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Early detection of multifetal pregnancies in Alpine goats using pregnancy-associated glycoprotein (PAG) concentrations in milk [1]

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Abstract

Being able to confirm the number of fetuses in Alpine goats during early pregnancy will be beneficial for breeders to conduct appropriate feeding management based on the number of fetuses. Therefore, the purpose of this experiment was to determine the feasibility of pregnancy-associated glycoprotein (PAG) concentration in milk to predict multiple pregnancies in goats. 348 milk samples from Alpines goats with 33, 43, 49, 57, 65, 71, 78, 85, and 94 days of pregnancy for PAG concentration analysis. The proportion of Alpines goats with litter sizes of 1, 2, and 3 or more heads were 21, 71, and 8%, respectively. Receiver operating characteristic (ROC) curve analysis was performed to assess the area under the curve (AUC) of different thresholds of PAG concentration in milk at different days of pregnancy for multiple fetuses. The results showed that at day 49 and days 57 of pregnancy, the milk PAG threshold of 1.208 and 2.643 were used to determine pregnant goats with multiple fetuses, which area under the curve (AUC) were 0.903 and 1 respectively. Further analysis using Canonical Discriminant Analysis (CDA) on different thresholds of milk PAG concentration and days of pregnancy for discriminating between goats with multiple and single/twin fetuses were adopted to assess any significant difference between the two. The results showed that starting from day 49, Wilk's Lambda value was0.786, indicating significant difference in PAG concentration of milk from goats with multiple fetuses and single/twin fetus ($P < 0.01$). When the days of pregnancy reached 57 days, Wilk's Lambda value was 0.104, indicating highly significant difference in PAG concentration of milk from goats with multiple fetuses and single/twin fetus ($P < 0.001$). Therefore, milk PAG concentration could effectively differentiate between multiple and single/twin pregnancy from day 49 to 57 of pregnancy. In conclusion, days 49 to 57 of pregnancy are the ideal time for milk PAG concentration to detect and determine multifetal pregnancy in pregnant Alpine goats.

Key words: Alpine goats, Pregnancy-associated glycoprotein, Number of fetuses.

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