

Automatic Calf Feeding Systems: Is this Your Next Employee?

Jennifer Bentley, Dairy Specialist, Iowa State University Extension and Outreach

Jim Paulson, Dairy Educator, University of Minnesota Extension

Individual calf hutches have historically been the industry's preferred management system for pre-weaned calves. This management system is highly labor intensive and allocates the majority of the labor attention on feeding and cleaning up after each individual calf. Automatic calf feeding systems have been introduced as a way to reduce labor as well as reallocating labor to monitor and manage calf health and performance on a more flexible schedule. Well-managed group housed calf rearing systems can provide advantages for both calves and producers.

Automatic calf feeders consist of a self-contained unit which heats the water, dispenses a programmed amount of milk replacer, mixes the milk replacer and water in a container from which the calf can suck it out through a nipple feeding station. There are numerous companies selling automatic calf feeders in the U.S. with varying computer software options.

Automatic Calf Feeding Facts:

- One mixing station will handle up to three or four nipple feeders. Each nipple feeder will feed approximately 20-30 calves or 10-15 veal calves depending on the age of the group.
- Calves are fed 0.5-2.0 L per feeding over four to eight feedings per day. There are usually about one to two hours between each feeding. Calves will spend about 30-50 minutes/day at the feeding station. Calves will not consume much, if any, for about six hours during the night.
- Automatic calf feeder software can monitor milk intake of individual calves, number of visits, number of unrewarded visits, as well as the rate of milk consumption. Any changes in individual calf feeding behavior are alerted to the manager to diagnose illness or failure to adapt to the system.
- Weaning can occur automatically at a pre-set age by reducing the number of feedings per day and the amount of milk or milk replacer offered over a predetermined period of time, usually one week.
- Group-housing allows for early socialization which is important in social development as the calf matures into a cow. However, some negative behavior can occur such as cross-suckling, competition around the feeder, and dominance behavior.
- Contagious diseases may affect more calves.

Considerations for increased Automatic Calf Feeding Effectiveness:

Many factors must be considered when utilizing an automatic calf feeding system. Here are some considerations in barn and auto feeder design:

- Colostrum management (quality, quantity, quickness, and cleanliness)
- It is still necessary to feed the calves by bottle in individual pens for the first 3-10 days. It has been noted in Europe, calves are put into the group pen after first feeding colostrum. The producer must still go inside group pen to feed second feeding colostrum.
- Adequate resting space (25 sq ft bedded, 35 sq ft total area per calf and over 40 sq ft needed if working with retrofit building with low ceiling)
- Adequate ventilation for good air hygiene (air exchange of 20cfm, 60cfm and 130cfm in cold, mild, and hot weather conditions, respectively.) Considerations of building design, curtains, and positive pressure tube systems should be discussed with an Ag engineer before group housing is considered.
- Design a stall that prevents calves from displacing one another to maintain milk intake and discourage competitive behavior.
- Closely monitor and clean the powder and additive outlets, calibrate powder and additive delivery, monitor and replenish cleaning solutions, examine water supply, inspect the delivery hose and nipples, monitor and follow up on collected calf feeding data.

Nutrition & Growth Performance:

- In conventional fed calves (pails or individual bottles), calves are fed limited amounts of milk replacer fed two-three times a day. Increasing the feeding rate and the number of portions fed per day may improve growth rates and body condition of calves during the milk-feeding period.
- Studies have shown variable growth performance results on calves on automatic calf feeder systems. Some studies have shown improved weight gain when computer-fed, some show no significant difference in growth of calves on automatic feeders or individually fed, and others have demonstrated lower growth rates and feed intakes compared to calves kept individually and fed twice daily. In each of these studies, group sizes were small in comparison to industry

recommendations for computer-controlled calf feeders.

- Calves will spend an average of 60 days in the auto feeder if assumed they come in at 5-10 days of age. The weaning process would start at about 49 days (7 weeks) and wean by 56 days (8 weeks) or when the calf is consuming 2-3 pounds of calf starter for 2 days. This would allow 25 calves/pen/year with two pens for a total of 300 calves on the feeder per year.
- De Passille et al. (2004) showed that group calves were able to be weaned earlier (35 days old) than bucket-fed calves (42 days old), resulting in 18 percent less milk replacer fed to calves using the automatic calf feeding system verses bucket fed, individually housed calves. Starter grain was also fed automatically in this study, which allowed for complete milk and grain intake.

Other Considerations:

- Excellent calf management is necessary even before calves are born starting with high quality feed and care for pregnant cows.
- Calves should always be grouped by age and size for optimal growth.
- Free choice water should always be available.
- **Cross-sucking behavior:** Feeding calves milk via an artificial teat allows them to exhibit a natural sucking behavior. Hammell et al (1988) stated that satiation (the feeling of fullness) with milk alone does not eliminate the sucking stimulus, thus even if the calves nutritional needs are met it still feels the need to suck. Artificial teat-feeding helps the calf feel satiated because the sucking stimulus has been shown to increase levels of cholecystokinin (CCK; a mediator of natural satiety) and insulin over bucket fed animals, making teat fed animals feel more satiated. It also takes longer for the calf to feed and thus the time spent feeding is closer to normal which will also decrease the likelihood of cross-sucking.

IOWA STATE UNIVERSITY

Extension and Outreach

... and justice for all

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue SW, Washington, DC 20250-9410, or call 800-795-3272 (voice) or 202-720-6382 (TDD). USDA is an equal opportunity provider and employer. Cooperative Extension Service, Iowa State University of Science and Technology, and the United States Department of Agriculture cooperating.

Economics of Automatic Calf Feeding Systems

Example economic scenario:
(650 cow dairy/300 heifer calves)

A single programmable feeding unit with two nipple feeding stations costs approximately \$17-20,000. This system has the capability of feeding two pens of 25 calves for up to 10 weeks. An optional computer and program for more feeding options and capabilities will cost an additional \$4,000.

Assuming a single programmable feeding unit with two nipple feeders and computer software at \$22,000/5 year depreciation=\$4,400/year.

- \$4,400/300 heifer calves per year = \$14.66/head feeder cost

Total Calf feeding labor for 300 calves per year fed with auto feeder: **\$18,300**

- 300 calves x 3.8 minutes/calf/day x 60 days = 1140 hours/year x \$12.00/hr = **\$13,680**
- 300 calves colostrum feeding and 10 days individually x 7.7 minutes/calf/day x 10 days = 385 hours x \$12.00/hr = **\$4,620**

Total Calf feeding labor for 300 calves per year fed individually: **\$32,340**

- 300 calves x 7.7 minutes/calf/day x 70 days = 2,695 hours/year x \$12.00/hr: **\$32,340**

Example economic scenario:
(200 cow dairy/100 heifer calves)

Assuming same set up as described above:

- \$4,400/100 heifer calves per year = \$44.00/head feeder cost

Total Calf feeding labor for 100 calves per year fed with auto feeder: **\$6,096**

- 100 calves x 3.8 minutes/calf/day x 60 days = 380 hours x \$12.00/hr = **\$4,560**
- 100 calves colostrum feeding and 10 days individually x 7.7 minutes/calf/day x 10 days = 128 hours x \$12.00/hr = **\$1,536**

Total Calf feeding labor for 100 calves per year fed individually: **\$10,776**

- 100 calves x 7.7 minutes/calf/day x 70 days = 898 hours x \$12.00/hr = **\$10,776**