Calving Ease

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Choose the Correct Colostrum Feeding Method to Maximize Antibody Absorption

- **The volume of colostrum at first feeding can influence the antibody absorption rate.**
- **When feeding three or more quarts at first feeding the feeding method does not affect antibody absorption rate – all methods give the same results.**
- **When feeding two quarts or less at first feeding the bottle method gives superior results compared to using an esophageal tube feeder.**

Our goal for first feeding of colostrum to newborn dairy calves is to get as many antibodies in the blood as we can. We observe the three basic rules of colostrum feeding: Quickly – feed as soon as possible after birth; Quality – feed the highest quality colostrum available; and Quantity – feed 200gm of antibodies within the first 4 to 6 hours of life.

When we feed large volumes at first feeding, feeding method does not affect antibody absorption rate.

But, how can the method we use to feed the colostrum influence the absorption outcomes? A research project completed at Penn State University compared nipple bottle feeding and delivery by an esophageal tube feeder.

The calves were fed colostrum of uniform quality less than one hour after birth. The method varied from 100% via nipple bottle to 100% via tube feeder. In the table below find five different combinations of feeding methods. Effectiveness of antibody transfer was estimated by total serum protein testing.

Table A. Description of treatments and blood parameters at 24 hr. of age in calves fed colostrum by nipple bottle, esophageal feeder or a combination of both.

Treatment (feeding method)	1	2	3	4	5
# of Calves	13	6	7	7	7
Amount Fed by method (Quarts)					
Nipple Bottle	4	3	2	1	0
Esophageal feeder	0	1	2	3	4
Total serum protein (g/dL)	6.3	6.6	6.5	6.6	6.3
Efficiency of Absorption	**35**	**35**	**36**	**32**	**35**

Table adapted from: J.A. Elizondo-Salazar and A.J. Heinrichs, " Feeding colostrum with an esophageal feeder does not reduce IgG absorption in neonatal dairy heifer calves." ADSA Poster presentation M34, Monday July 13, 2009.

Note that all the methods resulted in blood serum total protein levels well above the 5.5 threshold used to define passive transfer failure in dairy calves. The efficiency of absorption was essentially equal across feeding methods. Bottom line is that when feeding large volumes (i.e., 4 quarts) at one time shortly after birth the feeding method does not affect the antibody absorption rate.

When we feed different volumes at first feeding, feeding method does affect antibody absorption rate.

A research project completed at the University of Minnesota compared nipple bottle feeding and delivery by an esophageal tube feeder using two different volumes of colostrum. They used colostrum replacer manufactured from colostrum that contained 100g of IgG per dose. They fed one-half of the calves one dose and the other half two doses (one dose = 100g IgG, two doses = 200g IgG)

All calves were fed within two hours of birth. One-half of the calves were fed with a nipple bottle and the other half were fed with a tube feeder. In Table B you can see there were four treatments to the experiment. Blood serum total protein testing was used to estimate the antibody transfer rate.

Table B. Passive transfer indices for newborn calves fed either small (1/6 Qt.) or large (3.2 Qt.) volumes of colostrum replacer using either a bottle or an esophageal tube feeder.

		Treatment	Group	
Parameter	1.6 Qt. by bottle	1.6 Qt. by tube	3.2 Qt. by bottle	3.2 Qt. by tube
# of Calves	24	24	24	25
Total IgG fed	100 g	100 g	200 g	200 g
Total serum protein (g/dL) at 24 hours	5.3	5.0	5.8	5.9
Efficiency of absorption (%)	51	40	41	39
Calves with passive transfer failure (%)	**None**	**58%**	**None**	**None**

Table adapted from Godden, S. M, D.M. Haines, K. Konkol and J. Peterson, "Improving passive transfer of immunoglobulins in calves. II: Interaction between feeding method and volume of colostrum fed." Journal of Dairy Science Vol. 93 No. 4 1758-1764 (2010).

These researchers noted that sixty-eight percent of the bottle-fed calves fed 3.2 quarts drank all of it by bottle. If they did not finish all 3.2 quarts the balance was tube fed. Those that drank the entire feeding by nipple bottle were compared with those drank part of the 3.2 quarts and had to have the balance tubed. The efficiency of absorption was equal for both groups.

Bottom line from these data is that when the initial feeding is two or less quarts of colostrum better antibody absorption will be achieved using a nipple bottle compared to tube feeding (note 58% passive transfer failure for tube feeding). When feeding three or more quarts at the initial feeding the feeding method (similar to the Penn State findings) does not affect the absorption efficiency.

If you know of someone that doesn't currently receive **Calving Ease** but would like to, tell them to **WRITE** to Calving Ease, 11047 River Road, Pavilion, NY 14525 or to **CALL** 585-591-2660 (Attica Vet Assoc. office) or **FAX** (585-591-2898) or **e-mail** calvingease@rochester.rr.com with Subscribe as the subject. Back issues may be accessed on the Internet at either www.atticacows.com or www.calfnotes.com and clicking on the link, Calving Ease.

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Remember to search for "Calves with Sam" blog for profit tips for calf rearing.