

THE EFFECT OF CALVING SEASON AND STAGE OF LACTATION ON THE MILK PROTEIN CONCENTRATION OF QUEENSLAND DAIRY FARMS

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A number of factors are known to affect milk protein concentration, including breed, environment, management practices, disease status, stage of lactation, age, parity and nutrition of the dairy cow (De Peters and Cant 1992). A combination of, or an interaction between these factors, can significantly affect milk protein concentration. Calving season has also been found to affect the lactation curve of milk protein concentration (Garcia and Holmes 2001, White 2001). This effect is likely to be an important issue in Queensland due to the year-round calving pattern, which is primarily a relationship between the seasonal changes in the nutritive value of pastures and stage of lactation. The aim of the on-farm monitoring program conducted over a 12-month period in Queensland was to identify the main factors and interactions that affect milk protein concentration. The study is part of a Dairy Research and Development Corporation (DRDC)-funded national project, also being conducted in Western Australia using a similar data collection and analysis protocol.

Twelve farms were monitored in the southeast Queensland region over a 12-month period for nutritional, environmental, animal and management factors that might influence milk protein concentration. Farms were selected for low and high milk protein content (av. of 3.04 and 3.23 % (m/v), respectively) and their seasonal variation (range between the peak and trough is 0.29 and 0.46 % units, respectively) in milk protein concentration. Milk composition and time of calving data were collected from monthly herd recording of individual animals.

Table 1. The effect of calving season and stage of lactation (SOL) on average milk protein concentration (% m/v) from 12 Queensland dairy farms

Milk Protein Status	SOL (days)	Calving Season			
		Spring	Summer	Autumn	Winter
High farms (n=6)	1-100	3.09a	3.02a	3.13a	3.17a
	101-200	3.24b	3.26b	3.22b	3.09b
	201-310	3.30c	3.44c	3.35c	3.34c
Low farms (n=6)	1-100	2.86d	2.94d	2.93d	2.94d
	101-200	3.08e	3.06e	3.04e	2.98e
	201-310	3.34c	3.29c	3.26c	3.34c

Values with the same superscript are not significantly different at P=0.05

There was no significant (P>0.05) difference in the milk protein concentration between calving seasons, however lactation curves of milk protein concentration do show some variation between seasons at different stages of lactation. Garcia and Holmes (2001) also found differences in the lactation curves of milk protein concentration at various stages of lactation between spring- and autumn-calved cows. Significant (P<0.05) differences were seen between high and low farms at the 1-100 and 101-200 stages of lactation, with no differences seen at the 201-310 SOL. This suggests that cows on low milk protein farms have a lower protein content during early and mid lactation, then rise in late lactation to concentration levels of a similar value to cows on high protein farms. The interactions between nutrition, environment and management during peak lactation are likely to be contributing to this SOL effect between farms. In conclusion, there seems to be a greater effect on milk protein concentration from SOL than from calving season.

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