Time for Technology

Feeding and Breeding for Robotic Milking: New technology begs for new research.

Jack Rodenburg, DairyLogix

Ask any owner of a robotic milking herd what he thinks is the biggest factor in achieving frequent voluntary milking and high milk production, and he will tell you that the feeding program is far and above the most important determinant for success. And when you ask for the recipe, you will find that current feeding practices in robotic milking herds are substantially different from how most freestall herds are fed. So if it is important, and different and robotics is on the rise, it should be worthy of an article and a little research as well.

But I am reluctant to tackle this topic, because there is very little about it that I “know” with any degree of certainty. Yet I have just been invited to speak on this at a major North American nutrition conference, and perhaps that reflects how little the research community in general has to offer in this regard.

While most dairies abandoned feeding grain in the milking parlor and opted for total mixed rations (TMR) twenty years ago, early experience with robotic milking showed cows would not come for milking unless they were rewarded with grain in the milking stall. On-farm trials conducted in Ontario showed that hard pellets that are easy to consume make the best reward and fines whether the result of pellet breakdown or the use of mash feeds, reduce the value of the reward. In one herd, poorer pellet strength lead to a 17% decrease in visits and a 4% decrease in milk production. But minor differences in flavour of the pellets, as result from exclusion of minerals, or inclusion of flavouring agents or more palatable ingredients has not generally made much difference. Only one published research paper in the Journal of Dairy Science (Halachmi, JDSc. 2009, pg 2317-2325) has looked at the composition of these pellets and it found that pellets made from soyhulls with less starch and more digestible fibre led to higher milk production but nor more visits. If some pellets in the robot is a good thing, prevailing wisdom suggests that more would be better. The general recommendation that has evolved is to formulate the mixed ration in the bunk for a typical cow producing 7 litres less than the average of the group. The amount of concentrate fed in the robot is then varied from a minimum of 2 kilograms per day to a maximum of 8 Kg. Eight kilograms is about maximum because the typical rate at which cows consume a good pellet is 250 to 350 grams per minute. If a high producing cow makes 3 milking visits, at an average consumption rate she will need to be in the box

nearly 9 minutes per visit to consume her allotment. Hence a high producing fast milking cow will have difficulty meeting her energy needs. Computer feeders are fast becoming a popular way to supplement the additional concentrate needs of these cows. In some barns these are located in special areas where the cow is directed after milking, but ideally they should be linked back to the milking system so only cows that are not eligible for milking can access their remaining grain allotment from the feeding station. Despite this recommendation the only published research in this area (Bach, JDSc. 2007 pg 5049-5055 did not find any difference in frequency of visits or milk production when either 3 or 8 Kg of concentrate fed in the robot were combined with mixed rations in the bunk formulated to equalize the total concentrate fed.

Field experience also shows that diets fed in British Columbia and Western Europe, based mostly on grass in which the energy comes from digestible fibre result in more visits and fewer fetch cows than Ontario herds with diets based on corn silage and alfalfa. In a field study I conducted in 2002, herds that fed more forage and less concentrate had better voluntary attendance. In general lower grain feeding levels, combined with free choice 24 hour a day access to good quality forage has become the norm in feeding robotic herds. With this focus robotic dairies will aim at a bit lower production but they should benefit from high milk component percentages, and healthy cows with healthy rumens and healthy feet.

But I am left to wonder why we are developing these recommendations solely from farmer experiences? With the millions of dollars expended worldwide on dairy research, often refining our knowledge of some nutritional topics far beyond practical limits, why are there only two published trials in the last five years of the Journal of Dairy Science with any relevance to feeding for robotic milking?

And nutrition is not the only discipline where this is the case. Two genetics studies, one Canadian (Nixon, JDSc 2009 pg 3422-3430) and one from Germany (Konig, JDSc. 2006, pg 3636-3644) suggest that 14 to 22 percent of the wide variation in milking frequency of cows in robotic milking herds is inherited. Robot owners often remark that the daughters of some bulls attend with a higher frequency than others and they would dearly love to have their observations verified by further research or sire proofs for this trait. Leading edge farmers now have ten years experience with robotic milking in Canada, and at least 15 years in Europe. This technology is here to stay and perhaps it is time for dairy research institutions to take a new look at what can be done to support its ongoing development.