

Glucose precursor supplementation in Holstein and Jersey cows as a preventative treatment for ketosis in the transition period.

K. E. Mitchell *

✉ Author Affiliations

1. UC Davis, Davis, CA

Abstract

Glucogenic substances can help treat subclinical or clinical ketosis by lowering β -hydroxybutrate (BHBA) levels and raising glucose (Glu) levels. Subclinical ketosis is defined as BHBA \geq 1.0 mmol/L and Glu < 60 mg/dL and clinical ketosis is defined as BHBA > 1.2 mmol/L and Glu < 60 mg/dL. The objectives of this study are to determine if supplementation with a glucose precursor powdered product (GP; Glucose Booster; Stuhr Enterprises, LLC) during transition would decrease subclinical or clinical ketosis and have an effect on health and milk production of multiparous Jersey and Holstein dairy cows. Holstein ($n = 106$) and Jersey ($n = 105$) cows at a commercial dairy were systematically enrolled into either a control (C; odd-numbered ear tags) or GP (even-numbered ear tags) treatments. Glucose precursor was top-dressed on the prepartum pen (PreP) TMR and postpartum pen (PPost) TMR at a rate of 300 g/cow per day and mixed in using a pushup tractor. Cows were then allowed access to the TMR. Daily feed samples were pooled weekly and sent to Analab (Agri-King, Fulton, IL) for nutrient analyses. Weekly blood samples were analyzed for Glu (mg/dL) and BHBA (mmol/L) using NovaMax (Nova Diabetes Care, Inc., Billerica, MA). Weekly milk samples were taken to approximately 21 DIM followed by monthly tests. Holstein ($n_{GP} = 52$ and $n_C = 54$) and Jersey ($n_{GP} = 53$ and $n_C = 52$) data was analyzed using the MIXED procedure of SAS (version 9.4; SAS Institute 2015) with repeated measures by cow, parity as a random effect and fixed effects treatment, previous lactation milk fat and protein yield, period of lactation, and DIM. Jersey cows did not show a response to treatment. Holstein cows supplemented with GP increased production by 4.05 kg/d milk yield ($P = 0.0011$), 0.22 kg/d fat yield ($P = 0.0002$), and 0.12 kg/d protein yield ($P = 0.0042$) while on treatment. After treatment, GP Holsteins' production was still greater than that of C Holsteins by 2.45 kg/d milk ($P = 0.0487$), 0.08 kg/d fat ($P = 0.17$), and 0.08 kg/d protein ($P = 0.055$) until 120 DIM. Total number of health events in the first 60 DIM for GP Holstein cows decreased ($N_{GP} = 32$ and $N_C = 44$) and incidence of clinical and subclinical ketosis decreased by 15%. Holsteins and Jerseys responded differently to treatment; therefore, different breeds face different issues during early lactation. Holsteins tend to have a difficult transition period and are more likely to benefit from GP. For Holsteins, supplementation with GP prevented ketosis, decreased health events, and increased milk yield and milk component production.