

Intensified Milk Feeding for Holstein Heifer Calves: A Natural Inspiration

Masoud Alimirzaei¹ and Akbar Nikkhah^{2*}

¹*Behroozi Dairy Complex, Tehran, Iran*

²*Ferdows Pars Holding Co., Tehran, Iran*

***Corresponding Author:** Akbar Nikkhah, Chief Highly Distinguished Professor, Ferdows Pars Holding Co., Tehran, Iran.

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Abstract

This article aimed to underline the importance of intensified milk feeding for improved health and performance of pre-weaning Holstein calves and their future productivity. Pre-weaning period is a critical stage of calf life because many infectious diseases would occur in this period. Feeding and management practices in this critical period has short-term (health, performance and behavior) and long-term (milk yield and reproductive performance) effects. In dairy farms, newborn calves can be fed conventionally or intensively. In conventional system, milk or milk replacer are fed to calves at about 8 - 10% of body weight; however, it seems that this amount may not meet energy and nutrient requirements of rapidly-growing calves. Conventional milk feeding may not allow calves to reach optimal body growth, and thus, may unfavorably affect their immune function. Providing milk at about 20% of body weight would be an intensive milk feeding system that would possibly occur in the natural environment. More nutrients intake could translate into greater weight gain and structural growth as well as better health condition. Nonetheless, concerns exist about diarrhea or other symptoms as a consequence of higher milk ingestion. Improved growth and health of calves in early stages of life could positively affect future milk production and reproductive performance of Holstein heifers. Therefore, optimizing calf growth, immunity, and health, and reducing infectious diseases using a proper milk feeding method can help approach maximal farm profitability and sustainability.

Keywords: *Calf; Milk Feeding System; Growth; Health*

Philosophy and Discussion

The objective of this article was to highlight short-term and long-term effects of intensified milk feeding systems in pre-weaning Holstein heifer calves. The first two or three weeks of calf life may be more important than other parts of their life cycle because most of the calf loss occurs in this time period. In a recent work [1], it was demonstrated that conventionally whole milk fed calves (10% of body weight) lost their body weight during the first two weeks of age that resulted in greater blood urea nitrogen (BUN) and serum cortisol. In contrast, intensified milk fed calves did not show any body weight loss, while possessed significantly greater weight gain on d-21 of age. The serum glucose and triglyceride levels were also higher in intensified milk fed calves (milk fed at 20% of body weight) which underlines the greater nutrient requirements for greater calf growth patterns. Similar results have been reported by others [2]. In addition to suppressed weight gain, feeding calves at maintenance can impair immune system and may predispose calves to infectious diseases in early stages of life.

Nutritional inadequacy can also be a major challenge under abnormally hot or cold environments when energy needs for maintenance increase. In a study conducted in the cold season, calves were fed equal amounts of whole milk or milk replacer; and lower weight gain and higher mortality rate were observed for milk replacer fed calves [3]. This difference was related to greater energy content of whole milk which would support improved weight gain and immune function. It has been demonstrated that low milk fed calves exhibit elevated levels of acute-phase proteins as inflammatory and stress markers [4], indicating that they may be at increased risks of various diseases. As such, higher levels of serum amyloid A (SAA) have been observed in conventionally milk fed calves (milk fat at only 10% of body weight) [1]. During inflammation, there is a shift in nutrient partitioning toward calf immunity and survival instead of growth which at least partially describes lower weight gain in conventionally milk fed calves.

In commercial dairy facilities today, managing heifers with optimal growth rate for calving between 22 to 24 months of age is a main goal. Lower weight gain and poor skeletal growth in early life has been associated with delayed calving time that dramatically increases

heifer and milk production costs [5]. Intensified milk feeding systems could lead to improved growth early in life with subsequent positive effects on heifer growth and productivity. In addition to reproductive performance, milk yield in the first lactation is closely associated with feeding higher volumes of milk in early life. As discussed above, greater nutrient intakes may translate into greater weight gains. For instance, a daily weight gain of more than 500 g would have positive effects on subsequent milk production, when compared to calf daily gain of 300 - 500g. Other mechanisms such as improved immune function, early development of mammary system, altered endocrine function and metabolic programming have been proposed to describe the greater milk production of high milk fed heifers [6].

Conclusion

Milk-feeding dairy heifers intensively in early stages of life can maximize growth performance and optimize calf, and future cow, health and longevity. Intensified milk feeding may possess future favorable effects on dairy heifer and cow milk production, reproduction and health.

Acknowledgments

Challenges are acknowledged as bright opportunities for growth and development.

Bibliography

1. Alimirzaei M., *et al.* "The effects of feeding high or low milk levels in early life on growth performance, fecal microbial count and metabolic and inflammatory status of Hlstein female calves". *Animal* 14.2 (2020): 303-311.
2. Hammon HM., *et al.* "Feed intake patterns, growth performance, and metabolic and endocrine traits in calves fed unlimited amounts of colostrum and milk by automate, starting in the neonatal period". *Journal of Dairy Science* 85.12 (2002): 3352-3362.
3. Godden SM., *et al.* "Endocrine analysis of feeding pasteurized non-saleable milk versus conventional milk replacer to dairy calves". *Journal of American Veterinary Medical Association* 226.9 (2005): 1547-1554.
4. Schaff CT., *et al.* "Effects of feeding milk replacer *ad libitum* or in restricted amounts for the first five weeks of life on the growth, metabolic adaptation and immune status of newborn calves". *Plos One* 11.12 (2016): e0168974.
5. Akins MS. "Dairy heifer development and nutrition management". *Veterinary Clinics of North America: Food Animal Practice Journal* 32.2 (2016): 303-317.
6. Drackley JK. "Early growth effects on subsequent health and performance of dairy heifers". Chapter 12 in *Calf and Heifer Rearing*. P. C. Garnsworthy, ed. Nottingham University Press, Nottingham, UK (2005).

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