

Blood metabolites in cows fed elephantgrass-based diets containing two types of sunflower oil associated with two methods of concentrate feeding

Fernando C. F. Lopes ^{*1}, Carlos G. S. Ribeiro ², Marco A. S. da Gama ¹, Mirton J. F. Morenz ¹, Norberto M. Rodriguez ², Carollina B. Alevato ³, Mariana M. de Almeida ⁴, Plínio de O. Fassio ⁵
^{*}Ruminant Nutrition Researcher, Embrapa Dairy Cattle; 610 Eugênio do Nascimento Street; Juiz de Fora, MG 36038-330 Brazil; ¹Embrapa Dairy Cattle, Juiz de Fora, MG; ²School of Veterinary of Federal University of Minas Gerais, CAPES, Belo Horizonte, MG; ³Embrapa Dairy Cattle, CNPq, Juiz de Fora, MG; ⁴Federal University of Juiz de Fora, CNPq, Juiz de Fora, MG; ⁵Federal Institute of Minas Gerais, Bambuí, MG
 * fernando.lopes@embrapa.br

Diet supplementation with plant oils rich in oleic and linoleic acid has been shown to improve the nutritional quality of milk fat in dairy cows. Under practical conditions, lipid supplements are usually mixed with other concentrate feeds and given to animals either during/after milking (as observed in grazing systems) or as part of total mixed rations (TMR). The latter has been shown to promote a more stable rumen environment as small amounts of concentrate are consumed along with the forage throughout the day. The present study aimed to evaluate the effects of the method of concentrate feeding (twice a day vs. TMR) on the concentration of blood metabolites in cows fed elephantgrass-based diets containing two types of sunflower oil (SO). Thirty-two ½ to 15/16 Holstein x Gir primiparous lactating cows (75 ± 31 DIM, 15.4 ± 4.8 kg day⁻¹ of milk and 444 ± 84 kg BW) were assigned to a 2 x 2 factorial treatment arrangement (two methods of concentrate feeding and two types of SO) in a randomized block experimental design. The two types of SO differed mainly in their oleic and linoleic acid contents and were classified as high oleic (72.6 and 10.4% of oleic and linoleic acid, respectively) and medium oleic (42.8 and 33.6% of oleic and linoleic acid, respectively). The SO was mixed with other concentrate feeds (ground corn, soybean meal, citrus pulp, minerals and vitamins) at 4.5% of diet DM. The concentrate mix containing high oleic or medium oleic SO was fed either twice a day after morning and afternoon milking or as part of a TMR (65F:30C, on a DM basis). Fresh chopped elephantgrass (70 – 90 days) was used as forage source and the trial lasted four weeks. Blood samples were collected from the coccygeal vein in 10 mL vacuum tubes containing EDTA after morning milking on the day 21. Plasma obtained after centrifugation (1,500 x g; 15 min) was stored at -20°C and analyzed for glucose, insulin, and NEFA concentrations using commercial kits. Statistical analysis was performed using the PROC MIXED of SAS (v. 9.0). Type of SO, method of concentrate feeding and their interaction were considered as fixed effects and cow as random effect. Differences were considered significant at P<0.05. There was no effect (P>0.05) of type of SO and method of concentrate feeding (or their interaction) on plasma concentration of glucose, urea and NEFA, which varied from 55.0 to 57.6 mg dL⁻¹, 42.5 to 48.0 mg dL⁻¹ and 0.167 to 0.200 mmol L⁻¹, respectively. The low NEFA values indicate no significant body fat mobilization, suggesting that the energy requirements of cows were met through the diets. Plasma glucose concentration fell within the normal range reported in the literature while urea plasma levels were slightly higher than expected which may be attributed to the relatively high dietary protein content (15.1%) in relation to milk production level. It was concluded that the feeding methods and the SO types tested were not able to influence the concentration of blood metabolites in an elephantgrass-based diet fed for lactating cows.

Keywords: glucose, non-esterificated fatty acids, *Pennisetum purpureum*, plant oil, plasma, urea

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*FERNANDES
JULIO*