

Feeding Practices on Dairy Farms with Automatic Milking Systems

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Introduction

The goal of every feeding program is to develop a low cost diet that meets the nutritional requirements of cows while optimizing milk production and cow health. In most conventional herds this is accomplished by feeding a total mixed ration where the all ingredients are mixed together and delivered to the cow. For automatic milking systems (AMS) herds a partially mixed ration (PMR) is offered in the feed bunk with a portion of the concentrate being fed through the milking box. One of the challenges facing nutritionists is to balance the nutrients supplied in the PMR and feed offered in the milking box to entice cows to visit the milking stall on a regular basis. Feed offered in the AMS unit is the major motivating factor to attract cows to consistently visit the milking station.

We are conducting a field study with 53 farms in Minnesota and Wisconsin using AMS. This article summarizes some of the key aspects we learned about feeding cows on AMS farms.

Enticing cows to visit the milking station

The interaction between cow behavior, activity, her diet, feed consumption and cow health and production is complicated (Rodenburg, 2011). Because of this a poor performing AMS system can cause frustration for both the farmer and their nutritionist.

We asked nutritionists to rank five feeding factors they thought were keys to AMS feeding success: PMR energy content, PMR starch content, consistent mixing and delivery of the PMR, consistent delivery and push up of PMR, and palatability of the pellets. Nutritionists working with these dairies indicated that palatability of the pellets and consistency of the PMR were the two biggest feeding factors contributing to AMS success. These results agree with comments made by the dairy producers on our visits as several commented that even minor changes in the PMR moisture, consistency of the mix and changes in forage quality affected visits. Many producers in our survey had tried feeding a meal instead of a pellet in the milking box. On every farm this proved unsuccessful and they reverted back to feeding a pellet. Pellets should be made from palatable ingredients, hard and free from fines.

Free flow vs guided flow

Our survey of nutritionists showed that feeding strategies were different for free flow and guided flow systems. A higher percent of the dry matter and nutrients were delivered through the PMR in guided flow systems. The amount of pellets offered through the milking box ranged from 2 to 25 lb/cow per day in free flow systems whereas in guided flow systems the minimum was also 2 lb/cow/day but the maximum fed was 18 lb/cow/day. The average amount of pellets fed across all herds was 3 lb/cow/day less with guided flow barns.

The PMR in guided flow systems was higher in energy (0.015 Mcal/lb) and lower in NDF (2.1%) than in free flow systems. In free flow herds the PMR was balanced for milk production levels of 10 to 30 lb less than the herd's average production. For guided flow herds the PMR was balanced for 9 to 20 lb less than the average of the herd.

Farmer comments and our observations indicate that the milk first system is superior with the US style of dairying where economics demand high production. Our observation is that in feed first systems cows fill up on the PMR and tend to stand in the feed alley or commitment pen and chew cud without entering the selection gate or visiting the AMS. Producers in these systems had the same observations. Feed first systems work best in farms where the PMR is very low in energy and there is a drive for cows to consume the concentrate in the milking box (Rodriguez, 2013).

In a free flow system Bach et al. (2007) showed that increasing the amount of pellets offered in the robot box from 6.6 lb/cow/day to 17.6 lb/cow/day increased the frequency of visits from 2.4 to 2.7 milkings per day for cows not being fetched. However, increasing the feed offered in the robot box did not decrease the number of fetch cows. They suggested that something other than the amount of concentrate offered such as lameness, or fear was affecting the number of fetch cows.

Both guided flow systems and free flow systems can be successful. In our study, we have herds that averaged over 90 lb/cow/day over an entire year of production with both free flow and guided flow systems. The key is to manage the system well to optimize production.

Conclusion

The rapid growth on the number of farms using AMS in the Upper Midwest is expected to continue. The complexity of balancing the ration in the PMR and feed offered in the milking box can be a challenging task for nutritionists. Based on research, nutritionist surveys and farmer comments, the most important factors affecting feeding success include a high quality, palatable pellet and excellent feed management. It is important to work with herd managers to educate them on the importance of feed management and to balance energy in the PMR with pellets fed through the milking box to optimize visits and minimize the number of fetch cows.

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