

Is Milk Production Affected by Providing More Light or More Grain?

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Previous studies have shown that milk production of dairy cows increases up to 2.5 kg/day by exposing cows to long photoperiod (16-18 h of light per day). Nevertheless, the effects of the interaction between photoperiod and nutritional management have not been studied. The aim of this study was to evaluate simultaneously animal responses to nutritional and photoperiod management in milk production of dairy cows. The study was conducted at the Dairy Research Technology Center which has metal halide light fixtures. Thirty mid lactating cows (109 ± 37 days in milk; mean ± SD) were exposed to long photoperiod (LP; 16 h of light; n = 15) or short photoperiod (SP; 8 h of light; n = 15) in a tie-stall barn. The light intensities were 205-255 and 15-17 lux when the light fixtures were ON and OFF respectively. Cows were fed three diets (steam rolled barley grain at 15, 25 and 35% of dietary dry matter; LG, MG, and HG, respectively) in a 3 × 3 Latin square design within each photoperiod treatment. Dry matter intake was lower for cows fed the LG diet compared with those fed the HG diet (20.4 vs. 22.7 kg/d; $P < 0.001$) whereas it was not affected by photoperiod treatment. The interaction effects between photoperiod and dietary treatment were significant for yields of milk ($P = 0.03$), milk fat ($P < 0.01$), and milk protein ($P = 0.02$). Cows exposed to SP treatment and fed HG diets increased milk yield by 4.0 kg/d compared with the LG diet (30.5 vs. 26.5 kg/d) while the increase was 2.2 kg/d for cows on the LP treatment (30.4 vs. 28.2 kg/d). Likewise, the HG diet increased milk protein yield compared with the LG diet to a greater extent for cows on the SP treatment (1.03 vs. 0.84 kg/d) than those on the LP treatment (0.99 vs. 0.90 kg/d). Furthermore, the HG diet increased milk fat yield by 0.15 kg/d compared with the LG diet for cows on the SP treatment (1.25 vs. 1.10 kg/d) while dietary grain content did not affect milk fat yield for cows on the LP treatment.

Implications: The results of this experiment suggested that cows exposed to short photoperiod had a greater milk production when they are fed high grain diets, and that the amount of grain in the diet can be reduced without affecting milk fat yield if cows are exposed to long photoperiod.