

# Effect of Transition Ration Energy and Fiber Levels on Subclinical Laminitis and Ruminal Acidosis in Holsteins Cows in Florida

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Subclinical laminitis (SL) has been identified to be a common problem in high producing dairy cows. The condition is characterized by solar hemorrhages in its early stages and a predisposition for sole ulcers and subsolar abscesses. Environmental as well as nutritional factors have been suggested as the most important causative agents in SL. Early postpartum cows undergoing acclimation from late dry to early lactating rations are thought to be the most susceptible to nutritional causes of subclinical laminitis due to repeated episodes of ruminal acidosis during this acclimation period. This research focused upon energy and fiber levels in pre- and postpartum (transition) rations to determine if various combinations of these nutrients would influence the subsequent rate of solar hemorrhages and ruminal acidosis in early lactating cows. All animals were housed in identical conditions of pasture prepartum and sand-bedded freestalls postpartum. Cows (n=98) were assigned to treatments in a continuous randomized complete block design with a 2 x 2 factorial arrangement of treatments. Treatments consisted of a late dry (springer) ration fed for 3 weeks prior to calving, and a lactating ration fed for 3 weeks postpartum. Rations varied in levels of net energy of lactation (NEL), acid-detergent fiber (ADF), and neutral detergent fiber (NDF). A ration with high levels of NEL and relatively low ADF and NDF was designated "HOT", while a ration with lower NEL and higher fiber levels was designated "COOL". For the prepartum springer rations levels of NEL (Mcal/kg), % ADF, and % NDF were 1.50, 30.7, 47.4 and 1.66, 23.2, 39.2 for the COOL and HOT rations, respectively, and 1.70, 22.4, 36.8 and 1.77, 17.5, 31.4 for the COOL and HOT lactating rations, respectively. Four treatment combinations resulted: HOT-

COOL, HOT-HOT, COOL-COOL, and COOL-HOT. All cows were fed a neutral ration after 3 weeks in lactation. Hoof scores were performed at 45 days prior to calving, and at 30 and 78 days in milk (DIM). Hoof scoring involved dividing each claw into 6 zones and evaluating the level of hemorrhages/ulcers on a 0 to 4.0 scale. In order to monitor ruminal acidosis, rumenocentesis was performed 14 days prior to calving and at 8, 22, and 70 DIM. Hoof scores among treatments were similar at 25 to 35 DIM ( $p>0.05$ ). The COOL-HOT group had significantly higher hoof scores ( $p<0.05$ ) than the HOT-HOT and the COOL-COOL groups from 55 to 75 DIM. By 85 DIM no treatment effect was seen. Overall least squares means rumen pH values for all collections were not different ( $p>0.10$ ) between treatment groups. However, the rate of ruminal acidosis ( $\text{pH} \leq 5.8$ ) for the 8 and 22 DIM collections was significantly higher ( $p<0.05$ ) in the postpartum HOT groups versus the COOL groups (0.58 and 0.66 versus 0.33 and 0.34, respectively). No direct correlation between lowest postpartum rumen pH and hoof scores on an individual cow basis was found ( $p>0.10$ ). In addition, clinical lameness and clinical claw disease through 150 DIM were not affected by treatment ( $p>0.10$ ). The ration treatment combination COOL-HOT resulted in the widest difference in energy and fiber levels between the springer and lactating rations; this group demonstrated somewhat higher solar hemorrhage scores for a transient period of time postpartum. Transition rations which permit late dry dairy cows to acclimate to the high energy rations of lactation need to be formulated to minimize abrupt changes in energy and fiber in order to lower the risk of SL in the first 3 months of lactation.

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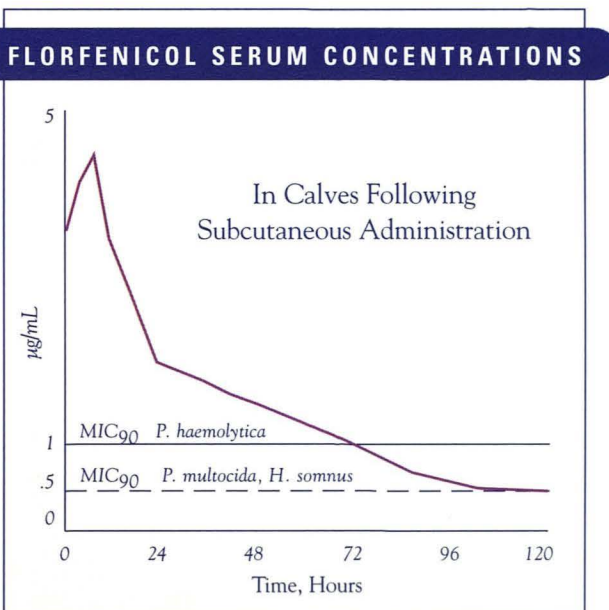
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