

# **PUBLICATIONS**

**1978**

Texas A&M University Agricultural Research and Extension Center at Overton – 1978

# Forage

# Beef Cattle

# Soil

## Research 1978 Overton

## Research Center, Technical Report No. 78-1

# EFFECT OF A PROTECTED LIPID ON FEEDLOT PERFORMANCE AND CARCASS CHARACTERISTICS OF BEEF STEERS

M. M. McCartor and Z. L. Carpenter

## SUMMARY

Two hundred steers were randomly allotted to either a control (C) diet or the control diet with 14.3% of a protected tallow (PT) product substitute for micronized milo on an equal weight basis. Within the control group 20 steers were fed for 89 days and 78 were fed 118 days. In the protected tallow group 76 were fed for 89 days and 20 were fed 118 days. Average daily gains adjusted to a common dressing percentage for each feeding period were greater for the PT groups than for controls. Feed required per pound of gain favored the PT groups in each feeding period group. Carcass characteristics for steers fed the PT diet for 89 days were fully equal to the carcass characteristics of steers fed the C diet for 118 days. Beef samples taken from 20 carcasses from each treatment group indicated that feeding the protected tallow or changing time on feed did not affect sensory (taste panel) or cooking characteristics of the beef.

## OBJECTIVES

The objectives of this study were:

- 1.) To evaluate the effect of a protected tallow product on feedlot rate and efficiency of gain when fed for 89 or 118 days.
- 2.) Determine the effect of time on feed and protected tallow on slaughter and carcass characteristics.
- 3.) Measure differences in the sensory (taste panel) evaluation of beef steers fed either 90 or 120 days with or without protected tallow.

## PROCEDURE

Two hundred steers of mixed breeding with an average weight of 767 pounds were randomly allotted within breed into control or protected tallow treatments. Time on feed was varied within each group as is shown in table 1.

Table 1. Experimental treatments comparing control and protected tallow treatments fed for 89 or 118 days.

Treatment	Control		Protected Tallow	
	C-1	C-2	PT-1	PT-2
Number head	20	78	76	20
Days on feed	89	118	89	118
Initial weight, lb	790	768	778	779

Both control (C) and protected tallow (PT) groups were gradually brought to a full feed of a micronized milo, corn silage and supplement diet. The protected tallow product was fed at the rate of 4.6 lbs per head per day which supplied 1.84 lb of tallow per animal per day. Tallow intake was approximately 8% of the dry matter of the diet. Control animals were fed micronized milo instead of the protected tallow product. Monensin was included in all diets and all steers were implanted with synovex-s. Full live weights were recorded at the beginning of the trial at 89 days and at 118 days.

All steers were slaughtered in a commercial packing plant and the wholesale rib from one side sent to the University Meats Laboratory for cooking tests and sensory evaluations. Data were analysed by analysis of variance using procedures of Barr *et al.* (1973).

### RESULTS

The results of the feedlot phase of the trial are shown in table 2.

Table 2. Feedlot performance of control and protected tallow fed steers.

Treatment	C-1	C-2	PT-1	PT-2
Days on feed	89	118	89	118
Initial weight	790	768	778	779
Final weight	1138	1159	1138	1198
Gain	348	391	360	419
ADG	3.91	3.31	4.05	3.55
Feed intake, lbs				
Milo	18.17	17.69	13.53	13.44
Corn silage	12.93	11.09	12.94	12.48
Supplement	1.63	1.52	1.63	1.61
PT product	-	-	4.68	4.26
Total	32.73	30.30	32.78	32.15
F/G	8.37	9.16	8.09	9.03

Average daily gains were not different ( $P > .10$ ) due to protected tallow feeding but were significantly ( $P < .05$ ) lower for steers fed 118 days versus those fed 89 days. Feed required per pound of gain was higher for steers fed 118 days than for steers fed 89 days. Steers fed protected tallow either 89 or 118 days tended to require less feed per pound of gain. Intake was satisfactory throughout the trial and appeared to be unaffected by protected tallow feeding.

### Carcass Characteristics

Carcass weights and other characteristics are shown in table 3.

Table 3. Carcass characteristics of steers fed 89 or 118 days with or without protected tallow.

Treatment	C-1	C-2	PT-1	PT-2
Days on feed	89	118	89	118
No. carcasses	20	78	76	20
Warm weight, lbs	678	725	677	746
Marbling score <sup>a</sup>	12.7	13.3	13.0	13.7
USDA grade <sup>b</sup>	12.3	12.4	12.4	12.6
Yield grade	2.7	3.0	3.1	3.8
Adj. fat thickness, in.	.47	.54	.57	.68
Ribeye area, in <sup>2</sup>	12.71	12.80	11.98	11.84
Ribeye area per cwt. carcass, in <sup>2</sup>	1.88	1.77	1.77	1.59

<sup>a</sup> Traces = 8; slight = 11 and small = 14

<sup>b</sup> USDA choice = 14; good = 11 and standard = 8

While marbling scores and USDA grades were not significantly different, there was a consistent trend for protected tallow fed steers to have higher marbling scores and a higher USDA grade than controls. Feeding the control diet for 118 days produced essentially the same numerical marbling score and the same USDA grade as steers fed the protected tallow diet 89 days. Fat thickness over the 12th rib was greater ( $P < .05$ ) for steers fed protected tallow for 118 days. The fat thickness for steers fed the control diet for 118 days or the protected tallow diet for 89 days were similar and not significantly different. Steers with the least fat were those fed the control diet for 89 days and they were different ( $P < .05$ ) from controls fed 118 days or protected tallow fed steers.

As the steers became fatter either due to time on feed or inclusion of protected tallow in the diet, the ribeye area per unit of carcass weight was reduced.

The steers fed the control diet for 118 days and those fed the protected tallow diet for 89 days had an equal amount of ribeye area per unit of carcass weight. Steers fed the protected tallow for 118 days had less ribeye area per unit of carcass weight than C-2 or PT-1.

Mean values for sensory characteristics, cooking characteristics and the Warner-Bratzler Shear test are shown in table 4.

Table 4. Sensory and cooking characteristics.

Treatment	C-1	C-2	PT-1	PT-2
No. samples	20	20	20	20
% fat in <u>L. dorsi</u>	13.7	15.7	16.0	17.9
Warner-Bratzler Shear	9.46	9.40	8.96	9.11
Juiciness <sup>a</sup>	4.86	4.75	4.76	5.02
Tenderness <sup>a</sup>	6.3	5.93	6.54	6.06
Flavor <sup>a</sup>	5.73	5.81	5.84	5.81
Overall satisfaction <sup>a</sup>	5.77	5.72	5.91	5.81
Cooking shrink, %	30.51	32.67	31.07	31.74
Cooking time, min.	25.49	27.81	25.58	27.51
Doneness <sup>b</sup>	4.25	3.50	3.95	4.21

<sup>a</sup> Means based on 8-point rating scales (8 = extremely flavorful, tender, juicy or satisfactory in overall palatability).

<sup>b</sup> Means based on a scale of 1-10, 1 = extremely well done; 10 = extremely rare.

Percent fat in the loin eye (L. dorsi) was increased by either time on feed or by feeding the protected tallow product. Sensory characteristics, cooking characteristics and Warner-Bratzler Shear values were not statistically different due to treatment, however, steaks from both groups fed the protected tallow product were rated higher in overall satisfaction than steaks from control cattle.

This study provides evidence that feeding a protected tallow can be used in the diet of beef cattle to reduce the time on feed by approximately 30 days without any deleterious effect on carcass characteristics, sensory evaluation of the beef or cooking characteristics.

As protected tallow products become available, they can provide the means to keep stocker cattle on grazing programs for an additional 45 to 60 days without affecting carcass size or quality.