Session No: N4.63
Effects of Pre-Partum Body Condition Score on Milk Yield of Holstein Dairy Cows

A. Pezeshki[1], G. R. Ghorbani[1], and H. R. Rahmani[1], [1]College of Agriculture, Isfahan University Of Technology (IUT), Isfahan, Iran 84156. Email: gghorbani@yahoo.com

ABSTRACT

There are few studies about the effects of pre-calving BCS on milk yield of dairy cows in relation with their next lactation. The objective of this study was evaluating the effects of dry period BCS on milk yield and milk composition of Holstein dairy cows on their subsequent lactation. One-hundred twenty-two Holstein dairy cows were assigned BCS on 5 point scale in approximately 60 d and 30 d before expected calving date. Treatments for analyses included BCS $\geq$ 3.2 and BCS $\leq$ 3. Milk production were recorded daily in three consecutive milking, and milk samples were collected weekly for the first 8th week of lactation and were analyzed with PROC MIXED of SAS (v.8.2.SAS., 1999). There were not any significant differences between treatments on milk yield, milk protein and milk SCC. Thinner cows had greater amounts of milk fat (3.69 vs. 3.31, respectively; $p = 0.05$) and milk lactose (5.41 vs. 5.22; $p = 0.01$) compared with fatter cows in the first 8 weeks of lactation. In conclusion, milk yield of Holstein dairy cows might be affected by other factors in early lactation.

INTRODUCTION

Body Condition Score (BCS) is a method for evaluating the amounts of energy deposit as a fat in the body of the animals. Initially, BCS was described for lambs (Jefferies, 1961) and then was defined for dairy cows based on scoring from one to five (Wildman et al., 1982). Field studies have established that BCS affects milk yield, reproduction and health condition of dairy cattle. In response of one score increase in BCS, body weight would increase about 56 kg in dairy cows (Otto et al., 1991). In concurrent with BCS improving, the percentage of dry matter and ether extraction of body tissues increased and percentage of crude protein and ash decreased (Otto et al., 1991). Original experiments about the effects of BCS on milk yield of dairy cows were started in U.K that most of them used limited number of cows. There was not any study for evaluating the effects of far-off BCS on milk yield of subsequent lactation up to 1997. One experiment demonstrated that there was negative relationship between BCS at milk stasis time and milk yield of cows in first 120 day of lactation (Domeq et al., 1997). Other studies concluded milk yield of cows were not affected by low and high BCS groups at dry period time in the next lactation (Theurer et al., 2003; Contreras et al., 2004). As it mentioned there are different findings about the effects of pre-calving BCS on milk yield of dairy cows in the next lactation. Thus objective of the current study was evaluating the effects of dry period

BCS on milk yield and milk composition of Holstein dairy cows under Iranian management conditions.

MATERIALS AND METHODS

One-hundred twenty-two Holstein dairy cows were assigned BCS on 5 point scale by one individual in approximately 60 d and 30 d before expected calving date. Cows were grouped for analyses into two groups including BCS $\geq$ 3.2 and BCS $\leq$ 3 (n = 65 and n = 57, respectively). The mean pre-calving BCS for low and high BCS groups was 2.85 and 3.50 respectively. All of cows were fed Total Mixed Ration (TMR) two times per day to meet their productivity and pregnancy requirements (NRC, 2001). Milk production was recorded daily in three consecutive milking, and milk samples were collected weekly for the first 8 weeks of lactation for chemical analysis and the collected data were analyzed by PROC MIXED of SAS (v.8.2.SAS., 1999).

RESULTS AND DISCUSSIONS

No significant differences were detected due to low BCS (BCS $\leq$ 3) and high BCS (BCS $\geq$ 3.2) treatments related to milk yield of cows at first 8 weeks of lactation (36.19 vs. 37.38, respectively; Figure 1). These results confirm other studies (Theurer et al., 2003; Contreras et al., 2004) in this regard. Contreras et al (2004) concluded that cows with BCS $\leq$ 3 at far-off tended to increase more milk than cows with BCS $\geq$ 3.25 at the same time, however there were not any significant differences between treatments ($p < 0.12$). Theurer et al (2003) indicated that peak milk yield were not different between BCS > 3.50, 3.50 $\geq$ BCS > 3.0 and BCS $\leq$ 3.0 in the close-up period (46.6, 47.5 and 49.2 kg, respectively; SEM = 1.0). However, in contrast to these results, our study demonstrated that higher BCS cows had numerically greater milk than lower BCS cows, but this conclusion only could be contributed to Iranian herds' condition and it might be different from other countries with different management strategies. Lower BCS cows had higher milk fat than higher BCS cows (3.69 vs. 3.31, respectively; $p = 0.05$). Contreras et al (2004) concluded that there are not any significant differences between BCS $\geq$ 3.25 and BCS $\leq$ 3.0 regarding their milk fat ($p < 0.14$). Higher milk fat in thinner cows compared with fatter cows, could be contributed to lower milk yield of lower BCS cows in the subsequent lactation. Similarly, milk lactose increased significantly for thinner cows (5.41 vs. 5.22; $p = 0.01$). There were not any significant differences between the protein composition of the milk from low and high BCS cows (3.12 vs. 3.12) and their milk SCS (5.69 vs. 5.74). Higher BCS cows had greater SCC than lower BCS cows, numerically and there may be a risk for incidence of mastitis in fatter cows, but as indicated there were not statistically significant differences between two experimental groups on SCC yield.

CONCLUSION

Despite the different findings about the effects of pre-calving BCS on milk yield of dairy cows, in this study, pre-calving BCS did not affect the milk yield of cows in their next lactation. In addition, dry period BCS had not any effect on milk protein and SCS, but

milk fat and milk lactose were increased due to pre-calving lower BCS. It is might be concluded that milk yield of Holstein dairy cows in early lactation is affected by many other factors that BCS is one of them.

REFFERENCES

Contreras, L. L., C. M. Ryan, and T. R. Overton. 2004. Effects of dry cow grouping strategy and pre-partum body condition score on performance and health of transition dairy cows. J. Dairy Sci. 87:517-523.

Domeq, J. J., A. L. Skidmore, J. W. Liyod, and B. Kaneene. 1997. Relationship between body condition scores and milk yield in large dairy herd of high yielding Holstein cows. J. Dairy Sci. 80:101-112.

Jefferies, B. C. 1961. Body condition scoring and its use in management. Tasmanian J. Agric. Min. Agric. 32:19.

National Research Council. 2001. Nutrient requirements of dairy cattle. Ed. Natl. Acad. Sci., Washington, Dc.

Otto, K. L., J. D. Ferguson, D. G. Fox, and C. J. Sniffen. 1991. Relationship between body condition score and composition of ninth to eleventh rib tissue in Holstein dairy cows. J. Dairy Sci. 74:825.

SAS Users Guide: Statistics, Version 8.2 Edition. 1999. SAS Inst., Inc., Carry, NC

Theurer, M. L., M. A. Mcguire, and J. J. Higgins. Relationship between body condition score and peak milk in Holsteins. 2003. J. Dairy Sci. 86:282 (Abstr.)

Wildman, E. E., G. M. Jones, P. E. Wagner, R. L. Bowman, H. F. Troutt, and T. N. Lesch. 1982. A dairy cow body condition scoring system and its relationship to selected production characteristics. J. Dairy Sci. 65:495.

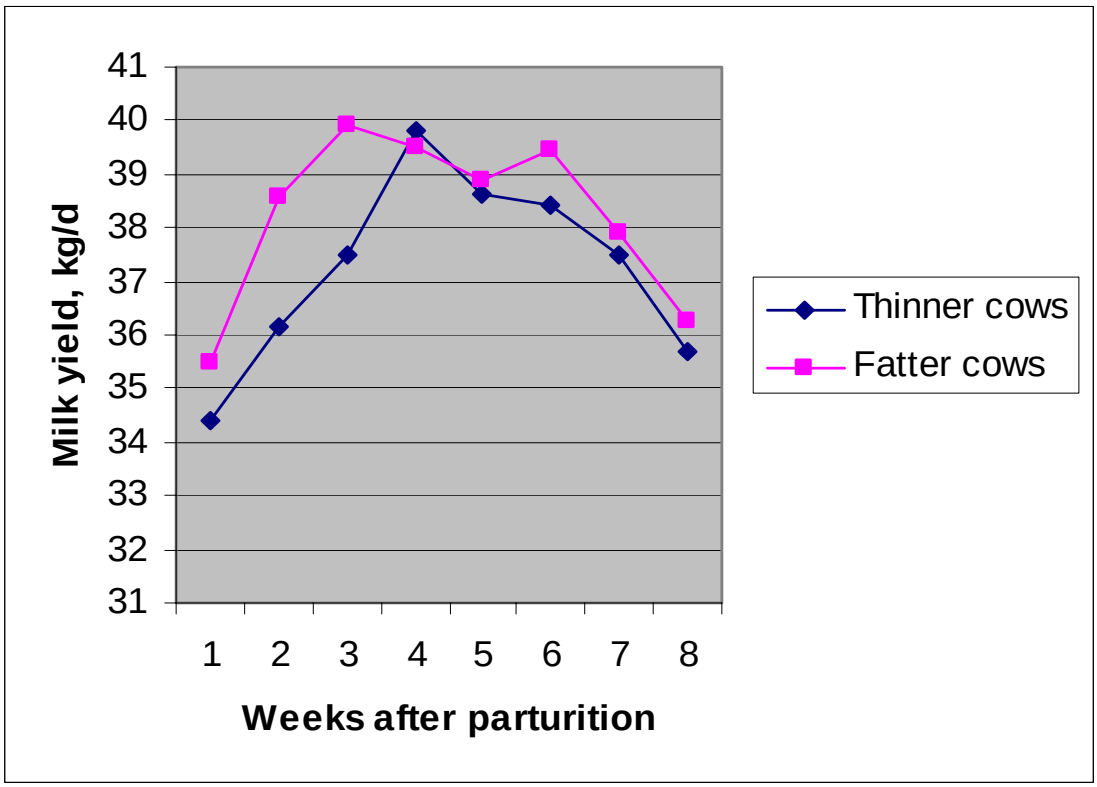

Figure 1. Effects of pre-calving Body Condition Score (BCS) on milk yield Of Holstein dairy cows