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## Effect of pre-slaughter withdrawal from feed on cattle fasted for varying lengths of time

### Abstract

Feedstuffs pass through cattle in approximately four days; however, steam-flaked rations may have a faster rate of passage. How much value do cattle derive from feed fed the last few days prior to slaughter, particularly cattle taken directly from feedlot to slaughter plant? Cattle that have been shrunk kill more easily than those with full intestinal tracts. Perhaps withdrawing cattle from feed 1, 2, or 3 days before they are slaughtered would economically benefit both feeder and slaughterer.

### Keywords

Cattlemen's Day, 1969; Report of progress (Kansas State University. Agricultural Experiment Station); 529; Beef; Steam-flaked rations; Feedlot; Carcass yield

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# Effect of Pre-slaughter Withdrawal from Feed on Cattle Fasted for Varying Lengths of Time

Tom Carr, Dell Allen, Philip Phar and Rufus Cox

## Introduction

Feedstuffs pass through cattle in approximately four days; however, steam-flaked rations may have a faster rate of passage. How much value do cattle derive from feed fed the last few days prior to slaughter, particularly cattle taken directly from feedlot to slaughter plant? Cattle that have been shrunk kill more easily than those with full intestinal tracts. Perhaps withdrawing cattle from feed 1, 2, or 3 days before they are slaughtered would economically benefit both feeder and slaughterer.

To find out, we needed to determine:

1. Differences, if any, in tissue yield between cattle withdrawn and those continued on feed.
2. Differences, if any, in carcass grade between fasted and fed cattle.
3. If fasting increases the incidence of dark-cutters.
4. Percentages of live weight lost during pre-slaughter fasting.

## Procedure and Experimental Design

To test previously mentioned factors, we fed or fasted 175 steers for 0 to 3 days before slaughter as follows:

Treatment	<u>Days</u>			
	0	1	2	3
	<u>Number of Steers</u>			
Fed	25	25	25	25
Fasted	--	25	25	25

We completed one trial last summer, another in April, 1969. In the first trial, 175 steers at the Circle E Ranch, Potwin, Kansas, were used; in the second, 125 steers, from the same feedlot. All were individually identified and all had water available free-choice. Those fed were handled and fed routinely; fasted steers were simply removed from feed. The fasting steers were closely observed by several persons.

#### Results

1. Steers fasted 1 or 2 days were much quieter in temperment and easier to handle than those which were continued on feed or those fasted 3 days.
2. Steers fasted 1 or 2 days showed little or no evident discomfort from fasting.
3. Solid contents in rumens of fasted cattle were markedly reduced, especially contents of those fasted 3 days.
4. Color of muscle tissue was definitely more desirable in steers fasted 1 or 2 days than in those fed or fasted 3 days.

Weights when fasting started and when steers were slaughtered are given in table 19, for the first trial. Original live weights varied widely.

Table 19

Mean Weights of Steers Fasted or Fed  
for Days Indicated Before Slaughter

Treatment	Day							
	0		1		2		3	
	Int.*	Sl.**	Int.*	Sl.**	Int.*	Sl.**	Int.*	Sl.**
	Pounds							
Fed	1228	1228	1172	1179	1179	1183	1192	1199
Fasted	--	--	1125	1097	1168	1125	1198	1141

\* = Initial weight  
\*\* = Slaughter weight

Persons who sell with a "pencil shrink" instead of on a grade and yield basis will be interested in the percentage of live shrink in fasted cattle.

Table 20

Percentage of Weight (unadjusted) Gained  
or Lost by Steers in First Trial

Treatment	Day			
	0	1	2	3
Fed	-	+0.72	+0.34	+0.88
Fasted	-	-2.44	-3.62	-4.74

The percentage shrink of lighter cattle exceeded that of heavier cattle because both had approximately the same amount of rumen contents. That was expected because approximately the same weight loss occurs in both light and heavy animals.

For fasting to be successful, chilled carcass weights or carcass yield must be essentially the same in fasted as with fed cattle. To remove the effect of wide variation in live weight of the steers, linear effects of live weight were removed from the analysis.

Both hot and chilled carcass weights were analyzed to determine if fasting affected carcass cooler shrink.

Table 21

Hot Carcass Weight Difference Between Fed and Fasted Steers as Affected by Breed, Treatment and Days Treated\*

<u>Breed</u>	<u>Day 1</u>	<u>Day 2</u>	<u>Day 3</u>
	<u>Pounds per carcass</u>		
Hereford	-0.3	-5.1	-27.9
Angus	-8.2	-12.9	-35.7
Hereford-Angus Cross			
Hereford-Shorthorn Cross	+5.0	+0.3	-22.5
All others	+13.5	+8.8	-13.9

\* Negative (-) signs indicate carcasses of fed cattle had a weight advantage; positive (+) signs indicate fasted cattle had a weight advantage.

Data from 1968 indicate that fasting cattle of predominantly British breeding (especially Angus) is questionable (table 21). On the other hand, crossbred cattle fasted 1 or 2 days had heavier hot carcass weights than those not fasted. Crossbred cattle apparently withstand fasting stress up to 2 days with economic gains rather than losses.

Differences were not statistically significant on a chilled weight basis, but breed differences of chilled carcasses approached significance.

Considering only breed effects, omitting treatment, day and interaction effects, British crossbred cattle had significant ( $P < .05$ ) hot or cold carcass weight advantage (11.40 or 10.40 lb.). Carcasses from crossbred cattle shrank slightly more under cooling than did straight bred cattle.

The standard error for chilled carcass weight was so large that differences between fasted and fed steers were not statistically different thus we cannot definitely state that fasting decreased carcass weight.

Statistically the day-fast interaction showed an F value for fasting higher than for any effect other than breed (table 21). The loss from fasting on day 3 was disproportionately large.

Table 22

Pounds of Chilled Carcass Yield for Steers Fasted or Fed 0, 1, 2, or 3 Days, as Indicated

Treatment	0	1	$\frac{\text{Day}}{2}$	3	$s^e$
Fed	707.7	711.6	707.4	721.0	+25.3
Fasted	--	713.7	703.6	694.8	+24.6

$s^e$  = Standard error

Differences in chilled carcasses among steers fasted or fed 0, 1, or 2 days before slaughter were slight; those fasted 1 day yielded the most. However, the third day of fasting seemed to lower chilled carcass weight, though not significantly.

Table 23 gives effects of fasting and feeding on muscle tissue color. The primary concern was that fasting would result in dark colored muscle. The reverse was true.

Table 23

Muscle Tissue Color Scores  
for all Indicated Groups

Treatment	0	1	Day 2	3
Fed	4.33*	3.84	4.20	4.26
Fasted	--	3.04	2.96	3.63

\* Lower numbers indicate lighter color

Table 24 shows results of 0, 1, 2, and 3 day fasting or feeding on final carcass grade, which was essentially the same for all slaughter groups.

Table 24

Final Carcass Grades for All Groups

Treatment	0	1	2	3
Fed	19.09 <sup>1</sup>	19.52	18.84	18.57
Fasted	--	19.22	19.10	18.57

1 - 20 - Av. Choice; 19 - Choice; 18 - Good+

Chemical analyses for glycogen content of the liver, water-holding capacity of muscle tissue, and pH of muscle tissue showed essentially no differences, except that fasting markedly decreased glycogen content of the liver.



The liver is the major source of energy reserve for the body and glycogen is the major energy source stored, so fasting should rapidly deplete it. Probably glycogen in livers was mobilized during fasting.

#### Summary

Fasting crossbred steers one or two days before slaughter had little, if any, detrimental effect on carcass traits, and it may have improved color of muscle tissue. It appears that Hereford steers may be fasted one day with little effect on their carcasses. Fasting Angus steers appeared unwise. Differences in chilled carcass weights between steers fasted 3 days and those fed 3 days, though not statistically significant, were large enough to suggest that no breed be fasted that long. Fasting had no detrimental effect on carcass grade or any factor used to determine grade. Chemical analyses showed no differences in carcasses except for reduced glycogen, which was expected.