

# Feeding affects post-milking cow activities

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## Abundant feed after milking keeps cows on their feet

**F**eeding represents one-half of production costs in California dairies, and factors affecting feed efficiency can be of major consequence to economic success. Previous observations (see *California Agriculture*, November-December 1983) have shown that the amount and location of corral shade can markedly affect cow eating and other activities, such as resting and ruminating, particularly during the hot summer months. The availability of palatable feed in the corral manger also affected these activities.

University of California research on post-milking cow corral activities indicates that flow of cows from the milking parlor can be aided by their appetite for feed waiting in the corral manger. Also, research from the U.S. Department of Agriculture and Universities of Iowa and California suggests that cows' standing to eat after milking can reduce the entrance of mastitis pathogens into the mammary gland via the teat ends while the teat sphincter is open. The objective of this study was to gain further insight into effects of factors such as milking time of day, cow production level, and feed availability on the behavior of cows after milking when they are protected from adverse weather conditions.

Post-milking activities were monitored on three drylot commercial dairies in the southern San Joaquin Valley: one herd milked three times daily (3x), and two herds milked twice daily (2x). Each herd was divided into three production levels, averaging 96 Holsteins per corral, with average daily yields of 80 (high), 60 (medium), or 40 (low) pounds of milk having 3.5 percent butterfat. Cows milked twice daily at 12-hour intervals averaged 19,750 pounds of milk yearly, and those milked three times daily averaged 20,270 pounds of 3.5 percent butterfat milk.

All cows were kept in completely roofed free-stall barns to minimize weather effects. The barns had combined resting and feeding areas without walls, and animals had access to adjacent outside exercise pens. All cows were fed similar feeds in accordance with respective production level nutritional requirements, and manger space was sufficient to allow all cows to eat at the same time.

As cows returned to the corral, their activities were visually scanned at 15-

minute intervals for one hour and tabulated on a percentage basis. Observations were made on each dairy when feed in the manger following day and night milkings was abundant (more than 3.3 pounds dry matter per square yard of manger space) or scarce (less than 3.3 pounds). Information was collected during the summer in three-week periods that were bracketed by Dairy Herd Improvement Association tests to minimize cow population changes in each production group.

Temperatures ranged from afternoon highs averaging 100°F outside and 91°F inside the free-stall areas to nighttime lows of 68° and 70°F, respectively. Relative humidity ranged from 27 percent outside and 41 percent inside during the afternoon to 65 and 73 percent, respectively, at night. No attempt was made in this study to correlate weather conditions with cow behavior.

Results were analyzed, first, for effects of feed and time period on post-milking activities of combined high-, medium-, and low-yielding cows. When compared with feed abundance, scarcity was associated with a reduced percentage of cows eating and increased percentage of cows standing while not eating or drinking in all observations of both 2x and 3x cows. Feed scarcity also increased the percentage of cows lying down in all 2x and 3x observations, except 15 minutes after milking during the 9 a.m. to 9 p.m. time period for 2x cows. Day or night milking did not significantly affect eating, standing, or lying down, except that more 2x cows were lying down 15 minutes after milking in the nighttime when feed was scarce. More 2x cows were drinking water 15 minutes after milking from 9 a.m.

to 9 p.m. than from 9 p.m. to 9 a.m. More 3x than 2x cows were drinking during the same time period when feed was abundant or scarce at 15 minutes and, likewise, when feed was scarce at 30 minutes after milking.

Results were also analyzed for feed and production level effects on milking activities with a.m. and p.m. milkings combined. With abundant feed, the percentage of cows eating was generally lower in all 2x and 3x production groups at 45 and 60 minutes than at 15 and 30 minutes post-milking. Feed scarcity, compared with abundance, reduced the percentage of 2x and 3x cows eating in all production groups at all post-milking times. Scarcity further reduced the percentage of medium- and low-producing 2x cows that were eating 45 and 60 minutes after milking when compared with high-producing cows. However, scarcity reduced eating by 3x high-producing cows at 30 minutes post-milking, while the response was not seen until 60 minutes for medium and low cows.

The percentage standing without eating or drinking generally increased for all 2x and 3x cows having abundant feed at 45 and 60 minutes, when compared with 30 minutes post-milking. Scarce feed was generally associated with a decrease in 2x and 3x cows standing at 30, 45, and 60 minutes, compared with 15 minutes post-milking. With scarce feed available, the percentage of both 2x and 3x high-producing cows standing was further reduced and the percentage lying increased, as compared with medium- and low-producing cows 30 and 45 minutes after milking. The percentage of 2x and 3x cows lying down increased in all production groups 45 and 60 minutes after milking, as compared with 15 and 30 minutes, when abundant feed was available. This time effect was doubled for 2x cows and more than tripled for 3x cows with scarce feed. The percentage of high- and medium-producing cows drinking water after milking generally was higher 15 and 30 minutes than 45 and 60 minutes after milking. The percentage of 2x high-producing cows

TABLE 1. Correlation between cows' post-milking eating or lying down and feed availability

Production level	Correlation with feed availability*			
	Eating		Lying down	
	Minutes		Minutes	
	30	60	30	60
-----2x milking-----				
High	.68	.53	-.59	-.70
Medium	.76	.89	-.55	-.68
Low	.63	.93	-.46	-.72
-----3x milking-----				
High	.92	.76	-.73	-.70
Medium	.91	.86	-.60	-.75
Low	.94	.91	-.91	-.83

\*All values (P<.01) composite of 24 hour milkings with ± 1.00 maximum.

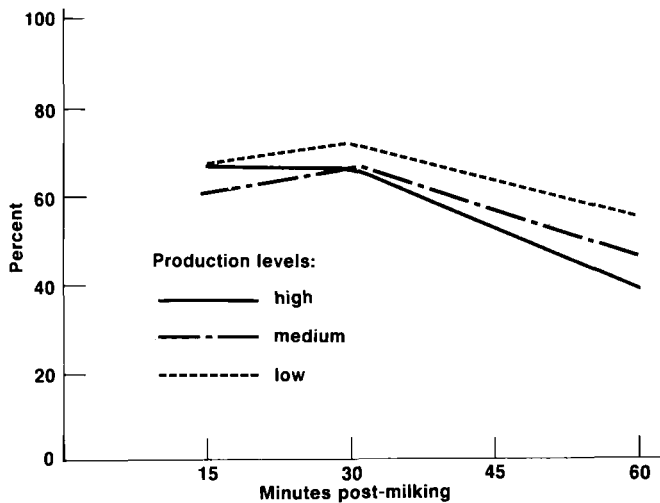


Fig. 1. Percent cows eating when feed is abundant.

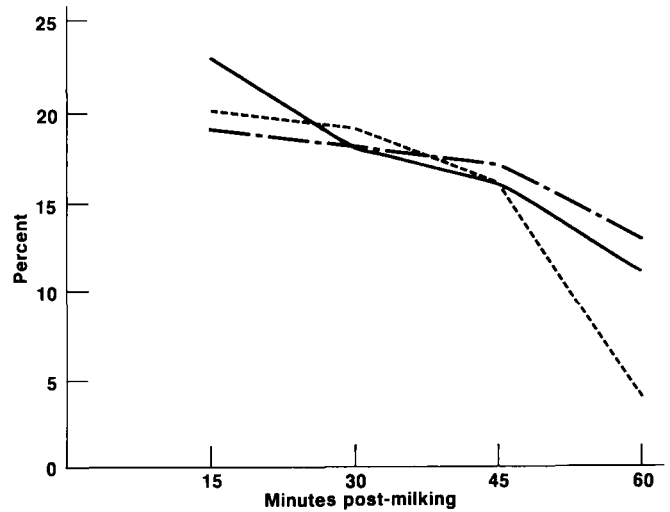


Fig. 2. Percent cows eating when feed is scarce.

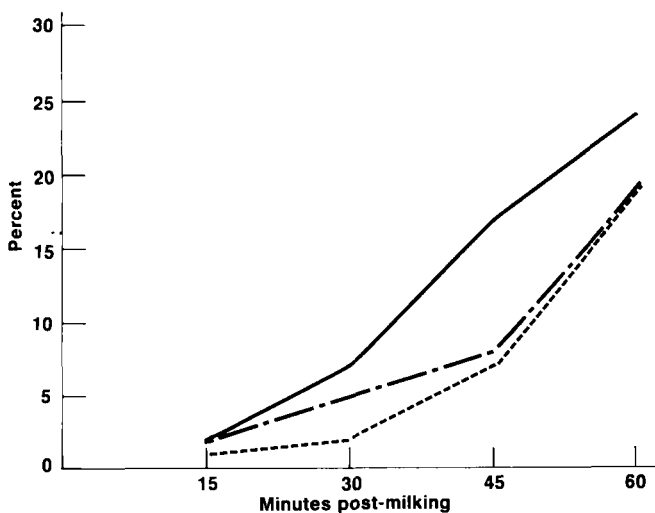


Fig. 3. Percent cows lying down when feed is abundant.

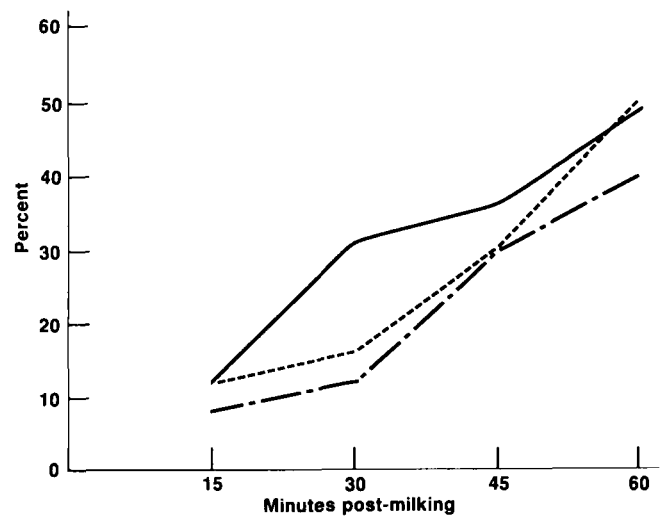


Fig. 4. Percent cows lying down when feed is scarce.

drinking was higher than low-producing cows at 15 minutes with abundant feed and at 30 minutes after milking with scarce feed.

Based on the previously mentioned research, maximizing feed intake and delaying cows from lying down shortly after milking is of major concern. Overall eating and lying-down trends (fig. 1 to 4) show that feed scarcity lowered the percentage of cows eating in all production groups 15, 30, 45, and 60 minutes after milking when compared with abundant feed. This effect was significantly more apparent for high-producing cows within 30 minutes after milking, but not as apparent until 60 minutes in medium- and low-producing animals. In contrast, the percentage of cows lying down increased in all production groups at each observation time with feed scarcity as compared with abundant feed. With scarce feed, the percentage of high-producing animals lying down noticeably increased within 30 minutes after milking, as compared with that of medium- and low-producing cows,

which did not increase until 45 minutes after milking.

These relationships — more cows eating and fewer lying down when feed was abundant than when scarce — were not significantly altered after day or night milkings. These correlations were markedly altered in previous observations with less environmentally protected corral mangers during the summer. It is noteworthy that high-yielding cows generally changed their behavior earlier than medium- and low-yielding cows when feed was scarce. This effect was not significantly altered whether no feed or up to 10 pounds of feed was offered in the milking parlor before cows returned to their corrals. These results indicate that feed quantity, as well as quality, can affect cow corral activities. Also, as indicated in previous studies, protection of animals and feed from the weather, particularly daytime heat, can benefit cow appetite.

Cow behavior trends following 2x and 3x milkings were generally similar; however, activity changes tended to be more

pronounced in 3x than in 2x animals (table 1). The results of this study suggest that having feed in the corral manger following milking can be a critical factor in obtaining acceptable feed intake to meet nutrient needs, particularly in high milk production. Also, ample post-milking feeding could serve as an additional management tool against environmental mastitis pathogens by prolonging the time a cow takes to lie down. Previous reports show that prolonging this time is of particular concern when the bedding area is not dry, or when corrals have recently been scraped.

Visual observation of post-milking activities of large groups of corralled cows can be of use in evaluating feeding management and overall mastitis control practices in relation to cow health and productivity.

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