

Calf College™ Course Note

Balancing pasteurized waste milk for optimal feeding success

Take home messages

- ☑ Properly pasteurized waste milk can be a great feed source for pre-weaned calves, but it can vary considerably in nutritional composition and supply.
- ☑ Adding a balancer to pasteurized waste milk can help provide consistent and balanced nutrition and, in turn, support calf health and growth.

Many farms look to pasteurized waste milk as an efficient and economical source of pre-weaned calf nutrition. While properly pasteurized waste milk is a viable option for some herds, adding a balancer can help to optimize both calf performance and farm profitability.

Balancers can help correct inconsistencies that occur in waste milk, adjust the solids levels and protein-to-fat ratio and provide the vitamins and minerals necessary for optimal calf growth. Balancers can also help extend the pasteurized waste milk supply rather than feeding calves salable milk.

Not quite perfect

Pasteurized waste milk may not provide calves with the nutritional consistency they require. One study of 618 farms showed the variability in the total solids, protein and fat content of pasteurized waste milk that can occur within the same farm and across farms (Figure 1).

Source – Pasteurized waste milk typically is made up of milk from transition cows and treated cows. The nutritional composition of this milk can vary greatly depending on the ratio of transition cows to treated cows. For example, total solids will be greater if a batch of milk is generated by a large percentage of fresh cows.¹ Conversely, milk produced by a greater percentage of cows with mastitis or other health challenges could be lower in solids than standard milk.

Handling – Inconsistent handling can lead to variations in nutritional consistency.

Pasteurized waste milk may not be agitated as frequently as salable, bulk tank milk. Also, human error can result in wash water entering the pasteurized waste milk supply in either the milking system or during the pasteurization/storage stage.

FIGURE 1

SOLIDS VARIATION IN PASTEURIZED WASTE MILK ²		
	Variation Within Farm	Variation Across Farms
Total Solids	6.58%	8.54%
Protein	7.90%	11.80%
Fat	17.30%	19.20%

Pasteurized waste milk may also be lacking in a variety of other ways, including:

Vitamin and mineral content – Pasteurized waste milk alone does not provide the vitamins and minerals calves require. When compared to the National Research Council (NRC 2001) recommendations for dairy calf nutrition (per pound of calf milk replacer solids), pasteurized waste milk is deficient in vitamins D3 and E, all seven essential trace minerals, and five of eight essential B vitamins.³

Unbalanced protein-to-fat ratio – On a dry-matter basis, whole milk contains approximately 25% protein and 30% fat.⁴ A high-fat diet can decrease the probability calves will reach growth targets and may make the weaning transition difficult. High-fat diets result in poorer feed efficiency, and fat levels above 20% of dietary dry matter have been shown to suppress starter intake.

Research has shown that pre-weaned dairy calves grow more efficiently when their liquid diet contains a higher percentage of protein than fat. Higher protein diets have been shown to promote structural growth and lean tissue development in pre-weaned calves, especially when fed at full potential levels. This development advantage has been shown to translate into earlier entry into the milking herd and higher milk production in the first lactation and beyond.^{5,6}

Low total solids levels – Increasing total solids levels can also help reduce stress in calves. One study evaluated the effects of increasing the total solids content in pasteurized whole milk through added milk replacer powder on the behavior of dairy heifers. Research has shown that calves fed a liquid diet containing 20.4% total solids had a higher number of play behaviors, spent less time standing and spent more time ruminating compared to calves fed 13.5% total solids.⁷

Adding a balancer to pasteurized waste milk can help correct these inconsistencies and provide balanced nutrition to calves.

Adding a balancer to pasteurized waste milk makes a difference

Studies evaluating the performance of calves fed diets of balanced pasteurized waste milk have produced telling results.

- In a trial conducted at a large Arizona calf ranch, calves fed a milk ration including a pasteurized milk balancer gained 17% more from birth to weaning compared to calves fed pasteurized waste milk without a balancer. The balancer group also had 8% improvement in hip height, 7% longer body length and 35% larger heart girth.⁸
- Researchers at Virginia Tech University found calves fed balancer gained 1.32 pounds per day, compared to 1.14 pounds per day for the calves fed pasteurized waste milk without a balancer.⁹
- A study conducted by Land O'Lakes Animal Milk Solutions found that weaned calves fed a diet with pasteurized milk balancer, compared to unbalanced pasteurized waste milk, showed:
 - Additional total weight gain of 2.4 pounds per head (16.1%)
 - Increased stature growth of 1.3 inches (3.8%)
 - Additional body length of 2.2 inches (7.3%)
 - Increased body volume of 33 liters (17.2%)
 - Lower cost per pound of gain of \$0.25 (17.2%)¹⁰

Balancer yields best performance

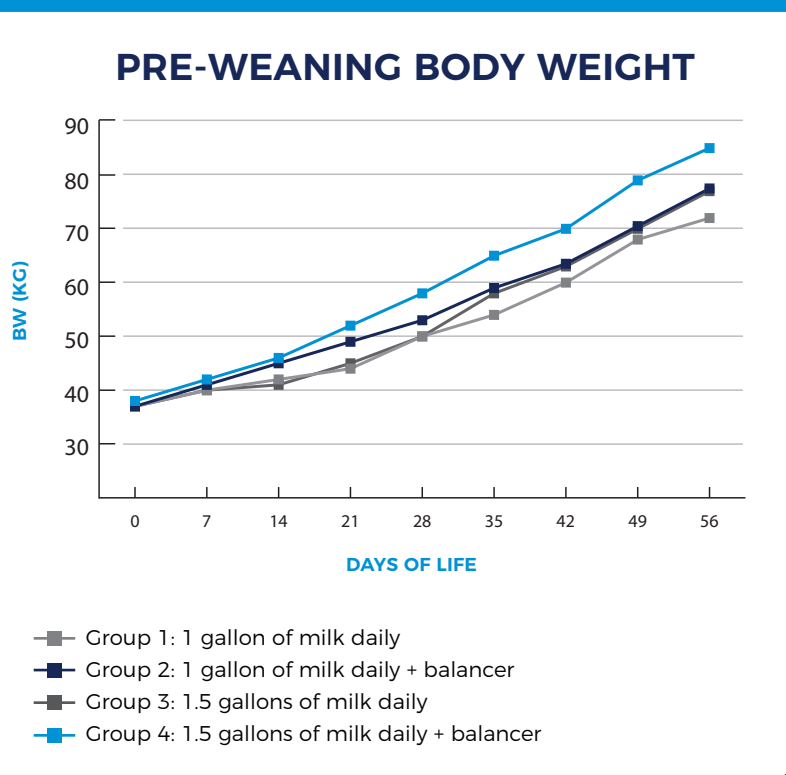
Another study by researchers at North Carolina State University concluded that a feeding program incorporating a pasteurized milk balancer into a full potential diet yielded the best performance in pre-weaned calves.

The researchers found the calves in group 4 fed 1.5 gallons of milk daily plus pasteurized milk balancer had the greatest body weight, average daily gain and feed efficiency.

Of note is the fact that group 2 calves fed 1 gallon of milk daily plus balancer had equal or greater weight gain compared to calves in group 3, which received 1.5 gallons of milk daily without balancer. While total solids fed were similar between the two programs, calves performed better on the balancer diet and less pasteurized waste milk was required to achieve a higher rate of gain (Figure 2).¹¹

FIGURE 2

COMPARISON OF PRE-WEANED BODY WEIGHT OF CALVES FED BALANCED OR UNBALANCED PASTEURIZED WASTE MILK AT TWO FEEDING LEVELS¹¹



Supply vs. demand

On-farm pasteurized waste milk supplies can fluctuate greatly from one day to the next. One study on a 1,100-cow dairy found pasteurized waste milk varied by as much as 300 pounds per day over a two-week period.¹²

The number of transition and treated cows in the herd can influence how much pasteurized waste milk is available. If health conditions in the milking herd are normal, a farm usually generates only 30-60% of the pasteurized waste milk needed to feed all calves. If the farm is feeding a full potential diet, this number drops to 10-20%. With a low supply of pasteurized waste milk, producers may turn to using salable milk to feed their calves which, in turn, may reduce profitability.

Feeding a balancer can help extend the pasteurized waste milk supply and remove the need to feed salable milk to calves.

LAND O LAKES® Pasteurized Milk Balancer®

- Delivers balanced nutrition, including optimal protein-to-fat ratio and all necessary vitamins and minerals for calf growth.
- Contains probiotics and prebiotics to help support a healthy gut microbiome.
- Is available in both original and protein blend formulations.
- Can include Bovatec® (Lasalocid) to help control coccidiosis and ClariFly® Larvicide (Diflubenzuron) to improve calf comfort by preventing breeding of house, stable, face and horn flies in the manure of treated calves.

LAND O LAKES® Pasteurized Milk Balancer® can help you take pasteurized waste milk feeding to a whole new level of consistency and profit potential.

**Contact your local calf specialist or
visit lalmilkreplacer.com to learn more**

¹ MidWest Plan Service. Ames, Iowa. 2003. Raising Dairy Replacements.

² Yoho, W.S. et al. T 132 Variation of nutrient content and bacteria count of pasteurized waste milk fed to dairy calves. 2017.

³ Wood, D. 2013. Milk-fed Calf Needs Vitamins and Trace Minerals. Animix LLC, Juneau, Wis.

⁴ Ferguson, J. 2014. Calves and Heifers VCSN642. Veterinary Medicine, Dairy Nutrition, University of Pennsylvania, Philadelphia, Pa.

⁵ Soberon F. and M.E. Van Amburgh 2013. The effect of nutrient intake from milk or milk replacer in pre-weaned dairy calves on lactation milk yield as adults: a meta-analysis of current data. J. Anim. Sci. 91:706-712.

⁶ Van Amburgh M.E. and F. Soberon 2013. Early life nutrition management and the impact of lifetime productivity on calves. Proc. of 2013 Four State Dairy Management Conference.

⁷ RUFINO, S.R. de A.; AZEVEDO, R.A. de; FURINI, P.M.; CAMPOS, M.M.; MACHADO, F.S.; PIRES, M. de F.A.; LIMA, J.A.M.; COELHO, S.G. Behavior of dairy heifers after increasing the amounts of milk replacer powder added to whole milk. 2019.

⁸ Land O'Lakes Animal Milk Solutions field trial 2009. Arizona calf-raising operation. Non-balanced pasteurized milk vs. balanced pasteurized milk.

⁹ Machado, K.L., R.E. James, M.L. McGilliard and T.J. Earleywine 2011. Effects of hutches and fortified waste milk on growth and health in pre-weaned Holstein dairy calves. J. Animal Sci. Vol. 89(E-Suppl. 1)/J. Dairy Sci. Vol. 94(E-Suppl. 1).

¹⁰ Land O'Lakes Animal Milk Solutions analysis of on-farm pasteurizers, 2006-2010.

¹¹ Glosson K. M., B. A. Hopkins, S. P. Washburn, S. Davidson, G. Smith, T. Earleywine and C. Ma 2015. Effect of supplementing pasteurized milk balancer products to heat-treated whole milk on the growth and health of dairy calves. J. Dairy Science 98:1127-1135.

¹² James, R.E. and M. Scott. 2006. On-farm Pasteurizer Management for Waste Milk Quality Control. Proceedings 10th Calf and Heifer Conference, Visalia, CA. March 21-23, 2006.

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