Mineral requirements for maintenance of dairy goats during pregnancy

* UNESP Univ Estadual Paulista, Department of Animal Sciences, Jaboticabal, SP, Brazil 14884-900. †Corresponding author: harter.carla@gmail.com

Because the mineral requirements of pregnant dairy goats are not well defined, we investigated the net Ca, P, Mg, Na, and K requirements for maintenance during pregnancy. Fifty-eight dairy goats (Oberhasli and Saanen) carrying twin fetuses were assigned to groups based on slaughter day (80, 110, and 140 days of pregnancy (DOP)) and feed restriction (ad libitum, 20% and 40% feed restriction) in a randomized block design. Another eight pregnant goats (baseline animals) were slaughtered at 50 DOP to estimate initial body composition and to calculate mineral retention from 50 to 80 DOP (using comparative slaughter methodology). Goats slaughtered at 50 DOP were thus considered the reference for animals slaughtered at 80 d; goats fed ad libitum and slaughtered at 80 DOP were considered the reference for animals slaughtered at 110 d; and goats fed ad libitum and slaughtered at 110 DOP were considered the reference for the animals slaughtered at 140 d. The net maintenance requirements were estimated by regressing the daily intake of a mineral (g BW\(^{-1}\)) against the daily retention of the mineral in the maternal body (products of pregnancy were not considered) relative to BW (g BW\(^{-1}\)). The net requirement for maintenance was estimated as the mineral losses when mineral intake was set to zero. Mixed models with days of pregnancy, levels of feed restriction, breed and their interactions as fixed effects and blocks as random effect were used for data analysis using SAS (v 9.4; SAS Inst. Inc., Cary, NC). The net Ca, P, and Mg requirements for maintenance did not vary by breed or over the course of pregnancy. The daily requirements of Ca, P, and Mg for maintenance were 88.3, 50.9, and 4.48 mg BW\(^{-1}\), respectively. The net Na requirement for maintenance was greater in Saanen goats than in Oberhasli goats (P<0.05), and it increased as pregnancy progressed. Net K requirements also differed by goat breed (P<0.05). The Net K requirement for maintenance did not change (P>0.05) over the course of pregnancy in Saanen goats (10.6 mg BW\(^{-1}\)) or Oberhasli goats (7.09 mg BW\(^{-1}\)). The findings of this study will guide design of diets with adequate mineral content for pregnant goats throughout their pregnancy.

Key words: gestation, major mineral, Oberhasli, Saanen.

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