

Effect of farming system on energy balance of temperate crossbred dairy cows in early lactation: A case study conducted at Welimada Veterinary Division

W.N.B.A. Piyathissa¹, M.B.P.K. Mahipala², W.M.P.B. Weerasinghe³, S. Kasthuriarachchi⁴, S. Gamage⁵ and K.K.T.N. Ranaweera^{1*}

^{1*}*Department of Animal Science, Uva Wellassa University, Badulla, Sri Lanka*

²*Department of Animal Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

³*Veterinary Research Institute, Peradeniya, Sri Lanka*

⁴*Divisional Veterinary Surgeon's Office, Department of Animal Production and Health, Welimada*

⁵*Uva Provincial Department of Animal Production and Health, Badulla*

The early lactation period of dairy cows in Sri Lanka has been identified with negative energy balance (NEB) due to improper feeding strategies. Hence, the objective of the current study was to evaluate the energy balance of temperate crossbred dairy cows in early lactation reared under two management systems (stallfed and tethered) at Welimada Veterinary Division. Forty dairy cows in early lactation were selected for the study (stallfed, n=20, and tethered, n=20). The energy balance was evaluated using a serum metabolic profile. Blood samples collected (between 0900 to 1030 hrs.) from each cow were analysed for serum Non-esterified fatty acids (NEFA) and Beta-hydroxybutyrate (BHBA) contents and values were compared with reference ranges. Milk production, parity, days in milk (DIM), and amount of concentrate fed were recorded. The average DIM was recorded as 30.75 days. The NEFA content of cows in both systems (0.30 ± 0.05 vs. 0.39 ± 0.07 mmol L⁻¹) was below the upper critical limit of the reference range and no significant difference ($p > 0.05$) was observed between systems. Yet, the BHBA content of cows in the tethered system was significantly higher ($p < 0.05$) than its counterpart (0.81 ± 0.22 vs. 0.35 ± 0.06 mmol L⁻¹) and it was close to the upper critical limit (0.854 mmol L⁻¹). Higher BHBA contents indicate NEB conditions during early lactation. The number of concentrates fed to stall-fed cows was observed to be significantly higher ($p < 0.05$) than its counterpart (13.64 ± 0.42 vs. 4.46 ± 0.29 kg/cow/d). Similarly, stallfed cows indicated higher ($p < 0.05$) milk production (19.88 ± 0.26 vs. 6.93 ± 0.40 L/cow/d). Results revealed that only the tethered cows were affected with NEB status. The reasons for low milk production and NEB in tethered cows could be due to lack of energy intake which was indicated by the low amount of concentrate fed. Further research is warranted to identify methods for increasing the energy intake of tethered dairy cows at early lactation while considering the socioeconomics of the farming system.

Keywords: Beta-hydroxybutyrate, Milk production, Non-esterified fatty acids, Stallfed, tethered

Acknowledgement: This work was funded by National Research Council of Sri Lanka (Grant No: NRC TO-14-10)