Table 1. Evaporative cooling (EC) and vitamin E (VitE) for periparturient dairy cows

	Treatment					*P*-value		
Item	NCM	NCH	CM	CH	SEM	EC	VitE	EC × VitE
DMI, kg/d								
Prepartum	9.2	8.7	10.1	10.4	0.3	0.01	0.72	0.24
Postpartum	21.9	21.9	21.4	21.4	0.6	0.41	0.93	0.95
Milk, kg/d	31.7	30.4	33.2	34.5	1.1	0.01	0.98	0.25
ECM, kg/d	31.3	30.5	33.4	35.6	1.1	0.01	0.52	0.18
Fat, %	3.55	3.64	3.69	3.88	0.05	0.01	0.01	0.31
Protein, %	2.97	3.01	2.94	3.04	0.02	0.88	0.01	0.30
FCM/DMI	1.57	1.48	1.69	1.77	0.07	0.01	0.94	0.21
Respiration rate, breaths/min	67	71	42	44	3	0.01	0.33	0.73

Key Words: dairy cow, heat stress, vitamin E

W45 Macromineral maintenance requirements for Holstein young calves. J. P. P. Rodrigues*[1], J. C. M. Lima[1], M. I. Marcondes[1], M. Campos[2], F. S. Machado[2], A. S. Trece[1], M. M. D. Castro[1], B. P. Moreira[1], and P. G. Castro[1], *[1]Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil, [2]Embrapa Gado de Leite, Juiz de Fora, Minas Gerais, Brazil.*

The aim was to determine the calcium (Ca), phosphorus (P), magnesium (Mg), sodium (Na) and potassium (K) retention efficiency and maintenance requirements of Holstein calves from birth to 87 d of age. The comparative slaughter method was used. Fourty-2 male Holstein calves were utilized (3 d of age, 35.56 ± 5.86 kg). Thirty 2 calves were randomized in 4 diets (2; 4; 6; 8 kg of raw milk), with starter (20% CP; 80% TDN; 0.57% Ca; 0.46% P; 0.08% Na; 0.38% K; 0.34% Mg) ad libitum. Each treatment had 8 replications: 4 slaughtered at 57d and 4 slaughtered at 87d. Those animals with 58d were fed Coast-cross hay plus starter ad libitum after weaning. Dry matter intake was registered daily. After slaughtering, the digestive tract was cleaned and empty body weight (EBW) was obtained. Each animal was separated into carcass (CC) and non-carcass components (NCC; head, legs, tail, leather, blood, organs, viscera), both milled using a cutter and sampled after homogenization. The relationship between body weight (BW) and EBW was 0.886. The reference group was used to estimate initial EBW composition. The mineral composition from milk, starter, hay, CC and NCC was performed by inductively coupled plasma mass spectroscopy (ICP-OES). The retained minerals (RM; mg/kg EBW/d) were regressed on mineral intake (MI; mg/kg EBW/d), according to the model: RM = $\beta_0 + \beta_1$*MI. All parameters were tested using the mixed procedure (SAS 9.2). The β_0 values found were −103.41 ($P = 0.0147$); −13.52 ($P = 0.2999$); −0.829 ($P = 0.7241$); −5.595 ($P = 0.1382$); −0.738 ($P = 0.2381$) for Ca, P, Na, K and Mg, respectively. These values can be used as the maintenance requirements (mg/kg EBW/d), being the mineral loss when intake as equal to zero. The β_1 values were 0.804 ($P = 0.0087$); 0.419 ($P = 0.0005$); 0.216 ($P = 0.0009$); 0.119 ($P = 0.0047$); 0.0455 ($P = 0.0025$) for Ca, P, Na, K and Mg, respectively. Significance of all β_1 parameters suggests that the models use accurate minerals retention efficiency. Highest β_1 for Ca and P may be correlated with the high skeletal growth. The requirements for maintenance (mg/kg EBW/d) can be calculated as the module of β_0. Supported by CNPq/FAPEMIG/INCT CA/FUNARBE/CAPES/EMBRAPA.

Key Words: calcium, calf, phosphorus

W46 In vitro study on the effects of sodium-calcium malate and live yeast on ruminal fermentation and methane production. J. Alcañiz*[1], A. Ortiz[1], M. D. Carro[3], M. J. Ranilla[2], and J. J. Mallo[1], *[1]NOREL S.A., Madrid, Spain, [2]Universidad de León, León, Spain, [3]Universidad Politécnica de Madrid, Madrid, Spain.*

The objective of this study was to analyze the effects of sodium-calcium malate (MS), live yeast (LY) and their combination on in vitro ruminal fermentation and methane production (MP). A system of batch cultures of mixed ruminal microorganisms (BCRM) was used. Experimental treatments were control (no additives), sodium-calcium malate (MS), Live yeast (LY) and combination of both (MSLY). Bottles (120 mL) including 300 mg of a diet (40% forage: 60% concentrate) and 30 mL of a mix solution 1:4 of rumen fluid and buffer solution described by Goering and Van Soest (1970) were used for the incubation. Additives were added at dose of 9 mg MS/BCMR and 1.5 mg LY/BCMR. Bottles were incubated at 39°C for 16 h. At the end of the incubation period, total gas production was measured in each bottle using a pressure transducer and a calibrated syringe. A gas sample was removed from each bottle and stored in a hemoguard vacutainer before analysis for methane by gas chromatography. Bottles were uncapped, the pH was measured immediately, and samples were taken for volatile fatty acids, lactate and ammonia-N analyses. Incubations were replicated 4 times to allow statistical analysis. Data were analyzed using Proc Mixed of SAS. No differences were found between treatments on acetic, butyric, lactic, valeric acid (VA) and MP. PH was similar for all treatments. MS increased propionate (PR) compared with control (319 vs. 287 mmol, $P < 0.01$), reduced VA production (17.3 vs. 19.5, $P < 0.01$) and acetic:propionic ratio (A:P) (2.85 vs. 3.13, $P < 0.05$). LY reduced VA production compared with control (17.1 vs. 19.5, $P < 0.001$). MSLY increased PR (329 vs. 289, $P < 0.001$) isobutiric (17.5 vs. 12.3, $P < 0.001$), isovaleric acid (22.1 vs. 19.8, $P < 0.01$) and total production of volatile fatty acids (1570 vs. 1449, $P < 0.05$) compared with control. MSLY increased also the total ammonia production (229 vs. 202, $P < 0.001$) and reduced gas production (2851 vs. 2923, $P < 0.01$). With this experiment we concluded that combination of additives was the most effective treatment affecting a higher number of parameters. LY only affected VA and MS was the most effective treatment to reduce A:P ratio.

Key Words: malate, live yeast

W47 Yeast supplementation of lactating dairy cows during summer. G. G. S. Salvati[1], N. N. Morais Junior[1], F. F. Cardoso[1], A. C. S. Melo[1], M. Aronovich[3], R. A. N. Pereira[2], and M. N. Pereira*[1], *[1]Universidade Federal de Lavras, Lavras, MG, Brazil, [2]Empresa de Pesquisa Agropecuária de Minas Gerais, Lavras, MG, Brazil, [3]Empresa de Pesquisa Agropecuária do Estado do Rio de Janeiro, Niterói, RJ, Brazil.*

Dairy cows subjected to heat stress have reduced feed intake and increased reliance on glucose, making feeding strategies capable of improving diet digestibility plausible for improving post rumen nutrient flow and performance. The effect of yeast on digestion and performance of lactating cows during the warm summer months of southeast Brazil was evaluated. Cows were individually fed in tie stalls, THI was above 68 for 75.6% of the time. Twenty-eight Holsteins (207 ± 87 DIM) received a standardization diet for 14 d and then a treatment for 70 d, in a covariate adjusted randomized block design with repeated measures over time. Treatments were: Yeast (*Saccharomyces cerevisiae*, strain NCYC 996; Procreatin7, Lesaffre) or Control. Capsules of 10 g were orally dosed to each cow daily, equivalent to 25×10^{10} cfu of live cells and 5×10^{10} cfu of dead cells. The diet contained corn silage (37.7%), Tifton (7.1%), raw soybeans (4.1%), soybean meal (16.5%), corn (20.7%), citrus pulp (11.9%), 18.3% CP, 37.5% NDF,