RESEARCH ABSTRACT
ANIMAL SCIENCE

Title: Improving fiber digestibility in DDGS from ethanol production – **NPB #11-097**

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Scientific Abstract:

The *in vitro* and *in vivo* effects of different mechanical, chemical and enzymatic treatments to improve fiber digestibility on energy and nutrient digestibility of pigs were investigated. These 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. Of the *in vitro* treatments, the enzymatic tests and the NaOH treatments were selected for animal studies as they showed significantly different values of fiber and digestibility (lysine content).

Extruded DDGS and a CaO treatment were also selected for the *in vivo* study.
Sixty-three barrows (initial BW: 76.1 ± 6.1 kg) were placed individually in metabolism cages and allotted to a randomized complete block design with 7 diets and 9 replicate pigs per diet. After 5 d adaptation period to the diet, feces and urine samples were collated for 5 d. A corn-based diet was formulated consisting of 97.0% corn and 6 additional diets were formulated by mixing corn with 47.95% DDGS that was untreated or extruded, treated with sodium hydroxide, treated with calcium oxide, treated with cellulase, or treated with an enzyme mixture. The apparent total tract digestibility (ATTD) of GE in corn, untreated DDGS, extruded DDGS, sodium hydroxide DDGS, calcium oxide DDGS, cellulose DDGS, and enzyme-treated DDGS was 86.6, 71.7, 72.8 73.3, 70.4, 75.0, and 73.9%, respectively. The ATTD of GE was greater ($P < 0.01$) in corn than in all other ingredients. The ATTD of GE in cellulose treated DDGS was greater ($P < 0.01$) than in calcium oxide DDGS and untreated DDGS, but the ATTD of GE was not different among extruded DDGS, sodium hydroxide treated DDGS, cellulase treated DDGS, and enzyme treated DDGS. The ATTD of NDF was less ($P < 0.01$) in calcium oxide treated DDGS than in corn, sodium hydroxide treated DDGS, cellulase treated DDGS, and enzyme treated DDGS. The ATTD of ADF was less ($P < 0.01$) in corn and extruded DDGS than all the other diets, but the ATTD of ADF was greater ($P < 0.01$) in extruded DDGS than in corn. The ME was 3,738, 3,442, 3,501, 3,458, 3,318, 3,701, and 3,545 kcal/kg DM in corn, untreated-DDGS, extruded DDGS, sodium hydroxide DDGS, calcium oxide DDGS, cellulose treated DDGS, and enzyme treated DDGS, respectively. The ME was less ($P < 0.01$) in extruded DDGS, sodium hydroxide DDGS, calcium oxide DDGS, enzyme treated DDGS, and untreated-DDGS than in corn and cellulase treated DDGS. In conclusion, in this experiment, no significant improvement in ME or ATTD of GE, OM, NDF, ADF, and cellulose was observed if DDGS was extruded or treated with sodium hydroxide, calcium oxide or an enzyme mixture. However, treatment of DDGS with cellulase resulted in an increase in ATTD of GE and OM, and in ME compared with untreated DDGS.