

**Title:** Improving fiber digestibility in DDGS from ethanol production

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The objective of this project was to assess effects of pretreatment methods (chemical, enzymatic, and mechanical) on the digestibility of energy in DDGS. Combinations of different methods were investigated using *in vitro* models. The *in vitro* treatments investigated were: sodium hydroxide, ammonium hydroxide, hydrochloric acid and two types of enzyme, one a cellulase/xylanase mix and the other an enzyme complex containing a wide range of carbohydrases, designed to break down hemicellulose in biomass. The parameters considered for the *in vitro* tests were acid and neutral detergent fiber (ADF, NDF) as well as total dietary fiber (TDF) to get the amount of digestible fiber, cellulose and hemicellulose remaining in the DDGS after treatment, as well as lysine, used as an indicator of digestibility. The most promising methods from the *in vitro* study were then used in an *in vivo* experiment to determine if the improvements observed *in vitro* also resulted in improvements in energy digestibility of DDGS when fed to pigs.

The *in vitro* studies showed that the sodium hydroxide and enzyme treatments were significantly different in fiber content and the enzyme treatments were also higher in lysine than the control, therefore these were selected for the *in vivo* study. In addition, two more treatments, calcium oxide and mechanical extrusion were tested *in vivo*.

The animal studies showed that the cellulase was effective in improving the ME of DDGS. In contrast, addition of an enzyme mixture, extrusion, or chemical treatments of DDGS did not consistently improve the ATTD of the ingredient.

**Key Findings:**

- Sodium hydroxide and enzyme treatment resulted in significantly different fiber content compared to control
- Enzyme treatment had greater lysine content compared to control
- Cellulase was effectively improved the ME of DDGS