

Do Distillers' Grains Affect Beef Quality?

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Project Title:

Fatty Acid Composition and Meat Quality of Cattle Fed Wheat or Corn-Based Distillers' Grains with Solubles from New Generation Ethanol Plants

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Background: Dried distillers' grains with solubles (DDGS) are widely used in feedlot rations throughout North America. Feedlot operators can calculate the impact of DDGS inclusion on animal performance and carcass grade relatively quickly and easily, but determining the effect on beef quality is considerably more difficult and expensive. Feeding DDGS may increase the levels of unsaturated fat in beef. While this may have human health benefits, unsaturated fats are less "oxidatively stable" than saturated fats. This means that unsaturated fats are more prone to chemical reactions that can lead to off-flavours, unpleasant smells, discoloration and shortened shelf-life.

Objectives: To determine the effect of replacing barley grain with DDGS on:

1. Carcass measurements,
2. Fatty acid composition of subcutaneous and marbling fat of ribeye steaks,
3. Objective meat quality and taste panel evaluations of ribeye steaks, and
4. Meat quality following oxidative stresses.

What they did: A total of 288 crossbred steers were backgrounded on four diets containing 40% concentrate. The control diet contained no DDGS. The three experimental diets replaced some of the barley grain with either 17% corn DDGS, 17% wheat DDGS, or 17% DDGS from a corn/wheat blend. In the finishing period, the concentrate level was increased to 93% (dry matter basis), and DDGS levels in the experimental diets were increased to 40%. Carcass data was collected on all of the steers at the end of the trial. Ribeye steaks were collected from 20 head per group, aged 14 days and used for detailed lab, shelf life and taste panel tests. Inside round roasts were also collected from each of the groups and frozen for a year (to give lots of opportunity for oxidation). After thawing, these samples were used to study whether the diet affects the degree of oxidation in beef and whether pumping the inside round roasts with a salt/phosphate brine solution could reduce this oxidation.

What they learned:

Carcass measurements: Diet did not affect carcass weight, dressing percentage or marbling score. Carcasses from control steers had lean meat yields that were 1.5 to 2% higher than DDGS fed cattle.

Fatty acid composition: Ribeye steaks from all diets averaged around 3.5% intramuscular (marbling) fat, which roughly corresponds to AA marbling. Polyunsaturated fat accounted for approximately 7% of the total intramuscular fat in steaks from cattle in the control group, and nearly 12% of the intramuscular fat in steaks from cattle in the experimental groups.

Fat oxidation: Feeding any of the DDGS diets significantly increased the degree of fat oxidation in the inside rounds after a year of frozen storage. Pumping the roasts with a salt/phosphate brine solution reduced the degree of oxidation in beef from all of the diets, but had the most benefit in samples from the DDGS diets. Similar results were observed with ground beef.

Retail acceptability: Diet significantly affected the colour of ribeye steaks in the retail display case. Compared to steaks from cattle in the control group, steaks from cattle fed the DDGS diets appeared to be less red, lost redness faster, showed more discoloration and were less desirable to consumers as time in the display case increased. Recall that these steaks had been aged for two weeks prior to entering the retail case, so this may not be a serious concern in all retail situations.

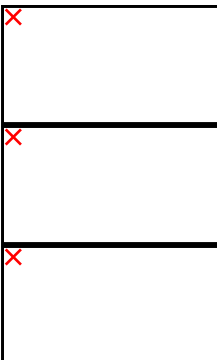
Cooking characteristics: Diet did not significantly affect the fat content, drip loss, cooking loss, cooking time or shear force (a mechanical measure of toughness) of ribeye steaks.

Taste panel evaluation: The trained taste panel did not detect any significant differences in tenderness, juiciness, flavour, or texture of the ribeye steaks from cattle fed the four different diets.

What it means: Feeding DDGS did not impact carcass weight or quality grade in this study, but DDGS did increase the amount of polyunsaturated fat in the beef as well as the degree of oxidation. This could produce undesirable changes in beef that is aged before entering the retail display case. Once the beef is cooked, however, there do not appear to be any differences in eating quality in the beef from cattle fed diets containing DDGS compared to those fed traditional feedlot finishing diets.

Pumping roasts with a brine solution may help to overcome the risk of oxidation and off colours observed in beef from cattle fed 40% DDGS. Supplementing the feedlot diet with vitamin E (a natural anti-oxidant) may also help prevent undesirable colour changes in the beef.

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