Replacement Report

Calf Starter Research

Grain Processing for Calf Starters and Growers

Over 3 years ago we summarized much of the literature on grain processing and energy sources for calf starters in an Akey Replacement Report. This paper is a review of the grain processing portion of that summary with some new information since that time. The summary was prompted by research from the lab of Dr. Jud Heinrichs at Penn State University. He fed calves starters containing whole, dry rolled, roasted-rolled, and steam flaked corn (33% inclusion). Many of their measurements did not differ statistically among treatments, but ADG, starter intake, and feed efficiency tended to be better for calves fed whole and dry rolled corn (Table 1).

As a follow-up to the Penn State trial we fed calves starters containing whole corn, dry rolled corn, and steam-flaked corn (all procured from the same bin of corn but processed differently). Each starter contained 37% corn. There were no differences in intake, ADG, or feed efficiency among treatments (Table 2). The manure was screened from calves receiving each diet during the eighth week of the trial and no whole particles of corn, or even moderately large pieces of corn, were found in the screened manure of calves on any treatment.

Two other grower trials were conducted to evaluate corn processing. In each trial the complete textured feed was blended with 5% chopped grass hay and fed for 28 days (from 8 to 12 weeks of age). In the first trial whole corn was compared to rolled corn (Table 3). In the second trial steam-flaked corn was compared to rolled corn (Table 4). In each trial the starters contained 37% corn and the corn came from the same corn bin. There were no differences in intake, ADG, or feed efficiency in either trial.

We have conducted two other 56-day starter trials in calves initially less than 1 week old. One of those trials compared the same starter fed as either a complete pellet or as a coarse textured feed. There were no differences in starter intake, ADG, or feed efficiency (Table 5). The second trial compared the same starter fed either as a coarse textured feed or as half coarse textured feed and half meal feed. The meal feed contained finely rolled grains, soybean meal, and minerals without pelleting. The objective of this trial was to compare how calves consume and perform on a coarse textured feed or a feed with the same ingredients but with fines. Starter intake was 15% lower and ADG was 6% lower in calves fed the starter with fines than in calves fed the coarse feed ($P < 0.05$; Table 6). Feed efficiency was the same in both groups.

The take-home message is that calves are good feed processors. They chew their feed well. The grain processing method does not influence calf performance unless feed processing results in a lot of fine particles which the calves appear to not like eating. Manufacturing calf feeds free of fine particles can be a real challenge. Making a textured calf starter with whole grains and pellets with limited molasses is a viable option.

Table 1. Corn processing on 0 to 42 day performance

Item	Whole	Dry rolled	Roasted rolled	Steam Flaked
Gain, lb/d	1.03	1.04	1.00	0.95
Intake, lb/d	1.21	1.30	1.11	1.06
Feed efficiency	0.53	0.49	0.49	0.47

Source: Penn State University

Table 2. Corn processing on 0 to 56 day performance

Item	Whole	Flaked	Rolled
Gain, lb/d	1.29	1.33	1.28
Starter intake, lb/d	2.01	2.24	2.16
Feed efficiency	0.49	0.45	0.45

Table 3. Corn processing on 56 to 84 day performance

Item	Whole	Rolled
Gain, lb/d	2.7	2.6
As-fed intake, lb/d	7.5	7.4
Feed efficiency	0.36	0.35

Table 4. Corn processing on 56 to 84 day performance

Item	Whole	Flaked
Gain, lb/d	2.2	2.1
As-fed intake, lb/d	6.7	6.6
Feed efficiency	0.33	0.32

Table 5. Starter form on 0 to 56 day performance

Item	Textured	Pelleted
Gain, lb/d	1.26	1.25
As-fed intake, lb/d	1.78	1.81
Feed efficiency	0.50	0.49

Table 6. Starter particle size on 0 to 56 day performance

Item	Textured	Textured w/ fines
Gain, lb/d	1.6	1.4*
As-fed intake, lb/d	2.7	2.4*
Feed efficiency	0.44	0.45
Hip width change, inches	1.8	1.6*

* Means differ ($P < 0.05$).

References:
Lesmeister, K. E., and A. J. Heinrichs. 2005. J. Dairy Sci. 88:411-418
Akey. 2009. J. Dairy Sci. 92:782-789