



Calf starter physical diet forms evaluated

Higher fat ingredients should be avoided in calf starters.

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Winston Churchill said on Nov. 11, 1967, that “Indeed it has been said that democracy is the worst form of government except for all those other forms that have been tried from time to time...” The same might be said at times for the anonymous peer-review process for scientific journals.

I experienced the downside of this process after my PhD research project at Cornell University. The project was joint between my professor J.T. Reid and a meats professor G. H. Wellington on the growth and development of cattle. We used two breeds (Angus and Holstein), three sexes (bulls, steers, heifers), two levels of intakes (ad libitum and 70% of that), and four bodyweight points (400 lb. baseline, 600, 800, and 1000 lb.). All animals were slaughtered and detailed body composition - both physical dissection and chemical - was measured. Other data measured were intake, daily gain, and the single diet digestibilities.

I also did specialized assays for growth (Kertz et al., 1982). This study was replicated and involved graduate students from Chile (Siegfried Simpfendorfer and Rene Anrique), Colombia (Horacio Ayala), Canada (Andre Fortin and David Sims), Mali West Africa (Almouzar Maiga), and myself as also the project coordinator.

After completing graduate school, four journal manuscripts were developed from my thesis. The review was an extensive process over several years with constructive comments and suggestions not only by several sets of reviewers but also by the Editor-in-Chief. After final approval, I was awaiting the galley proofs in the mail. Instead, I was quite shocked when the new journal editor summarily and arbitrarily rejected and returned all four manuscripts! I called Dr. Reid about this astonishing news. He asked for some time to think about this situation. Several days later, he unexpectedly died of a heart attack at age 60 years old. Eventually, my thesis papers were published in a Cornell research station document (Kertz et al., 1982). Two other journal articles were published out of this project (Fortin et al., 1980 and 1981).

A better outcome occurred when I was a reviewer for a study done on a Wisconsin dairy farm. The two other journal reviewers rejected the study manuscript mainly because it was not done at a university setting. I was taken by the astonishing results from the study in which the only treatments were that the first colostrum was fed initially at either two or four quarts to every other calf born during one year on a dairy farm in Wisconsin. I felt this was a seminal study, so I emailed the major author that I knew of their study, and suggested that they consider publishing that study in the ARPAS journal. He indicated they were considering doing that and now would do so (Faber et al., 2005).

That brings us to the point of reviewing a study done by a M.S. degree graduate student in China. That study was done on a large dairy farm in the Beijing area. I have been on that dairy several times, including while this calf study was being conducted. This study necessitated the graduate student, Du Chao, physically moving to the dairy and doing all of the work for the study while it was in progress. He did an admirable job and made some personal observations, which provided additional information and contributed further to conclusions.

Before writing in this column about the study itself, I want to provide some elements of this journal article review process. The first journal to which the manuscript was submitted, I did not think was a good fit, and it was rejected. The second journal reviewers were at least, let's say, persnickety. After a second round of review occurred and we addressed all issues, one reviewer, in particular, began another new round of additional issues. Time to move onto another journal. When submitted to the journal where it is now published (Du et al., 2021), one reviewer said the English was not good and a native-speaking English editor should be engaged. Ouch! It was a struggle for the graduate student but something I worked through with him. I found most disconcerting in this whole

review process was that reviewers were often not well-acquainted with the subject area, or else wanted the study to be something else it was not.

The study was conducted from April 18 to August 11, 2015. Daily weather collection indicated that heat stress occurred almost every day within a month after trial began with a THI over 72. Yet, some reviewers did not want this addressed in results and discussions even though there are limited data for calves under heat stress. There were 25 calves per treatment with 21 Holstein females and four males. The males were used for fecal sampling for indigestible NDF (iNDF) and acid insoluble ash digestibility measurements. Some reviewers wanted more, or no male calves used; but the reality on most dairy farms is they do not keep male calves beyond several days of age. All calves were separated at birth and fed via esophageal tube four liters of colostrum. Each calf was housed in a calf hutch bedded with sand, which was managed daily as needed. Pasteurized milk from the dairy was fed twice daily via bucket at two liters per feeding during week one, three liters per feeding during weeks two through six, and then two liters during week seven followed by complete weaning. Starter feeding began at day five, continued free choice through two weeks after full weaning. Water was fed free-choice throughout the study.

We hypothesized that a texturized starter would result in greater intake and/or daily gain than either of two pelleted starters. The three starter treatments were: Texturized, pelleted with the exact same formula as the texturized (Pelleted-A), and another pelleted starter but with a different formula (Pelleted-B). All these starters were manufactured by the same feed company. The starters were formulated to 21% CP on a dry matter basis. Their primary ingredients are shown in the table.

	Texturized	Pelleted-A	Pelleted-B
Ingredients, % of DM			
Corn (cracked in TX)	30	30	0
Oats (whole in TX)	10	10	0
Molasses	5	5	4

Corn ground	10	10	50
Soybean meal	25	25	10
Cottonseed meal	5	5	12
Wheat bran	10	10	5
Full fat soybeans	0	0	5
Distillers grains	0	0	5
Preweaned 0 to 42 days			
Daily gain, lb	1.14	1.21	1.10
Milk dry intake, lb/d	1.84	1.84	1.84
Starter intake, lb/d	0.36	0.43	0.30
Weaning 43 to 49 days			
Daily gain, lb	1.58	1.41	1.20
Milk intake, lb/d	1.09	1.09	1.09
Starter intake, lb/d	1.62	1.76	1.10
Postweaned 50 to 63 days			
Daily gain, lb	1.77	1.63	1.38
Starter intake, lb/d	3.46	3.26	2.87

Daily gain, lb 0 to 63 days	1.33	1.30	1.18
iNDF Digestibility, %			
Dry matter	65.6	71.8	76.2
Crude protein	63.9	73.6	78.4

Key observations were:

- Before weaning (0 to 42 days), there were no differences in daily gain or intake although starter intake tended ($P < 0.19$) to be lower on Pelleted-B. During weaning (43 to 49 days), Pelleted-B was lower ($P < 0.005$) in starter intake than the other starters.
- After weaning (days 50 to 63), calves ate and gained less ($P < 0.08$) on Pelleted-B.
- Lower starter intake of Pelleted-B was most likely due to greater fat content contributed by full fat soybeans and distillers dried grains (Kertz 2013).
- There were no differences among treatments on other body measurements, rumen pH, rumen VFA (with two minor exceptions), and blood values.
- Diarrhea was not different among treatments, although calves that had diarrhea ate 5.5 lb. less total starter during the study.

Dry matter and crude protein digestibilities were lower ($P < 0.01$) for the Texturized starter treatment by the iNDF method. The same was also true for the acid insoluble ash method, although the actual percentage numbers were lower than with iNDF. This was not unexpected as cracked corn particles were quite large and visible in feces of calves on this texturized starter treatment. The corn was too hard for good digestibility even though it was cracked.

Another observation is that the texturized starter with 5% molasses applied externally drew many flies in those starter buckets. Calves do not like to put their heads in buckets with many flies.

The Bottom Line

The texturized starter in this study did not do as well as expected, but lower cracked corn digestibility and many flies attracted by external molasses affected digestibility and intake of this treatment. The Pelleted-B starter had lower intake and daily gain than the other treatments due to higher fat ingredients. Hard flinty corn and a good fly control program should be implemented when external molasses is applied in texturized starters. Higher fat ingredients should be avoided in calf starters,

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