Sheep & Goat Research Journal
Volume 29, 2014 - December

Effect of Fat Source on Growth Performance and Carcass Characteristics of Growing Lambs

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Summary

Seventy two Polypay crossbred lambs (BW 34.3 ± 0.75 kg) were used in a complete randomized design to determine the effect of supplemental fat source on growth performance and carcass characteristics over a 70-d feeding period. Lambs were stratified by weight and sex and assigned to 12 pens (3 wethers and 3 ewes per pen). Pens were assigned randomly to one of three dietary treatments consisting of 40 percent corn stover, 4 percent soy hulls, 2.4 percent supplement and one of the following treatment combinations: 1) 34 percent low-fat dried distillers grains (CON), 2) 34 percent conventional dried distillers grains plus solubles (DIST), 3) 34.6 percent low-fat dried distillers grains plus 1.85 percent raw corn oil (OIL). DIST and OIL diets were formulated to be iso-lipid. Lambs were allowed ad libitum access to feed and water. On d 21, d 42, and d 63 feeders were emptied and residual feed was weighed, recorded, and sampled. Initial and final BW were determined as the average of weights on d -1 and d 0 (initiation of feeding) and d 69 and d 70, respectively. Three intermediate weights were recorded on d 21, d 43, and d 63 to monitor growth performance. At the conclusion of the feeding period, four lambs were harvested from each pen and carcass data were collected. Cumulative DMI, ADG, G:F, and final BW were similar ($P > 0.24$) for lambs fed the fat-supplemented diets and the CON diet, however, lambs fed the DIST diet had greater ($P < 0.01$) cumulative DMI, ADG, G:F, and final BW compared to the OIL diet. Supplementation with corn oil tended ($P = 0.06$) to decrease HCW compared to supplementation with DDGS, but there were no differences between the CON diet and fat-supplemented diets ($P = 0.44$). Dressing percentage; backfat thickness; LM area; body wall thickness; USDA-yield grade, and boneless, closely trimmed retail cuts were not affected by fat supplementation or source of fat ($P > 0.20$). However, lambs were fed a higher energy diet for the last two weeks of the trial to meet target finished-weight goals.

Key Words: Fat, Lambs, Growth, Dried Distillers Plus Solubles

Introduction

The growing ethanol industry and increasing availability of co-products has made dried distillers grains plus solubles (DDGS) a commonplace component of ruminant diets as an economical source of protein and energy. A major contributor to the energy content of DDGS is its fat content (approximately 10.6 percent fat on a DM basis; NRC, 2007). However, the role of DDGS as a fat source in the diets of growing ruminants has not been investigated extensively. The majority of past research has been conducted in beef cattle, and available data for growing lambs are limited.

Previous research into the use of supplemental fat in growing diets has resulted in variable growth performance and carcass merit. Huffman et al. (1992) found no difference in the ADG of lambs fed 0 percent, 1 percent, 2 percent, or 4 percent tallow, while Brandt and Anderson (1990) observed increased daily gains in yearling steers fed soybean oil, tallow, or yellow grease. Bock et al. (1991) observed increased subcutaneous fat, but no changes in ribeye area (REA), USDA yield grade (YG), marbling score, or percentage kidney pelvic heart fat (KPH) when feedlot steers were supplemented with 3.5 percent fat. In contrast, 4 percent supplemental fat increased REA and KPH, but had no effect on subcutaneous fat, marbling score or HCW in feedlot steers (Zinn, 1988). The most consistent trend observed when ruminants were supplemented with fat was an improvement in feed efficiency (Brandt and Anderson, 1990; Zinn and Plascencia, 1996; Felton and Kerley, 2004).

The inconsistencies in past studies demonstrate the need for further research into fat supplementation for growing lambs. The objectives of this study were to compare the effects of DDGS and raw corn oil on ADG, feed efficiency and carcass characteristics in growing lambs. These fat sources were chosen because they are readily available dietary ingredients resulting from ethanol production in the Midwest. It was hypothesized that 1) DDGS would result in greater ADG and improved feed efficiency than feeding corn oil and 2) source of fat would have no effect on carcass merit.

Materials and Methods

Animals, Diets, and Experimental Procedures

All experimental procedures were approved through the South Dakota State University Institutional Animal Care and Use Committee before trial initiation. Polypay crossbred lambs (n = 72) of similar genetic background raised at the South Dakota State University Sheep Unit were used in a completely randomized design. Lambs were stratified by weight and sex and assigned to 12 pens, (3 ewes and 3 wethers per pen). The initial average weight was similar (initial BW 34.3 kg ± 0.75 kg) across pens. Pens were assigned randomly to one of three diets resulting in four pen replications per treatment. Lambs were housed in outdoor earthen research pens (3.66 m x 4.88 m). Twice daily, lambs were monitored for health status and, if needed, ill animals were treated according to SDSU Sheep Unit protocol and following the advice of the attending veterinarian.

Treatment diets were formulated to meet or exceed NRC (2007) requirements for growing/finishing lambs. Diets consisted of corn stover, soy hulls, and 2.4 percent supplement (limestone, ammonium chloride, deconquinate, and vitamins A, D, and E) and one of the following treatment combinations: 1) 34 percent low-fat dried distillers grains (CON), 2) 34 percent DDGS (DIST), 3) 34.6 percent low-fat dried distillers grains plus 1.85 percent raw corn oil (OIL) (Table 1). The level of corn stover chosen for the basal diet was based on the results of a preliminary study that determined the level of inclusion that would result in satisfactory intake. All diets were mixed and pelleted at the SDSU feed manufacturing facility. Diets were formulated to be isonitrogenous, with CP levels common in commercial lamb feedlot diets and that met or exceeded NRC requirements for growing/finishing lambs. However, slight variations in the CP content of the feed ingredients resulted in the DIST diet having a slightly greater CP content than either the OIL or CON diets. The DIST and OIL diets were formulated to be iso-lipid. Feed was sampled on d 21, d 42 and d 63 of the trial. Samples were dried using a forced air induction oven at 60°C for 48 hours. Dried samples were ground in a Wiley mill (Thomas Scientific, Swedesboro, N.J.) to pass through a 1 mm screen. Ground feed and offered but refused treatments (ORTS) were stored in sealed plastic bags at room temperature and then ground before laboratory analysis. Subsamples were assayed for CP (Kjeldahl; AOAC, 1990), ADF and NDF (Goering and Van Soest, 1970), ash (AOAC, 1990), and ether extract (EE; Goldfisch; AOAC, 1990). Lambs were allowed *ad libitum* access to feed via self feeders and had *ad libitum* access to water via automatic waterers in each pen. Waterers were checked and cleaned daily. As feed was added to the self feeders, it was weighed and recorded. On d 21, d 42, and d 63 feeders were emptied and the residual feed was weighed, recorded, and sampled for DM determinations. Feeder trays were checked daily, and wet feed or contaminants (fecal material, wool, mud, etc.) were removed. Wet feed was bagged, weighed, and sampled for DM determination. This residual feed source was included in the ORTS.

Lambs were adapted to the treatments via step-up diets over the course of nine days. From d -9 to d -7, lambs had access to 25 percent of their assigned treatment diet and 75 percent finishing diet (whole shelled corn, soybean hull pellet, and protein pellet) that was similar across treatments. From d -6 to d -3, lambs had access to 50 percent treatment diet and 50 percent finishing diet. From d -2 to d -1 lambs had access to 75 percent treatment diet and 25 percent finishing diet. Then, on d 0, lambs were given 100 percent treatment diet.

Due to lower than projected growth performance, lambs did not reach an acceptable market weight (50 kg) by the end of the 70-d feeding period. Thus, the feeding period was extended for 2 wks and the diet modified to contain more energy. The finishing diet (whole shelled corn, soybean hull pellet, and protein pellet) was substituted for the treatment diets, the amount increasing 15 percent (by weight) every 3 d, until the conclusion at d 84.

Due to extreme heat, beginning the second week of the trial, a plastic mesh covering was draped over the top of the south end of all the pens in order to provide shade and help alleviate heat stress. The mesh covering remained in place for the duration of the trial.

Table 1. Composition of treatment diets fed to growing lambs.

	Treatment[1]		
Item	CON	DIST	OIL
		% of diet DM	
Corn stover/soybean hulls[2]	59.20	59.60	57.20
DDGS[3]	—	34.00	—
Low-fat DDG[4]	34.00	—	34.55
Soybean hulls	04.40	04.00	04.00
Corn oil	—	—	01.85
Limestone	01.00	01.00	01.00
Ammonium chloride	00.50	00.50	00.50
Decoquinate[5]	00.15	00.15	00.15
Premix[6]	00.25	00.25	00.25
Sheep trace mineral salt[7]	00.50	00.50	00.50
Diet composition, DM basis			
DM, %	92.42	92.17	92.32
CP, %	14.56	15.30	14.86
ADF, %	30.49	30.18	29.84
NDF, %	51.76	52.16	50.65
Ash, %	10.26	09.84	09.92
EE[8], %	02.90	04.91	04.95
Ca, %*	00.69	00.69	00.68
P, %*	00.40	00.31	00.40
S, %*	00.37	00.34	00.38

1 CON = basal diet with no supplemental fat, DIST= basal diet with fat supplied by dried distillers grains plus solubles, OIL = basal diet with fat supplied by raw corn oil.
2 80% corn stover/20% soybean hull blend; Iowa BioFibers, Inc., Harlan, IA.
3 DDGS = conventional dried distillers grains plus solubles.
4 Low-fat dried distillers grains; Dakota Gold, Poet Refining, Milbank, SD.
5 Decoquinate fed to provide 0.5 mg/kg of live BW (Deccox, Alpharma Animal Health, Bridgewater, NJ).
6 Included 400,000 IU/lb vitamin A; 80,000 IU/lb vitamin D_3; 24,000 IU/lb vitamin E.
7 Included 2.0% Fe; 1.6% Mn; 1.32% Zn; 0.032% I; 0.008% Co; 0.012% Se.
8 Ether extract.
* calculated value.

Measurements

Initial and final BW were determined as the average of weights recorded on d -1 and d 0 and on d 69 and d 70, respectively. Three intermediate weights were recorded on d 21, d 43, and d 63. All weights were recorded between approximately 0800 h and 1000 h on their respective days.

At the conclusion of the feeding period, four lambs (3 wethers and 1 ewe) were selected from each pen and sent to Superior Farms of Denver, Colo. for harvest and carcass data collection by experienced Colorado State University personnel. The remaining ewe lambs were retained for replacements. Carcass data collected included HCW; dressing percentage; backfat thickness; LM area; body wall thickness; USDA-yield grade; and boneless, closely trimmed retail cuts

Statistical Analysis.

Growth performance and carcass data were analyzed as a completely randomized design, with pen as the experimental unit. Statistical analysis was performed using the PROC GLM procedure of SAS (SAS Inst. Inc, Cary, N.C.). Sums of squares were partitioned into single-degree of freedom contrasts to examine specific *a priori* orthogonal comparisons (i.e., CON vs DIST and DIST vs OIL) for growth-performance and carcass-characteristic variables. Treatment means were separated using the LSMEANS statement with the PDIFF option. For all data, significance was declared at $P < 0.05$ and tendencies accepted at $0.05 \leq P \leq 0.10$.

Results and Discussion

Growth Performance.

The effects of fat supplementation on intake and growth performance are reported in Table 2. During the first 21-d period, lambs on the CON diet consumed less feed than those on the fat-supplemented diets ($P < 0.01$), and lambs on the OIL diet consumed less than those on the DIST diet ($P = 0.04$). During the second period (d 22 to d 43), there was no difference in intake between lambs fed the fat-supplemented and the CON diet ($P = 0.53$), though lambs consuming the OIL diet again consumed less ($P = 0.02$) than those on the DIST diet. Dry matter intake during the third period (d 44 to d 63) was lower for lambs fed the fat-supplemented diets ($P < 0.01$) compared to those fed the CON diet, but in period four (d 64 to d 70), lambs on the CON diet consumed less ($P = 0.04$) than those consuming the fat-supplemented diets. During the third (d 44 to d 63) and fourth periods (d 64 to d 70), there were no differences in intake between lambs on the DIST and OIL diets ($P > 0.10$). Cumulative (d 0 to d 70) average daily DMI was not different for lambs fed the CON diet compared to the lambs fed the two diets supplemented with fat ($P = 0.32$). This is consistent with Van Emon et al. (2011), who observed no effect of supplemental fat in the form of DDGS or vegetable oil on the DMI of finishing lambs. Felix et al. (2012) reported no difference in DMI in growing lambs fed 0 percent, 20 percent, 40 percent, or 60 percent DDGS, diets that contained similar, and in the case of the 60 percent DDGS diet, greater amounts of EE than the current study. Vander Pol et al. (2009) also noted no effect of 2.5 percent or 5 percent corn oil on the DMI intake of heifers and no differences in DMI of yearling steers fed 0 percent, 20 percent, or 40 percent DDGS. The dietary EE contents of the diets used by Vander Pol et al. (2009) were similar to that of the dietary treatments utilized in the current study. The low-total dietary fat (less than 5 percent) in the current study may have mitigated any significant decrease in DMI. Previous research has noted decreases in DMI

Table 2. Effect of fat source from raw corn oil or dried distillers grains plus solubles on growth performance of growing lambs.

	Treatment[1]				Contrasts[2]	
Item	CON	DIST	OIL	SEM	I	II
No. of pens	4	4	4			
BW, kg						
Initial	34.8	33.9	34.2	0.36	0.14	0.61
D 21	37.1	38.8	38.5	0.54	0.05	0.79
D 43	42.5	44.2	42.8	0.38	0.08	0.03
D 63	45.1	47.2	45.1	0.45	0.10	0.01
D 70[3]	47.1	48.2	46.1	0.49	0.96	0.01
D 84[4]	52.2	53.4	51.4	0.51	0.82	0.02
DMI, kg/(hd.d)						
Period 1 (d 0-21)	1.17	1.45	1.33	0.04	< 0.010	0.04
Period 2 (d 22-43)	1.63	1.66	1.57	0.02	0.53	0.02
Period 3 (d 44-63)	1.98	1.81	1.75	0.03	< 0.010	0.16
Period 4 (d 64-70)	1.42	1.62	1.56	0.06	0.04	0.50
D 0-70	1.59	01.66	01.57	0.02	0.32	0.01
D 71-84[4]	2.11	02.05	02.03	0.04	0.20	0.79
ADG, kg/(hd.d)						
Period 1 (d 0-21)	000.11	000.23	000.21	0.02	< 0.010	0.52
Period 2 (d 22-43)	000.25	000.25	000.19	0.01	0.11	0.01
Period 3 (d 44-63)	000.13	000.15	000.12	0.02	0.86	0.17
Period 4 (d 64-70)	000.25	000.13	000.12	0.04	0.04	0.88
D 0-70	000.18	000.20	000.17	0.01	0.24	0.01
D 71-84[4]	0.36	0.36	0.38	0.02	0.72	0.65
G:F						
Period 1 (d 0-21)	0.09	0.16	0.16	0.02	0.01	0.99
Period 2 (d 22-43)	0.15	0.15	0.12	0.01	0.21	0.06
Period 3 (d 44-63)	0.07	0.08	0.07	0.01	0.35	0.26
Period 4 (d 64-70)	0.18	0.08	0.08	0.03	0.02	0.94
D 0-70	0.11	0.13	0.11	0.004	0.24	0.01
D 71-84[4]	0000.17	000.18	000.19	0.01	0.33	0.61

[1] CON = basal diet with no supplemental fat, DIST= basal diet with fat supplied by dried distillers grains plus solubles, OIL = basal diet with fat supplied by raw corn oil,

[2] Contrast I = CON vs DIST and OIL; Contrast II = DIST vs OIL.

[3] Final BW of the trial.

[4] Measures after 2 wk trial extension and addition of whole shelled corn, soybean hull pellet, and protein pellet mix to diet.

when supplemental fat was fed, however, depression usually occurred at levels greater than 7 percent (Willey et al., 1952; Kowalczyk et al., 1977; Felton and Kerley, 2004; Pavan et al., 2007).

Cumulative average daily DMI for lambs on the DIST diet was greater (P = 0.01) than for lambs on the OIL diet. Abdelqader et al. (2008) reported no significant difference in DMI for Holstein cows fed 2.5 percent corn oil compared to 30 percent DDGS. Previous research had demonstrated that feeding free oils often depresses intake (Willey et al., 1952; Cameron and Hogue, 1968; Bateman and Jenkins, 1998; Pavan et al., 2007).

Average daily gain was less (P < 0.01) for lambs on the CON diet than the fat- supplemented diets during the first period, but there were no differences (P = 0.52) in ADG between the DIST and OIL diets. In period 2 (d 22 to d 43), ADG across all treatments peaked with lambs consuming the DIST diet (P = 0.01) gaining more than those consuming the OIL diet. Average-daily gain decreased across all treatments in period three (d 44 to d 63), but there were no differences (P > 0.10) among any of the treatments. Bock et al. (1991) observed a similar trend in steers fed supplemental fat; animals reached the greatest ADG from d 29 to d 56 of the trial and dropped off from d 57 to d 84. In the current study, fat supplementation decreased ADG compared to the CON diet (P = 0.04) over the course of the fourth period (d 64 to d 70), but there was no effect of fat source (P = 0.88).

Cumulative (d 0 to d 70) ADG was not different between the fat-supplemented diets and the CON diet (P = 0.24). This is supported by Van Emon et al. (2011), who noted no difference in the ADG of lambs fed either 50 percent DDGS or 2.5 percent vegetable oil compared to a control diet containing no supplemental fat. In two studies, Huffman et al. (1992) reported no effect of 4 percent bleachable fancy tallow or 4 percent blended, animal-vegetable oil on ADG of lambs and no difference in ADG between lambs fed 0 percent, 1 percent, 2 percent, or 4 percent bleachable fancy tallow. Vander Pol et al. (2009) observed no differences in the ADG of finishing steers fed two levels of tallow (1.3 percent and 2.6 percent) and two levels of DDGS (20 percent and 40 percent) when compared to a control diet. Conversely, Brandt and Anderson (1990) reported increased daily gains when yearling steers were fed soybean oil, tallow, or yellow grease. Zinn (1988) observed increases in daily gains when yellow grease was supplemented at 4 percent of the diet in feedlot steers. Fat, supplemented at up to 8 percent in the diets of feedlot cattle, increased daily gains in a study performed by Zinn (1989). Huffman et al. (1992) reported an increase in ADG for yearling feedlot cattle supplemented with a blend of tallow and animal-vegetable oil fed at 4 percent compared to 0 percent. However, these studies utilized high-concentrate basal diets, whereas the current study used a high-forage basal diet. High-concentrate diets generally contain greater amounts of energy and are associated with greater growth performance.

Lambs on the DIST diet in the current study had a greater cumulative ADG (P = 0.01) compared to lambs on the OIL diet. The greater ADG for lambs on the DIST diet is most likely a result of the increased DMI observed for lambs fed the DIST diet. Another possible explanation was the slightly greater CP level in the DIST diet compared to the OIL diet (15.30 percent and 14.86

percent, respectively). Previous researchers reported increased gains in growing animals fed elevated protein levels. Dabiri and Thonney (2004) observed a linear increase in ADG in growing lambs fed 13 percent, 15 percent, or 17 percent CP.

Cumulative (d 0 to d 70) feed efficiency was not different between the fat-supplemented diets and the CON diet ($P = 0.24$). This result was unexpected as improvements in feed efficiency are typical of diets supplemented with fat (Zinn and Plascencia, 1996; Ramirez and Zinn, 2000; Felton and Kerley, 2004). It was most likely due to the decrease in ADG for lambs on the fat-supplemented diets during the fourth period (d 64 to d 70) and the increase in ADG for the lambs on the CON diet during the fourth period. Lambs fed the DIST diet were more efficient than those fed the OIL diet ($P = 0.01$), a result of the greater ADG for the lambs on the DIST diet coupled with a slight, but significant increase in DMI compared to the lambs fed the OIL diet.

Fat supplementation increased feed efficiency ($P = 0.01$) of lambs during the first feeding period, but there was no effect of fat source ($P = 0.99$). Fluharty and Loerch (1997) observed non-significant differences in efficiency of gain during the first 21 days of feeding feedlot steers supplemental fat. Neither fat supplementation ($P > 0.20$) nor fat source affected efficiency during the second (d 22 to d 43) and third periods (d 44 to d 63), though lambs consuming the DIST diet tended ($P = 0.06$) to be more efficient than those consuming the OIL diet during the second period (d 22 to d 43). Due to a large decrease in ADG in lambs fed supplemental fat during the fourth period (d 64 to d 70), lambs on the CON diet were more efficient during the fourth period ($P = 0.02$) than those fed additional fat. Fat source did not affect efficiency ($P = 0.94$) during the fourth period.

At the end of period one (d 0 to d 21), lambs on the CON weighed less ($P = 0.05$) compared to lambs on the fat-supplemented diets. There were no differences in BW between the DIST and OIL diets ($P = 0.79$). At the end of period 2 (d 22 to d 43), lambs on the CON diet tended to weigh less than lambs on the fat-supplemented diets ($P = 0.08$) and lambs on the DIST diet weighed more than those on the OIL diet ($P = 0.03$). There were no differences in weight between lambs fed the fat-supplemented diets and the CON diet ($P = 0.10$) at the end of period 3 (d 44 to d 63), though lambs on the DIST diet weighed more than lambs on the OIL diet ($P = 0.01$). Fat supplementation had no effect ($P = 0.96$) on final BW of growing lambs, which is consistent with much of the literature. Felton and Kerley (2004) observed no difference in final BW of finishing steers fed supplemental fat. Additional fat from either vegetable oil or DDGS did not affect the final BW of finishing lambs (Van Emon et al., 2011) and Zinn and Plascencia (1996) noted no effect of 6 percent supplemental yellow grease on final live BW of feedlot cattle. Brandt and Anderson (1990) also reported no effect of 3.5 percent additional fat on the final BW of feedlot cattle. Source of fat did affect final BW; supplementation with DDGS resulted in greater final BW than supplementation with raw corn oil ($P = 0.01$), primarily due to the increased intake of lambs receiving supplemental fat from DDGS.

The growth trial was officially terminated after d 70; however due to lower than expected growth performance, lambs had not yet reached an acceptable weight for harvest. The diet was adjusted with the addition of the finishing diet (whole shelled corn, soybean hull pellet, and protein pellet to the assigned treatment diets, and the lambs were fed for an additional 2 wks. On d 84, live weight was recorded before lambs were shipped to Denver, Colo. for harvest and collection of carcass data. There were no differences in the d 84 weights between the CON and fat-supplemented diets ($P = 0.82$); however, lambs originally fed the DIST diet weighed more than lambs originally fed the OIL diet ($P = 0.02$).

Carcass traits.

The effects of supplemental fat on carcass traits are reported in Table 3. Lambs on the DIST diet tended to have a greater HCW compared to lambs on the OIL diet ($P = 0.06$), but there was no difference in HCW between the CON diet and the fat-supplemented diets ($P = 0.44$). Neither fat supplementation nor source of fat had any effect on any of the other carcass characteristics measured in this study ($P > 0.20$). This is consistent with Van Emon et al. (2011), who noted no differences in carcass merit between a non-supplemented, control diet and supplementation with either DDGS or vegetable oil. In agreement with the current study, Pavan et al. (2007) found no effect of corn-oil supplementation on the dressing percentage or yield grade in grazing steers and Felix et al. (2012) observed no effect of increasing levels of DDGS on backfat, yield grade or LM area in lambs. Felton and Kerley (2004) reported no effect of supplemental fat on LM area;

Table 3. Effect of fat source on carcass traits in growing lambs.

	Treatment[1]				Contrasts[5]	
Item	**CON**	**DIST**	**OIL**	**SEM**	**I**	**II**
Number of pens	4	4	4			
HCW, kg	26.30	26.50	25.40	0.34	0.44	0.06
Dressing percent	47.90	47.80	47.40	0.20	0.34	0.20
Backfat thickness, cm	0.44	0.43	0.45	0.08	0.97	0.87
LM area, cm^2	13.39	14.52	14.52	0.73	0.24	1.00
BWTH[2], cm	2.04	2.23	1.84	0.12	0.39	0.55
YG[3]	2.10	2.10	2.20	0.31	0.97	0.87
BCTRC, %[4]	46.50	46.70	46.90	0.46	0.62	0.74

1 CON = basal diet with no supplemental fat, DIST= basal diet with fat supplied by dried distillers grains plus solubles, OIL = basal diet with fat supplied by raw corn oil.

2 BWTH = body wall thickness.

3 YG = USDA yield grade.

4 % BCTRC (boneless closely trimmed retail cuts) = 49.936 - (.0848 x HCW (lb)) - (4.376 x backfat thickness (in)) - (3.53 x BWTH (in)) + (2.456 x LM (in^2)).

5 Contrast I = CON vs DIST and OIL; Contrast II = DIST vs OIL.

yield grade; dressing percent; or boneless, closely trimmed retail cuts (BCTRC) in feedlot steers. However, carcass-merit responses to supplemental fat in ruminant diets have been inconsistent. Unlike the current study, Zinn (1988) found that 4 percent supplemental fat increased REA in feedlot steers and Brandt and Anderson (1990) reported an increase in dressing percentage and backfat in yearling steers fed 3.5 percent supplemental fat. Bock et al. (1991) observed an increase in backfat in feedlot steers fed 3.5 percent supplemental fat.

It should be noted that the carcass traits evaluated in this study cannot be considered to be due exclusively to the three dietary treatments originally implemented, due to diet modifications after d 70. The finishing diet of whole shelled corn, soybean hull pellet, and protein pellet was added incrementally after the official finish of the growth trial to achieve an acceptable harvest weight.

Conclusion and Implications

In growing lambs, the CON diet and fat-supplemented diets should not differ in final BW or cumulative DMI, ADG or feed efficiency. However, lambs fed supplemental fat provided by DDGS were more efficient and exhibited greater final body weight, DMI and ADG than lambs fed fat provided from raw corn oil. Other than a tendency for an increase in HCW, carcass merit was not affected by source of fat. Growth and carcass data for growing or finishing lambs fed supplemental fat are limited compared to research conducted in beef cattle and further investigation is required to clearly understand the effect of fat source on growing lambs. Our results indicate that DDGS can be a fat source and, furthermore, added fat from DDGS had no detrimental effect on performance or carcass merit.

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