

Calving Ease

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Hay for Preweaned Calves

- Calf-care persons have widely different opinions about feeding hay to preweaned calves.
- Discussions about feeding hay to preweaned calves need to specify (1) the physical form of hay, (2) volume hay fed, (3) nutrient profile, (4) species present, and (5) calf age at which hay is introduced to the ration.
- Discussions about feeding hay to preweaned calves may focus on papillae development and health and lack emphasis on the microbial population essential for forage digestion.
- Recent research is leading me to conclude that limited hay intake has a variety of positive outcomes for preweaned calves.
- Practical aspects of feeding hay to preweaned calves.

Opinions about feeding hay to pre-weaned calves.

It seems to me that many calf-care persons have strongly held opinions about the subject. Often these opinions are not open to discussion – “I know what is right.” In spite of this I am jumping into the middle of this controversial topic.

What is hay?

If a discussion of feeding hay to preweaned calves is going to lead to a workable feeding protocol then we have to agree on:

- Physical form – whole long hay or chopped hay (and if chopped, how long particles)
- Maturity of calf when hay is introduced – either number of weeks old or stage of milk feeding
- Volume of hay fed – either fixed amount or percentage of dry feed ration
- Quality of hay fed – could be nutrient profile, digestibility or palatability

Why are we including hay in the ration?

In a brief statement about rumen development in calves Jud Heinrichs (2005) summarized four take-home messages about the topic:

- “Young calves have underdeveloped rumens at birth and must undergo physiological changes before they can digest high fiber feeds.
- Concentrate feeds are digested to propionic and butyric acids in the rumen and stimulate the growth of the rumen papillae.
- Digestion of milk and forages does not provide the end products needed to develop rumen papillae.
- **After concentrate feeding begins, 3 to 4 weeks of rumen development is needed before the calf is able to digest substantial amounts of dry feeds.**” [ed. emphasis added]

For the objective of papillae development clearly we want to include concentrates and water in the ration. Forages such as hay contribute very little to this development.

The addition of forages in the rumen stimulates the growth of a specialized microbial population focused on the kind of forage being fed. This population matures over 10 to 20 days. Then, when we feed this forage it will be digested efficiently releasing its nutrients for the calf (and, the waste microbes provide protein for the calf, too). **Thus, there is a lag time between when a forage is introduced and when this forage can be effectively digested and utilized as energy and protein.**

Recent research focuses on both papillae growth and microbial population.

Recent research reports include the nature of the hay fed to the calves, its physical format and the proportion of hay in the total dry feed ration. Both orchard grass and alfalfa hay have been tested. Chopping hay was a practical way for research teams to include hay in the dry feed ration and keep track of the amount of hay consumed.

What did they conclude?

- Limited amounts of hay (regardless of type of hay) had little effect on the volume of concentrates consumed compared to rations without any hay – no negative effects.
- As little as 5 percent of dry feed ration as hay seems to have positive outcomes; an upper limit of 10 percent seems to be a threshold where concentrate intakes are not changed.
- Feed efficiency was similar among calves fed rations either with or without hay.
- Introducing hay around four weeks of age (calves weaned either at 7 or 8 weeks) seemed to be an ideal time for promoting consistent post-weaning gains.
- Pre-weaning gains were comparable for calves on either “regular” or “accelerated” milk feeding rations when comparing rations with and without hay.
- Post-weaning gains consistently favored calves that had been fed “hay-included” rations when compared to calves that had not been fed any hay before being moved to post-weaning pens.

Practical aspects of feeding hay to preweaned calves.

1. Our goal could be to include highly palatable hay at ten percent of the dry feed ration starting at four weeks of age.
2. If the hay is going to be physically blended with the calf starter grain it will need to be chopped to roughly 1” length. Then it can be bulk blended for feeding. Assuming this dry ration is bucket-fed then the primary challenge is to keep the volume of mix fed close to what the calf is consuming. This procedure emphasizes keeping the grain/hay mix fresh – this means frequent dumping of refusals and replacing with clean blended grain/hay mix.
3. If it is not practical to chop hay it is probably easiest to handle the hay in small square bales rather than round bales or super-large one-half ton bales. I have done this. I had ten to twenty calves receiving hay (roughly all six weeks and older). My choices were a small, medium and large handful of hay. I tucked it into the top of the grain pail as I fed calf starter grain.

References: Kahn, M.A. and Others “Effect of different forages on performance and behavior of Holstein calves.” *Journal of Dairy Science* 2011 94:3547-3553. Castells, L.I. and Others “Hay intake improves performance and rumen development of calves fed higher quantities of milk.” *Journal of Dairy Science* 2012 95:286-293. Heinrichs, Jud “Rumen development in the dairy calf” *Advances in Dairy Technology* (2005) volume 17, page 179-187.

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