

CEREAL GRAINS FEEDING MANAGEMENT TO MODULATE METABOLISM IN PERIPARTURIENT SHEEP

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INTRODUCTION

Periparturient nutrigenomics management affects lactation health. Sheep is an easy-to-experiment ruminant increasingly and economically regarded as a working model for periparturient physiological studies. The objective of this study was to determine effects of periparturient dietary cereal grain management on ewe insulin efficiency and metabolism.

MATERIALS AND METHODS

Twenty cross-bred Afshari × Merino ewes (80.3 ± 2.0 kg body weight) were monitored in a completely randomized design study from 24 d prepartum through 21 d postpartum. Ewes were housed indoor in individual boxes (1.5×2.5 m) and fed once daily at 0900 h total mixed rations with either higher or lower concentrate levels based on either solely corn grain (CO) or 50:50 ratio of wheat and barley grains (WB), with a 2×2 factorial arrangement of grain level and grain source. Forage to concentrate ratio in the higher grain diet was 60:40 prepartum, and 50:50 postpartum; while being respectively 70:30 and 65:35 in the lower grain diet. Dietary forage included 3:1 ratio of chopped alfalfa hay to corn silage. The CO and WB diets were isoenergy, isoprotein, and isoNDF. Blood was sampled weekly. Data were analyzed as linear mixed models for repeated measures with best fit covariance structures.

RESULTS AND DISCUSSION

Provision of higher vs. lower WB (57.6 vs. 52.2 mg/dL) and not CO (56 vs. 55 mg/dL) increased plasma glucose concentrations ($P < 0.05$), respectively. Feeding CO vs. WB reduced periparturient plasma NEFA (0.25 vs. 0.28 mmol/L, $P < 0.05$), maintained plasma insulin (0.38 vs. 0.36 ng/L), and, thus, increased insulin to NEFA ratio (2.47 vs. 1.77, $P < 0.05$), suggesting improved insulin efficiency. Findings establish that cereal grains feeding management provides opportunities to modulate insulin efficiency, energy dynamics, and metabolism of periparturient sheep.

Keywords: Cereal grain, Insulin, Metabolism, Periparturient sheep

References

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