

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Beef Cattle Reports

Animal Science Department

January 2008

Effect of Distillers Grains Fat Level on Digestibility

Mark E. Corrigan

University of Nebraska-Lincoln

Galen E. Erickson

University of Nebraska-Lincoln, gerickson4@unl.edu

Terry J. Klopfenstein

University of Nebraska-Lincoln, tklopfenstein1@unl.edu

Nathan F. Meyer

University of Nebraska-Lincoln, nmeyer2@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/animalscinbcr>



Part of the [Animal Sciences Commons](#)

Corrigan, Mark E.; Erickson, Galen E.; Klopfenstein, Terry J.; and Meyer, Nathan F., "Effect of Distillers Grains Fat Level on Digestibility" (2008). *Nebraska Beef Cattle Reports*. 18.

<https://digitalcommons.unl.edu/animalscinbcr/18>

This Article is brought to you for free and open access by the Animal Science Department at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Beef Cattle Reports by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Effect of Distillers Grains Fat Level on Digestibility

Mark E. Corrigan
Galen E. Erickson
Terry J. Klopfenstein
Nathan F. Meyer¹

Summary

Four steers were used in a three-period switchback design to determine effects of dry distillers grains fat level on digestibility. Forage based diets were supplemented with distillers grains with differing fat levels (6.9% or 13.3 % dry matter). Intake and digestibility of DM and organic matter did not differ between treatments. Neutral detergent fiber intake was less and digestibility tended to be less in steers supplemented with high fat distillers grains. Differences in fiber type and intake as well as fat intake may be responsible for the small difference in neutral detergent fiber digestibility.

Introduction

Variability in composition of wet distillers grains has been demonstrated (2008 Nebraska Beef Report, pp. 126-127), and it is likely that these differences in nutrient composition impact overall feed value. Previously we have reported an interaction between dry distillers grains (DDG) composition and supplementation level (2007 Nebraska Beef Report, pp. 17-18.). In that study, ADG and F:G improved with increasing DDG supplementation level in steers fed DDG containing intermediate levels of solubles (5.4% to 19.1%, DM basis). When steers were supplemented with DDG containing 21.1% solubles however, ADG and F:G were optimized with the 0.50% supplementation level and decreased with increasing supplementation levels thereafter. Distillers solubles have a higher fat content (approximately 20% of DM) than do distillers grains without solubles (7% of DM). Therefore, as DDG solubles level increased, so did DDG fat content. We hypothesize the high fat

intake of steers fed high levels of the high solubles DDG may have caused a reduction in nutrient digestibility. The current study was conducted to determine if DDG composition affects DM, OM, and NDF digestibility.

Procedure

Four steers were used to determine effects of DDG composition on digestibility of DM, OM, and NDF in growing steers fed a forage-based diet. A three-period switchback design was used. Treatments included supplementation of one of two types of DDG fed in a previous experiment (2007 Nebraska Beef Report, pp 17-18). The DDG differed in nutrient composition (Table 1) and were supplemented at 1% of BW. Nutrient composition was different due to different amounts of distillers solubles added to distillers grains (0% and 22.1%, DM basis). Steers were assigned randomly to one of two groups. Group 1 steers were supplemented with the low fat DDG (LOW FAT) during periods 1 and 3 and the high fat DDG (HIGH FAT) during period 2. Group 2 steers were supplemented with HIGH FAT DDG during periods 1 and 3 and LOW FAT DDG during period 2. For 5 days prior to initiation of the experiment, steers were supplemented with DDG containing 14.5% solubles at 1% of BW and allowed ad libitum intake of a mixed forage diet (58.8% alfalfa hay, 39.2% brome hay, and 2.0% supplement). Throughout the experiment steers were fed the mixed forage diet at 95% of their previously recorded ad libitum intake. Steers were individually fed once daily at 0800.

Period duration was 14 days and consisted of a 10-day adaptation period followed by a 4 day total fecal collection period. Fecal collection bags were placed on the steers at 0800 on day 11. Bags were replaced and fecal contents were weighed and sampled at 0800 and 1700 daily. Fecal samples were immediately frozen and later analyzed for DM, OM, and NDF content.

Table 1. Composition of dry distillers grains (DDG) with different amounts of distillers solubles fed to steers at 1% of BW.

| Item | Low Fat DDG | High Fat DDG |
|--------|-------------|--------------|
| DM, % | 95.5 | 89.6 |
| CP, % | 32.1 | 30.9 |
| Fat, % | 6.9 | 13.3 |
| NDF, % | 36.8 | 29.3 |

Data were analyzed as a three-period switchback design using the MIXED procedure of SAS (SAS Inst. Inc., Cary, N.C.). Carryover effect and treatment sequence were included as fixed effects in the model.

Results

Intake of DM and OM were not different between treatments (Table 2). This is not surprising as forage intake was limited throughout the experiment to 95% of ad libitum. However, intake of NDF was greater ($P = 0.02$) in steers fed LOW FAT DDG compared to steers fed HIGH FAT DDG. This is a reflection of the different NDF percentages of LOW FAT (36.8%, DM basis) and HIGH FAT DDG (29.3%, DM basis). No treatment differences were observed for digestibility of DM or OM. There was however a 3% improvement in NDF digestibility in steers fed LOW FAT DDG compared to steers fed HIGH FAT DDG, which was approaching significance ($P = 0.14$).

There was a large difference in the fat content of LOW FAT (6.9% fat, DM basis) and HIGH FAT DDG (13.3% fat, DM basis). Supplemental fat has been shown to reduce the digestibility of DM, OM, and NDF in forage diets (Paven et al., *Journal of Animal Science*). The observation of 3% greater NDF digestibility for steers supplemented with LOW FAT DDG compared to HIGH FAT DDG may be a result of the amount of daily fat intake (0.8 and 1.1 lb/day for LOW FAT and HIGH FAT DDG, respectively). The NDF from the DDG would be expected to be more digestible than

(Continued on next page)

that of the forage. Therefore, the higher proportion of NDF intake from DDG in steers supplemented with LOW FAT DDG compared to HIGH FAT DDG supplemented steers may explain some of the difference. Intake of NDF from DDG was 36.6% and 29.9% of total NDF intake for LOW FAT and HIGH FAT DDG, respectively. In contrast, lower fiber intakes observed in steers supplemented with HIGH FAT DDG would have been expected to increase digestibility of DM, OM, and possibly NDF. Therefore, the reasons for the observed small difference in NDF digestibility between treatments remain unclear.

Table 2. Intake and digestibility of dry matter, organic matter, and NDF from DDG varying in fat content when fed at 1% of BW.

| Item | Low Fat DDG | High Fat DDG | P-value |
|------------------|-------------|--------------|---------|
| DM | | | |
| Intake, lb | 14.7 | 14.7 | 0.90 |
| DDG, lb | 6.6 | 6.6 | 0.90 |
| Digestibility, % | 67.5 | 66.2 | 0.58 |
| OM | | | |
| Intake, lb | 14.2 | 14.2 | 0.91 |
| DDG, lb | 6.5 | 6.4 | 0.46 |
| Digestibility, % | 69.8 | 68.5 | 0.55 |
| NDF | | | |
| Intake, lb | 8.2 | 7.7 | 0.02 |
| DDG, lb | 2.9 | 2.4 | <0.01 |
| Digestibility, % | 62.6 | 59.6 | 0.14 |

¹Mark E. Corrigan, graduate student; Galen E. Erickson, associate professor; Terry J. Klopfenstein, professor; Nathan F. Meyer, research technician; Department of Animal Science, Lincoln.