rates: 40 and 80 lbs  $P_2O_5$  per acre plus a check with no P. There were three products applied at these rates: triple super phosphate (TSP), which does not supply any other macro nutrients, CDS, and WDG. Nitrogen levels were brought up to the level of the highest amount of nitrogen supplied by one of the by-products or to the recommended level, whichever was higher. Other nutrients were applied based on soil test levels. The sites were all on a Heimdal loam soils. Three sites tested low for phosphorus: 2016 at 5ppm, 2018 at 6ppm and 2019 at 5ppm. The site in 2017 had 13 ppm phosphorus.

## Results

Protein and test weight did not have a significant response to treatments. The yield results are shown in Figure 1. There were significant yield differences in 2016 and 2018. In 2016, CDS at 80 lbs had the highest yield (56.54 bu/ac) and the check had the lowest (42.33 bu/ac). In 2018, only the check was significantly different from the rest, but there was a consistent yield increase by phosphorus rates for all three products. Yields from the WDG plots were consistently higher than those from the TSP-treated plots in every year, even though the differences were not significant. CDS had higher yields than TSP in three out of the four years, but these differences were not statistically significant either.



**Application of wet distiller's grains.**



**Figure 1. Yield response to phosphorus treatments by rates and products broken down by year.** Letters depict mean separations using Tukey,  $\alpha < 0.05$ .

### Conclusion

The results of this study show that corn distillers by-product when applied at the same phosphorus rate, serve just as well, or in some years better, as phosphorus sources for spring wheat than triple super phosphate. An added benefit is that they supply other macro and micro nutrients as well, which lowers the need for synthetic fertilizer inputs. Given that the nutrient content of CDS and WDG varies batch to batch, it is helpful to send a sample for nutrient analysis before application. For those thinking of using these products on their field, it is also important to take into consideration the cost of hauling and applying, as well as the price of the products.