METABOLIC EVALUATION OF THREE DIFFERENT TREATMENTS FOR PREVENTING DELETERIOUS EFFECTS OF THE NEGATIVE ENERGY BALANCE IN EARLY POSTPARTUM DAIRY COWS

Alejandra Barrera1, Felipe Cardoso2, Rómulo Campos3, Diego Thedy4, Felix Gonzalez5

1Universidad Federal do Rio Grande do Sul, Porto Alegre, Brazil, 2Animal Science, University of Illinois, Urbana, IL, USA, 3Ciencia Animal, Universidad Nacional de Colombia, Palmira, Colombia, 4Medicina Animal, 5Patologia Clinica Veterinaria, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

In early lactation dairy cattle suffer metabolic alterations caused by negative energy balance which predisposes to fatty liver and ketosis. The aim of this study was to evaluate the metabolic condition of high yielding dairy cows subjected to three treatments for preventing severe lipomobilization and ketosis in early lactation. Fifty four multiparous Holstein cows yielding >30 L/day were divided into four groups: control (no treatment), glucose precursor (propylene-glycol), hepatic protector, and energy supplement with salts of linolenic and linoleic acids. Blood samples were collected on days 0, 7, 14, 21, 28, 35, 42 and 49 postpartum. Body condition score (BCS) was evaluated at the same periods and milk yield was recorded at 2nd, 4th, 5th, 6th, 7th and 8th weeks of lactation. Evaluations in blood were concentrations of non-esterified fatty acids (NEFA), albumin, AST, β-hydroxybutyrate (BHB), cholesterol, glucose, protein, urea and triglycerides. Cut-off points for subclinical ketosis were defined when BHB ≥1,4 mmol/L and NEFA ≥0,7 mmol/L. General occurrence of subclinical ketosis was 24% during the period. An ascendant curve of cholesterol and glucose was observed from the 1st to the 8th week of lactation, while any tendency was observed with BHB and NEFA, although differences among treatments were detected. BCS decreased from a mean of 3,85 at 1st week to 2,53 at 8th week of lactation. Milk yield (L/day) of the groups along the period were: control 32.0 ± 6.8, propylene-glycol 30.3 ± 6.9, hepatic protector 31.2 ± 8.4 and essential fatty acids 38.5 ± 4.9. Compared with the control group, the treatment with hepatic protector did not show significant differences in blood biochemistry and milk yield. Cows receiving propylene-glycol and essential fatty acids showed higher values of NEFA, indicating accentuated lipomobilization. Supplementation with essential fatty acids resulted in significant higher concentrations of cholesterol, BHB, NEFA, urea, AST and lower values of glycemia. This performance may be explained by the highest milk yield. Treatments with propylene-glycol and hepatic protector do not improve milk yield, compare with control cows, but do not show metabolic evidence of ketosis, fat mobilization or fatty liver. The results suggest that essential fatty acids supplementation improves milk production but induces a higher negative energy balance leading to severe lipomobilization and ketone bodies production, increasing the risk of fatty liver.