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Effect of feeding total mixed ration (TMR) briquettes on plasma metabolites in early lactating dairy cows in Sri Lanka

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Abstract

The negative energy balance (NEB) in early lactating cows is associated with metabolic disorders. Plasma metabolites are one of the major indicators to monitor metabolic disorders and NEB. The objective of the study was to examine the effect of feeding a TMR briquette on plasma metabolites in early lactating dairy cows. Nine, Jersey × Sahiwal crossbred dairy cows (avg. body weight = 275±33 kg) in the second week of the third lactation were selected and assigned randomly to three treatments in a replicated 3 × 3 Latin Square Design consisting of three periods. Each period included 14-d diet adaptation followed by 21-d measurement period and was separated by 14-d washouts. Three treatments were control (CTL) - Guinea grass (*Panicum maximum*) + commercial cow feed, TMR1 and TMR2. Both TMR1 and TMR2 were formulated using different proportions of air-dried forages and agro-industrial by-products. At the beginning and end of each period, blood samples were drawn from the jugular vein of cows and plasma was separated. The plasma samples were analysed in triplicates for glucose, blood urea nitrogen (BUN), β hydroxybutyrate (BHBA), non-esterified fatty acids (NEFA), albumin (ALB), immunoglobulin (IgG) and calcium (Ca) by using assay kits following the manufacture's guidelines. Concentrations of plasma glucose, BUN, NEFA, ALB, IgG, BHBA and Ca were not significantly ($p>0.05$) different for cows fed with three different treatment diets. Plasma glucose levels of the present study (61.98 - 64.22 mg/dL) were considered as a better range for milk production. The BUN concentration (19.61 - 20.68 mg/dL) indicates sufficient protein contents in treatment diets. Low plasma NEFA contents of cows (8.14, 5.53 and 8.78 mg/dL for CTL, TMR1 and TMR2, respectively) indicate that they do not suffer from NEB. The concentration of ALB and IgG ranged within 1.69 - 2.10 mg/dL and 0.70 - 0.73 mg/dL, respectively. The BHBA concentrations were 3.80, 3.51 and 2.41 mg/dL in CTL, TMR1 and TMR2, respectively showing a lower risk of metabolic disorders. The plasma Ca contents ranged within 1.53 - 2.50 mg/dL. Since feeding the cows with formulated TMR briquettes did not negatively affect plasma metabolites, it is recommended to feed such diets to avoid metabolic disorders in early lactating dairy cows.

Keywords: Blood urea nitrogen, Metabolic disorders, Negative energy balance, Non-esterified fatty acids

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