Mini Review

Open Access Journal of
Biomedical Science
ISSN: 2690-487X

Bedding Management for Young Calves: Health, Welfare and Growth Perspectives

Akbar Nikkhah[1]* and Masoud Alimirzaei[2]

[1]*Department of Agricultural Science, University of Zanjan, Iran*

[2]*Behroozi Dairy Complex, Iran*

ABSTRACT

This article aimed to review and highlight the importance of different bedding management on health, welfare, and growth of young dairy calves. Rearing healthy calves with maximal growth rate is a first goal of any dairy heifer rearing program. Nutrition alongside comfortable environment can optimize growth and health of dairy calves. Bedding for young calves seems to be an important environmental effector of calf wellbeing. Since calves are in direct contact with bedding materials; quality, quantity and type of bedding can greatly impact on their health and growth performance. Bedding management is also critical when disease outbreak and cold weather threaten dairy calves. Adjusting the bedding characteristics (type, quantity, and quality) in any situation contributes to keeping calves healthy. Wheat straw, sawdust, wood shavings, sand and rubber or plastic mats are the most common materials used for bedding worldwide. Understanding advantages and disadvantages of each bedding system can help manage calves less stressfully and thus more gainfully.

KEYWORDS: Dairy calf; Bedding; Growth; Welfare; Management

INTRODUCTION AND DISCUSSION

The objective of this article was to elaborate on bedding management and discuss the role of different bedding types on health, welfare, and growth performance of young dairy calves. Health and growth of dairy calves in pre- and post-weaning periods can be related to their later performance as dairy cows. It has been demonstrated that greater growth rate in early stages of life would lead to greater milk production of dairy heifers [1]. Alongside optimal nutrition, growing calves should be kept away from major stressors to reach desirable growth rate. Under stressful conditions, nutrients ingested are partitioned towards rather maintenance to overcome stress than growth [2].

As a result, providing a suitable environment to improve calf comfort can improve production outcomes. A key factor affecting calf welfare and growth is bedding. The major characteristics that must be considered when we decide to provide bedding for calves include quality or cleanliness (wet *vs.* dry), quantity (depth of bedding materials), and type of bedding materials. Wheat straw, sawdust, wood shaving, sand, and plastic mats are widely used as bedding materials in dairy farms. Wheat straw is a common bedding material used broadly worldwide. Straw is a preferred material for bedding because it provides a soft and comfortable area for calf resting. Lying down with stretched legs is a best sign that indicates optimal calf welfare [3]. Such a calf position along with rapid eye movement (REM) are frequently observed in straw-bedded boxes. It seems that growth performance of calves on wheat straw compared to other materials is typically improved in cold season [4].

In a study [5], less days treated was reported for calves reared on wheat straw, further indicating that straw is a safe and natural bedding for young calves. Moreover, higher nesting score (score 3, the situation in which calf legs and hooves are not visible), a hallmark of bedding sufficiency, can be easily achieved by using deep straw bedding. Also, wheat straw beddings should be deep enough to prevent possible pelvic dislocation in newborn calves. Shortly after birth, calves are unable to stand sturdily and may slip on thin

Quick Response Code:

Address for correspondence: Akbar Nikkhah, Department of agricultural science, University of Zanjan, Iran

Received: January 24, 2022 **Published:** February 11, 2022

How to cite this article: Nikkhah, Alimirzaei, Bedding Management for Young Calves: Health, Welfare and Growth Perspectives. 2022- 4(1) OAJBS.ID.000396. **DOI:** 10.38125/OAJBS.000396

layer straw bedding with hind legs open on both sides causing pelvic injuries. Filthy bedding materials should be removed and renewed daily because contaminated materials are a suitable place for the growth of pathogenic microorganisms, possibly causing calf infectious diarrhea. For optimal calf growth, wheat straw should be kept dry and clean throughout the rearing period. It is important to note that using spoiled straw must be avoided because calves may ingest it. For its thermal insulation, long size straw is an excellent bedding material for young dairy calves in cold weather. In contrast, sand bedding is appropriate in hot environment. Calves on sand bedding seem to have more treated days [5].

Wood shaving is another material that can be used successfully to bed dairy calves. Notably important, the existence of foreign materials such as nails should be checked when wood shavings are used as bedding. Nails can dip into the calf hooves and cause lameness.

Sawdust can be used as bedding for both pre- and post-weaning calves. However, behavior and health outcomes need to be considered. Calf behavior is a main determinant of welfare which can change in response to bedding conditions. It has been demonstrated that the quality of sawdust bedding affects lying and standing behaviors of calves, with strong preference for drier bedding [6].

As newborn calves spend most of their time budget for lying [7,8], decreased lying time may reduce their welfare and growth performance. In addition to lying behavior, non-nutritional behavior is observed in calved bedded with sawdust. In our experience, milk-fed calves have an odd desire to ingest newly spilled sawdust as bedding, causing digestive problems. Sometimes the sawdust is treated with poisons to stand against rodents' sabotage. Eating such materials can lead to death in young calves. In addition, it is important to note that sawdust is naturally composed of very fine particles which can spread during removing and renewing times. Distributed particles especially those contaminated by manure may enter the calf pulmonary system and result in infectious diseases such as pneumonia. Effects of dust on respiratory inflammations has also been reported [9].

Hence, sawdust is not recommended in closed calf housing systems. Moreover, because of the stickiness of sawdust when it contacts with water or calf urine, this bedding type is hard to handle. In cold weather, sawdust bedding should be used deeply for providing thermal insulation and preventing pneumonia. Thin layers increase the risk of pneumonia.

Rubber mats are used sometimes to bed young calves when straw is less available and costly. Rubber and plastic mats especially those with rough surfaces may have some basic problems which are listed herein. They are not absorbent materials; do not provide thermal insulation; in the case of diarrhea, calves on mats are too wet and susceptible to hypothermia in cold seasons; joint issues occur because of direct contact of knees with rough surface for standing. Overall, rubber and plastic mats may not be recommended when the other natural and more effective materials are available.

CONCLUSION

Optimal bedding management is essential for optimal health, welfare, and growth performance of dairy calves. Every bedding should be kept dry with an appropriate depth to keep calves away from environmental stressors such as cold weather. A suitable bedding must have optimal absorbent property. As such, long size wheat straw would be a perfect bedding for calves in all ages. Other bedding materials own their advantages and disadvantages that must be carefully considered before they are used.

ACKNOWLEDGMENT

The authors gratefully thank Behroozi Dairy Farm's management and staff for their keen cooperation.

REFERENCES

1. Soberon F, Raffrentano E, Everett RW, Amburgh ME (2012) Early life milk replacer intake and effects on long-term productivity of dairy calves. Journal of Dairy Science 95(2): 783-793.
2. Mariska V (2018) The influence of bedding material on growing and health of rearing calves: A warm bed for rearing calves. Denkavit, Netherlands.
3. Ag animal health spotlight (2020) Veterinary medicine extension: Calf housing and environment series. Washington State University, USA.
4. Hill TM, Bateman HG, Aldrich JM, Schotterbeck RL (2007) Effects of feeding rate of milk replacers and bedding material for calves in a cold, naturally ventilated nursery. The Professional Animal Scientist 23(6): 656-664.
5. Panivivat R, Kegley EB, Pennington JA, Kellog DW (2004) Growth performance and health of dairy calves bedded with different types of material. Journal of Dairy Science 87(11): 3736-3745.
6. Whalin L, Weary DM, Keyselingk V (2021) Understanding behavioral development of calves in natural settings to inform calf management. Animals 11(8): 2446.
7. Alimirzaei M, Alijoo YA, Dehghan BM, Eslamizad M (2020) Effects of intensified or conventional milk feeding on pre-weaning health and feeding behavior of Holstein female calves around weaning. Veterinary Research Forum 11(4): 311-318.
8. Camiloti TV, Fregonesi JA, Keyderlingl MAG, Weary DM (2012) Effects of bedding quality on lying behavior of dairy calves. Journal of Dairy Science 95(12): 3380-3383.
9. Burch JB, Svendsen E, Siegel PD, Wagner SE, Essen S, et al. (2010) Endotoxin exposure and inflammation markers among agricultural workers in Colorado and Nebraska. Journal of Toxicology and Environmental Health 73(1): 5-22.