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Efficiency of Improved Metallic Feeders Developed for the Young Calves on Feed Intake and Wastage Pattern Involved

Saroj Rai[1], TK Dutta, MK.Ghosh, A. Mondol and M. Karunakaran

National Dairy Research Institute, Eastern Regional Station, Kalyani, West Bengal- India
E-mail: [1]drsaroj.rai@gmail.com

Abstract—*The traditional methods adopted in introducing feeds and fodders to the young calves usually involve approaches of reducing feed wastage, increasing dry-matter intake and overall performance of the calves. An improvement is made in introducing feeds and fodders to the young calves from first week of life so as to initiate quick rumen development. Such changes have been made in the feeder design of the calf. The new feeder for calves is made of iron sheets and metal frames on a stand. It is compared and evaluated with conventional aluminium bowls on-farm. The new feeder design for the calves increased the average daily dry matter intake ($p<0.05$) enhancing average daily body weight gains. The feed wastage was also significantly low ($p<0.05$) in a new feeder when compared to conventional aluminium bowls. Therefore small changes in managemental practice of offering the feeds and fodders to the calves can reduce feed wastage and enhance performance.*

Keywords*: Feed wastage, Crossbred calves, Calf feeders*

1. INTRODUCTION

In commercial dairy farms, feed wastage must be minimized if feed conversion efficiency and feed cost per unit of milk are to be optimized. Feed losses on farm occur frequently during delivery, pest infestation, storage, mixing of diets or during feeding of diets to cows. Any improvements in feed efficiency, whether at the animal level or the manufacturing level, will reduce waste. Poor feeder design and presentation of feed can lead to the wasting by animal. The feed is wasted when the offered concentrates/fodders are not consumed or loses its palatability when contaminated by the dung, urine and moulds/fungus. Gonyou and Lou (1998) reported that feed wastage in swine was typically 5% to 6% but much larger ranges have been reported in field conditions (2% to 20%). Wasting 5% of feed equates to 3% of an operating budget therefore, larger the operation, larger the economic loss (Tim, 2001). More feed is wasted when offered on bare ground than feeding through proper facility. Selecting a clean area daily to improve the palatability is also an issue. Feed loss during feed-out can be the most significant form of feed wastage yet, it has not been documented well. Many feeders for poultry, pigs, goats, sheep and cattle etc. have been improved and developed.

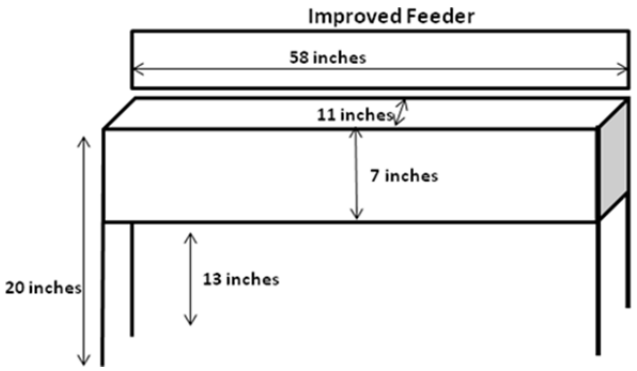
The main aim of the study is to compare the pattern of feed wastage and performance of calves in conventional aluminum bowls vis a vis improved metallic feeders designed for the calves at NDRI-ERS, Kalyani, West Bengal, India.

2. MATERIALS AND METHODS

The study is carried out in NDRI- ERS, Kalyani, West Bengal, India. Eight Jersey crossbred calves are randomly selected immediately after birth in each group. Eight calves were taken in each group on the basis of their birth weight and housed in group pens. The calves were fed colostrum for 3 days and thereafter allocated to standard milk feeding schedules as follows, 1/10th of body weight (BW) during 4 days to 1 month, 1/15th of BW during 2nd month and then, 1/20th of BW to wean at 3 month of age when the body weight of the calves was more than 55kgs. Commercial calf starters had crude protein of 22.24%, were fed along with tender green fodder in ad libitum quantity from the second week of age.

Traditional Aluminium Bowls

Traditional aluminum bowls (A) - The traditional aluminum bowls are used as the control feeder to offer concentrates and fodders to the calves. It has a diameter of 20" and height of 9" respectively. Two bowls are placed at different locations on a clean area over a 1m x 1m tarpaulin so that the concentrates that spread outside the feeders can be easily collected as wastage.



Improved feeder(I) - The feeder features a heavy duty metal frame with a tin modified tin trough having a dimension 58 inches length x 11 inches wide x 7 inches depth. It can easily accommodate 5 light weight calves in a row and being portable, it can be installed anywhere on the ground or cement pad. These feeders are placed at different locations on a clean area over a 1m x 1m tarpaulin so that the concentrates that spread outside the feeders can be easily collected as wastage.

The following parameters was recorded daily

1. Weight of feed and fodder offered and residual wastage on day-to-day basis
2. DM intake through feed and fodders and milk in each group
3. Weekly body weight gain of each calves under each group

Statistical analysis: The values for following mentioned parameters were collected and subjected to one way anova for the respective groups. Difference are considered significant when P≤0.05.

3. RESULT AND DISCUSSION

The results are presented in Table 1. Since the calves in both control and experiment were maintained in groups, results for the respective observations are presented as average. The average body weight of the calves were better when feed and fodders were offered in improved feeder with significantly ($p<0.05$) high dry matter intake (Kg/animal/day). This may be due to the optimum feeder space available in improved feeder when compared to the aluminum bowls. As keeping animals in group help in socialization influencing activity and play (Kor *et al.,* 2011) aggression and dominance becomes important when there is very limited amount of fodder (Stricklin and Gonyon, 1981). According (Sastry and Thomas, 2006) the optimum dimension of manger (cm) for calves being 40(W)x15(D)x20 (H), the aluminum bowls were sufficient for 3 small sized calves while 9-10 calves could feed comfortably in the improved feeder. Another major problem of aluminum bowls were that the calves inserted their legs in the feeder bowls, contaminating the feeds with dung and urine. In such conditions, feed became unpalatable which was often refused by the animal leading to wastage. The investigatory behavior of weaker calves in the group when fed in aluminum bowls were often suppressed as the healthier calves pushed them at times. The average residue in aluminum bowls was significantly ($p<0.05$) higher than the improved feeders developed for the calves at NDRI-ERS, Kalyani. This has also been reflected in the average weaning weight and FCR of the calves when feed and fodders were offered in the improved type of feeders. Therefore it has been concluded that feeding the young calves in improved feeders improved their overall performance.

Table 1: Overall performance of the calves fed in conventional and improved feeders

Parameters	Conventional	Improved
Average Initial body weight (kg)	20.87±1.13	21.12±1.12
Average weaning body weight (kg)	48.75±2.57	51.12±2.82
Average daily gain (g/day/calf)	0.32±0.03	0.37±0.03
*Dry matter intake (kg/day/animal)	1.22±0.08	1.34±0.13
*Residue (kg/group in DM basis)	7.42±0.47	6.01±0.41
Body weight gained/animal	26.00±2.44	31.00±2.47
FCR	1.96	1.84

*P≤0.05

Therefore any improvements in the existing feeder design helps in minimizing the feed wastage even for the calves. The results are expected to be far relevant in bigger farms with large expenses incurred in feeding and the losses associated with *ad libitum* feeding.