

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

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## Abstract

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Glucogenic substances can help treat subclinical or clinical ketosis by lowering  $\beta$ -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.