

Incorporating Condensed Corn Distillers Solubles into an Integrated Pasture and Drylot Finishing System for Feedlot Steers

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Introduction

The need to improve production efficiency continues to mount as livestock producers search for methods to maintain profitable livestock enterprises. Feed costs are a major component of production costs. Therefore, seeking feeds that are less costly and still meet nutritional requirements is paramount. The number of dry mill corn processing plants is rapidly growing in the Midwest. The fermentation of corn grain to ethanol produces coproducts—distillers grains and a liquid fraction called thin stillage. These coproducts derived from the manufacturing process have been shown to be affordable and to have feeding potential for beef cattle. The liquid fraction is often condensed to syrup, which can range from 30–50% dry matter (DM), and on a DM basis, 10–20% fat and 20–30% protein. The syrup is commonly referred to as condensed corn distillers solubles (CCDS). Because of its nutrient content and supposed palatability, there is widespread interest in mixing it with low-quality roughages to serve as a feed for growing-finishing cattle. Therefore, the objective of this study was to evaluate the use of CCDS mixed with ground corn stalks in a pasture and drylot growing-finishing program.

Experimental Procedure

The two-year study was conducted at the Western Iowa Research and Demonstration Farm, Castana, Iowa. A total of 224 (112 each year) Angus and Angus-crossbred steer calves with an initial average weight of 573 lb were used. Calves were purchased in Nebraska in

March and backgrounded at the Allee Farm in Newell until May. Before being placed on test on May 29, 2003, and May 3, 2004, calves were implanted with Compudose, injected with Ivomec (6 cm²), and provided with an insecticide ear tag. They were placed either in a drylot or on brome grass pasture in May. The brome grass pasture consisted of 24 paddocks, each 1.7 acres in size, separated by electric fence. The drylot facility consisted of pens with concrete floors and a shelter at the north end. Steers were fed in fence-lined concrete bunks on the south side of the lots and had access to an automatic watering system. The calves were randomly assigned to four treatments by weight and color pattern.

Four treatments (two drylot, two pasture) were developed, each with four replications and seven head in each replication. The first treatment of 28 steers went directly into drylot at the start of the test and were fed an 82% concentrate diet consisting of corn grain; ground alfalfa hay; and a protein, vitamin, and mineral supplement with molasses. The second treatment consisted of feeding an 82% concentrate diet consisting of corn grain and chopped corn stover mixed with CCDS and protein, vitamin, and mineral supplement. The third treatment involved placing calves on rotational brome grass pasture June 18, 2003, and May 11, 2004, respectively, and moved to the drylot September 2, 2003, and September 8, 2004, respectively. The fourth treatment consisted of placing calves on brome grass pasture June 13, 2003, and May 11, 2004, respectively, feeding them the chopped corn stalks with CCDS, and moving them to the drylot September 2, 2003, and September 8, 2004, respectively. Each pasture group had access to one paddock at a time. Following

pasture, the cattle in treatments three and four were placed in drylot and fed the same diets as the cattle in treatments one and two, respectively.

While on pasture, cattle were rotated based on forage availability. They were rotated to a new paddock every three to four days. Nitrogen fertilizer was applied to the pasture in the spring and fall. In the drylot facilities, the feeding levels were determined daily prior to the morning feeding. Feed samples were collected twice a week for dry matter determinations.

The steers in drylot treatment one were fed 223 days the first year and 219 days the second year. The steers in drylot treatment two and consuming CCDS were fed 253 days in the first year and 247 days in the second year. Both pasture treatments were fed 281 days in the first year. In the second year, the pasture treatment three cattle were fed 289 days, and treatment four cattle consuming the CCDS were fed 310 days. Daily feed intake in drylot was recorded and cattle were weighed at 28-day intervals to obtain average daily gains, feed consumption, and feed conversion among the treatments. When cattle within treatments averaged about 1,290 lb, they were processed into beef. Hot carcass weights were taken after slaughter, and yield and quality grades of the carcasses were obtained after postmortem chill. Carcass quality and yield grades were provided by the USDA Meat Grading Service.

Results and Discussion

Feedlot performance of the steers is summarized in Table 1. Cattle on pasture showed higher DM intakes because they were heavier when they entered the drylot feeding period. Average daily gains for the duration of the test favored cattle spending more time in drylot and receiving more grain throughout the feeding period. Accordingly, feed conversion during the drylot feeding period favored the cattle spending less time on pasture and a greater portion of their growing period in drylot. When pastured cattle were removed from pasture, cattle on pasture supplied CCDS had gained at least 0.5 lb/day more than nonsupplemented cattle. This advantage did not carry over into drylot feeding, but this might have been a function of daily energy intake while on pasture.

Carcass data are provided in the Table 2. Average carcass weights were similar across treatments. Carcass measurements for loin eye area, backfat (BF), and kidney, pelvic and heart fat (KPH) were fairly consistent among treatments, although, cattle in treatment one (drylot and alfalfa hay) displayed more BF and KPH, which resulted in a slightly higher yield grade. All treatment groups averaged low Choice quality grade or better.

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Table 1. Feeding performance of cattle.

| | Drylot + alfalfa | | Grass pasture | Grass pasture +CCDS |
|------------------------------------------------|------------------|--------------|---------------|------------------------|
| | hay | Drylot +CCDS | | |
| Initial wt. (lb) | 574.84 | 573.73 | 572.84 | 573.95 |
| Final wt. (lb) | 1,294.84 | 1,293.57 | 1,304.98 | 1,277.25 |
| Days on test | 221 | 250 | 285 | 295 |
| Daily DM intake in drylot (lb) | 24.01 | 22.26 | 26.53 | 24.37 |
| Avg. daily gain (lb) | 3.26 | 2.88 | 2.56 | 2.36 |
| Feed conversion in drylot (lb feed/lb gain) | 7.37 | 7.73 | 8.20 | 9.14 |

Table 2. Carcass composition and cattle grades.

| | Drylot + alfalfa | | Grass pasture | Grass pasture +CCDS |
|-------------------------------------|------------------|--------------|---------------|------------------------|
| | hay | Drylot +CCDS | | |
| Liver abscesses (%) | 9.0 | 2.0 | 4.0 | 9.0 |
| Hot carcass wt (lb) | 790.39 | 780.50 | 790.64 | 770.12 |
| Loineye area (in ²) | 13.79 | 13.22 | 13.42 | 12.79 |
| Backfat (in.) | .56 | .42 | .48 | .43 |
| Kidney, pelvic and heart fat (%) | 2.62 | 1.92 | 2.15 | 2.12 |
| Yield grade | 2.46 | 2.30 | 2.45 | 2.33 |
| Quality grade ^a | 8.20 | 7.77 | 7.63 | 7.29 |

^aChoice=7; Choice=8.