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FACT SHEET

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Using Colostrum to Raise Dairy Calves

Colostrum given to calves within 4 hours after birth provides protection against disease. Because colostrum has a high, properly balanced nutritive value for the newborn calf it can reduce calf feeding costs and the risk of calfhood diseases if properly used. Colostrum has been used successfully in a number of different forms, including:

a. First colostrum for the newborn calf,
b. Colostrum fed fresh,
c. Colostrum stored by freezing, then thawed and fed as needed, and
d. Soured colostrum.

The nutritive value of colostrum shifts abruptly toward that of normal milk during the first 2 to 4 days (table 1). The main change is in reduced solid-not-fat, primarily the proteins, and especially the disease protecting immune globulins. There is also a marked decrease in vitamin A.

Table 1. Approximate composition of colostrum and normal Holstein milk

Constituent	First-milk Colostrum (percent)	2nd & 3rd day Colostrum (percent)	Milk (percent)
Fat	6.0	3.5	3.5
Nonfat solids	22.3	12.5	8.6
Protein	18.8	7.5	3.25
Immune globulins	13.1	1.0	.09
Lactose	2.5	4.0	4.6

First Colostrum for the Newborn Calf

Calves need true colostrum, or first milk, soon after birth so the intestines can absorb a maximum of immune bodies (antibodies) in the first hours of life. After 24 to 36 hours or after receiving other food, the small intestine does not absorb these antibodies and the calf receives little or no disease protection from the colostrum.

When born, the calf has no antibody protection. It must receive this protection from first-milk colostrum. The calf should consume at least 6 percent of body weight in colostrum (2.5 quarts for a 90 pound calf) within 6 hours after birth. If the supply is limited, smaller amounts are still useful, especially for reducing the death loss caused by scours (colibacillosis).

Do not assume that a calf born in your absence has obtained the necessary colostrum. Without assistance too many calves fail to nurse the dam within 6 hours. Up to 50 percent of the bull calves sold at market have been found to be deficient of antibody protection. Make sure the young calf receives colostrum. You can either help the calf nurse or you can milk out some of the dam's colostrum and feed the calf with a pail or nipple bottle.

Occasionally cows are milked prior to freshening. In these cases, the milk produced after freshening provides no better disease protection than ordinary milk. Thus, storing of the first milk colostrum obtained prior to freshening is highly recommended. Every effort should be made to give this colostrum to the newborn calf even before it nurses its dam. Otherwise, absorption of the necessary antibodies may be reduced.

Slightly bloody colostrum can safely be fed to calves if it is otherwise normal. But discard extremely abnormal colostrum such as from a cow with acute mastitis.

What About the 2nd and 3rd Day Colostrum?

In recent years there has been an increasing interest in saving and feeding colostrum (and milk that still has a colostrum appearance) that is not consumed by the calf immediately after birth. Recent research has demonstrated that colostrum can be fed successfully either fresh or stored by freezing, then thawed and fed later. Reports of improved weight gains, reduced scours, and healthier calves have been commonplace. Several questions are frequently asked.

Question 1. How much colostrum should I feed? The amount of colostrum to feed the young calf depends on the breed (size) of the calf and the concentration of nutrients.

When feeding ordinary milk a calf should consume about 8 percent of the initial body weight. This means that a 100 pound calf would receive 8 pounds of milk daily. Because of the higher concentration of nutrients in the undiluted 2nd and 3rd day colostrum, a slightly lower feeding rate (7 pounds colostrum to Holstein calves) has resulted in excellent growth rates and healthy calves. A suggested feeding rate for each breed of dairy calf is shown in table 2.

Table 2. Suggested feeding rate for dairy calves receiving 2nd and 3rd colostrum

Breed	Initial Weight (pounds)	Daily Amount (pounds)	Daily Amount (quarts)
Holstein	90	7	3.2
Brown Swiss	90	7	3.2
Ayrshire	70	5	2.3
Guernsey	65	4.5	2.1
Jersey	60	4.2	1.9

Many dairymen do not increase the amount of colostrum as the calf grows older and gains body weight. By offering a constant amount of milk daily from birth to weaning, the feeding program is simplified and much easier to control. Furthermore, limiting milk fed to 2-week or older calves encourages greater consumption of starter grain ration. While 7 pounds of colostrum (for

Holsteins) is measured out, do not force the very young calf to consume all that is offered if it does not want that much. Nutritional scours frequently result from overfeeding.

Question 2. Should colostrum be diluted with water? Diluting the colostrum with water normally isn't necessary unless the milk is unusually concentrated. The liquid diet should contain 12 to 18 percent dry matter. The lower figure is approximately that of the normal Holstein milk. If too much water is added, the amount of liquid intake necessary to provide equivalent dry matter may become so high that diarrhea (scours) will occur. Furthermore, in older calves (3 weeks of age) there may be a lowered intake of the starter (grain) feed.

Question 3. Should the colostrum from each cow be kept separate? After the calf receives the necessary antibody protection from the true colostrum there is really no reason to keep additional colostrum from two or more fresh cows separate. Mixing the colostrum will simplify storing and will provide a more uniform product for the calves.

Soured Colostrum

There has been much recent interest in feeding naturally fermented colostrum, sometimes called pickled milk. Reports from dairymen and recent results from experiment stations have been reasonably good. Many trials have been clearly successful, and only a few dairymen have since abandoned the practice. Here are points to consider in feeding soured colostrum:

A. Make sure that the first colostrum is given directly to the calf. Mix all subsequent colostrum (and colostrum-like milk) obtained from the cow in the first seven milkings. These seven milkings provide enough milk for one calf for one month. If two or more cows freshen the same day, combine their colostrum. But, the number of calves fed from the combined container should not exceed the number of cows contributing to the total.

B. Use a covered container to store the fermenting colostrum. A container with a plastic liner is easier to clean before each reuse. Furthermore, a plastic liner prevents the soured milk (which becomes quite acidic) from corroding a metal container and causing excessive intake of zinc or other minerals.

C. Most dairymen allow the fresh colostrum to ferment naturally. However, there is a possibility of the wrong kind of fermentation. Some dairymen innoculate the fresh batch with 3 to 5 tablespoons of fermented colostrum from a previous batch to help start proper fermentation.

D. Don't hold the fermented colostrum for long periods before feeding, especially in summer. Research has shown that over time this product becomes very acid and much of the protein is destroyed.

E. Stir the fermenting colostrum daily, preferably twice daily, during storage and prior to feeding. Stirring helps prevent scum from forming and minimizes large lumps.

F. Whether or not the sour colostrum should be diluted before feeding depends on its consistency. If it is quite concentrated, similar to much first-milking colostrum, a dilution might be desirable.

Two different dilution rates have been used. The first method is one part water with one part colostrum. You may add hot water to warm the colostrum if feeding warmed colostrum is desirable. To obtain a protein and energy intake comparable to 8 pounds of regular milk, feed from 10 to 12 pounds of this diluted product. Thus, twice daily feeding is recommended and this diluted product should not be offered to the newborn calf until the fourth or fifth day.

A second dilution rate is one part water with two parts colostrum. This product is nearly comparable to whole milk in dry matter composition. The protein content would be superior to whole milk. Seven or 8 pounds of this product could be fed successfully on a once daily feeding program after the calf is old enough to consume that much.

If the soured colostrum isn't particularly thick (concentrated) no further dilution is advisable. Adding more water to this type of product makes it more difficult to insure adequate intake of energy and the calves are more likely to scour.

G. Start feeding the fermenting colostrum on the fourth day after birth (after feeding the fresh undiluted colostrum directly from the cow the first three days). By doing this, the colostrum hasn't yet completed its fermenting process and won't be as acid tasting to the calf. This helps teach the calf to consume the soured product.

H. If two or more batches of soured colostrum have been collected for at least a week, and have fully fermented, they may be mixed together to save space and shorten the time spent mixing. However, do not feed more calves than there are cows contributing to this mixture.

If You Run Short of Colostrum

If milk from a fresh cow is not marketed before the fourth day day there will generally be enough colostrum available to feed the amount recommended for 3 to 4 weeks. Don't shift back and forth from colostrum to another liquid diet such as whole milk or milk replacer because diet changes increase the risk of scours.

You have several alternatives:

1. Wean the calves early (21 to 24 days), provided they are healthy and not subjected to stress conditions such as (a) storms or extremely cold quarters, (b) being housed in damp or drafty facilities, (c) recovering from scours or some other condition causing unthriftiness. Many successful calf raisers are weaning calves regularly at 21 to 24 days. When practicing early weaning, you must feed a very palatable, high quality starter grain mix containing about 20 percent protein.
2. Feed the calf limited amounts of whole milk. You may feed milk from cows being treated for mastitis if the milk has a normal appearance and calves are not allowed to suckle each other.
3. Feed the calf limited amounts of a good milk replacer.

Should Calves Receive Additional Water Free-Choice?

The need for additional water depends on the amount of liquid in the diet and the barn temperature. Calves may need extra water if undiluted colostrum is fed. However, when diluted to the consistency of Holstein milk, additional water is not needed. Too much water may increase scouring.

In the normal milk diet, free access to water may encourage early intake of calf starter (helpful when weaning calves early). All calves require supplimental water in warm weather (over 70°F.).

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