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2012
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measures taken at closer time intervals. These relationships are inherent in animal growth data, which may disrupt the basic assumptions of statistical analysis, such as independence of errors. However, there is still controversy about which growth curve parameters normally used in the literature should be considered as random. This decision should be based on the biological interpretation of the parameters and significance of the estimated variance components. The goal of this study was to evaluate the nonlinear mixed model methodology for fitting the growth curves of dairy goat. Data used in this study were collected from the goat flock of the Universidade Federal de Viçosa, MG, Brazil, were used 12,573 records from 2,476 females. The models evaluated were the Brody, Van Bertalanffy, Richards, Logistic and Gompertz models. Random effects μ_1, μ_2, and μ_3 were linked to the β_1 (asymptotic value), β_2 (sigmoidal curve shape parameter), and β_3 (rate of maturing) parameters, respectively. In addition to the traditional fixed-effects model, we evaluated 4 combinations of random variables: all parameters linked to random effects (μ_1, μ_2, and μ_3), only the β_1 and β_2 parameters (μ_1 and μ_2), only the β_1 and β_3 parameters (μ_1 and μ_3), and only the β_1 parameter (μ_1). Residual variance and the Schwartz Information Criteria were used to evaluate the models. There was reduced residual variance in all scenarios in which random effects were considered. The Brody (μ_1 and μ_3), Van Bertalanffy (μ_1 and μ_3), and Richards (μ_1) models provided the best fit to the data. Interestingly, all 3 models have in common parameters with biologically significance linked to variance component significant ($P \leq 0.01$). A major advantage of using nonlinear mixed model methodology in fitting animal growth curves is the possibility of including population variation measurements in stochastic models to predict animal performance. Growth curves should be fitted using the nonlinear mixed model methodology, linking biologically parameters to random effects.

Key Words: stochastic, parameters, random effect

M281 Increasing doses of *trans*-10, *cis*-12 conjugated linoleic acid (CLA) and changes in milk fat content and secretion of dairy ewes. M. Baldin[1], R. Dresch[1], D. R. M. Alessio[1], J. Souza[2], M. A. S. Gama[3], M. P. Soares[4], and D. E. Oliveira*[1,5], [1]*Centro de Ciências Agroveterinárias, UDESC, Lages, SC, Brazil*, [2]*Esalq/USP, Piracicaba, SP, Brazil*, [3]*Embrapa, CNPGL, Juiz de Fora, MG, Brazil*, [4]*Instituto Federal Catarinense, Araquari, SC, Brazil*, [5]*Centro de Educação Superior do Oeste, UDESC, Chapecó, SC, Brazil.*

The aim of this study was to examine the relationship between milk fat depression and increasing levels of t10, c12 CLA fed as a rumen unprotected supplement (UnCLA, 29.9% of t10, c12) to dairy ewes. Twenty-three Lacaune ewes, 40 DIM, were used in a completely randomized design. Treatments were fed during a 14-d experimental period: Control (C): 30g of Megalac-E, n = 5; T1: 20g of Megalac-E plus 10g of UnCLA, n = 6; T2: 10g of Megalac-E plus 20g of UnCLA, n = 5 and T3: 30g of UnCLA; n = 7. The treatments provided 0, 2.99, 5.98 and 8.97 g/d of t10, c12 CLA, respectively. Ewes received after a.m. and p.m. milkings an isoproteic concentrate (1.0 kg/ewe/d) in which the fat supplements were added. Ewes were grazing paddocks of a tropical pasture. Milk samples were taken every 2d and on the last day of the experimental period for fat content and FA profile analyses, respectively. The relationships between milk fat and t10, c12 CLA-related variables were tested by linear regression analysis using the REG procedure of SAS, where Y is the variation observed in milk fat content or yield and X is the t10, c12 CLA in the diet or in milk fat. Outliers were removed from the data set. Milk fat content was decreased by 5.2, 14.1 and 26.5% and milk fat yield by 10.9, 17.9 and 26.8% in response to T1, T2 and T3, respectively. Inclusion of CLA linearly increased t10, c12 CLA content (C = 0.03; T1 = 0.10; T2 = 0.19; T3 = 0.30; $r^2 = 0.92$; $P < 0.001$) and t10, c12 CLA secretion (C = 0.03; T1 = 0.06; T2 = 0.12; T3 = 0.15; $r^2 = 0.95$; $P < 0.001$) in milk fat. Overall, estimated regression models (Table 1) show that the magnitude of milk fat depression increased linearly as t10, c12 CLA increased either in the diet or in milk fat.

Table 1. Estimated regression models

Predictors	Change in fat content (%)	Change in fat yield (%)
Dose of t10, c12 CLA (g/d)	$y = 6.97 - 2.87x$[1]	$y = -11.57 - 1.32x$
	$r^2 = 0.69$, n = 21	$r^2 = 0.44$, n = 18
Milk t10, c12 CLA (g/100g FA)	$y = 7.76 - 80.61x$	$y = -7.56 - 60.73x$
	$r^2 = 0.50$, n = 22	$r^2 = 0.84$, n = 14
Milk t10, c12 CLA (g/d)	$y = 7.46 - 143.13x$	$y = -10.11 - 73.05x$
	$r^2 = 0.43$, n = 23	$r^2 = 0.56$, n = 17

[1]All model coefficients were significantly different from zero ($P < 0.001$).

Key Words: CLA, milk fat

M282 Impacts of fat level and source on production of high producing California dairy cows. J. M. Soderstrom*[1], P. H. Robinson[1], and K. Karges[2], [1]*University of California, Davis*, [2]*POET Nutrition, Sioux Falls, SD.*

Addition of supplemental fat is common in total mixed rations (TMR) fed to high producing dairy cows, but these fats often have different saturations which influences their maximum dietary inclusion level. Unsaturated fats, especially those high in linoleic and linolenic acids, can affect rumen microbial activity leading to altered rumen biohydrogenation intermediates which can inhibit fat synthesis in the mammary gland. Saturated fats are less likely to affect rumen fermentation due to their high rumen stability. We determined if increasing net energy (NE) of a TMR with fat affects productive performance of high producing cows, and if unsaturated fat can be added at the same level as saturated fat without negatively affecting animal performance. The experiment was a 3 × 3 Youden square with 4 28 d periods and it was completed on a dairy farm using 3 high group pens (i.e., cows not yet confirmed pregnant), each with ~340 early lactation multiparity cows. All TMR were formulated with 75% of dry matter (DM) the same, mainly corn grain, wheat and sorghum silages, alfalfa hay, corn grain, canola meal, almond hulls and cottonseed. The other 15% of each TMR was 9% high crude protein (CP) (i.e., fat extracted) distillers dried grains with solubles (HPDDGS) and 6% beet pulp (BP) (diet LOWFAT); 15% DDGS (high fat diet with unsaturated fats: diet UNSAT); 11.1% HPDDGS, 2% BP and 1.9% rumen inert fat (high fat diet with saturated fat: diet RIFAT). The TMR had the same CP (avg. 17.3% DM), but fat levels were 3.8, 4.8, 5.0%. DM intake was highest for UNSAT ($P < 0.05$). Milk, fat and true protein yields, and milk energy output, were higher ($P < 0.01$) for RIFAT vs. UNSAT and LOWFAT. Milk fat % was lowest ($P < 0.01$) for UNSAT, highest for RIFAT and intermediate for LOWFAT. In contrast, true protein % was lowest ($P < 0.01$) for RIFAT. Change in body condition score was lowest for LOWFAT ($P < 0.01$). Whole tract digestibility of neutral detergent fiber did not differ among diets, but CP was higher for UNSAT vs. RIFAT ($P = 0.05$). Production performance and milk fat % were decreased by feeding unsaturated fat to increase diet NE but were increased by feeding rumen stable saturated fat.

Key Words: milk fat, saturated, unsaturated

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