



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

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Objectives

Determine if supplementation with a glucose precursor product (Glucose Booster, Stuhr Enterprises, LLC.; GP) during the transition period has an effect on glucose (Glu), beta hydroxybutyrate (BHBA) levels, health events, and milk production.

Background

Cows are at risk of ketosis in early lactation when ketosis incidence can be as high as 40%. Subclinical ketosis is estimated to cost around \$78 per cow (Geishauser et al., 2001). Clinical Ketosis is estimated to cost around \$375 per cow (McArt et al., 2015)

Methods

Multiparous Holstein ($n_{GP}=51$, $n_C=54$) cows at a commercial dairy were systematically enrolled into either control (C) or GP treatment. Cows in GP pens were supplemented daily with 300g/cow of GP. Weekly blood samples were tested for Glu (mg/dl) and BHBA (mmol/L) using NovaMax® Plus™ (Nova Diabetes Care, Inc., Billerica, MA)

- Subclinical ketosis is defined as <60 mg/dl Glu and ≥ 1.0 mmol/L BHBA

Daily drop and refusal TMR samples were taken and sent to Analab (Agriking, Fulton, IL) for analysis. Milk (yield, Fat %, Protein %) was tested weekly for the first 3 weeks of lactation followed by monthly tests. Data was analyzed using the MIXED procedure of SAS (v. 9.4, SAS Institute 2015)





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Health, Glu, and BHBA Results

Figure 1: LSM Glu and BHBA by week of lactation with SEM bars

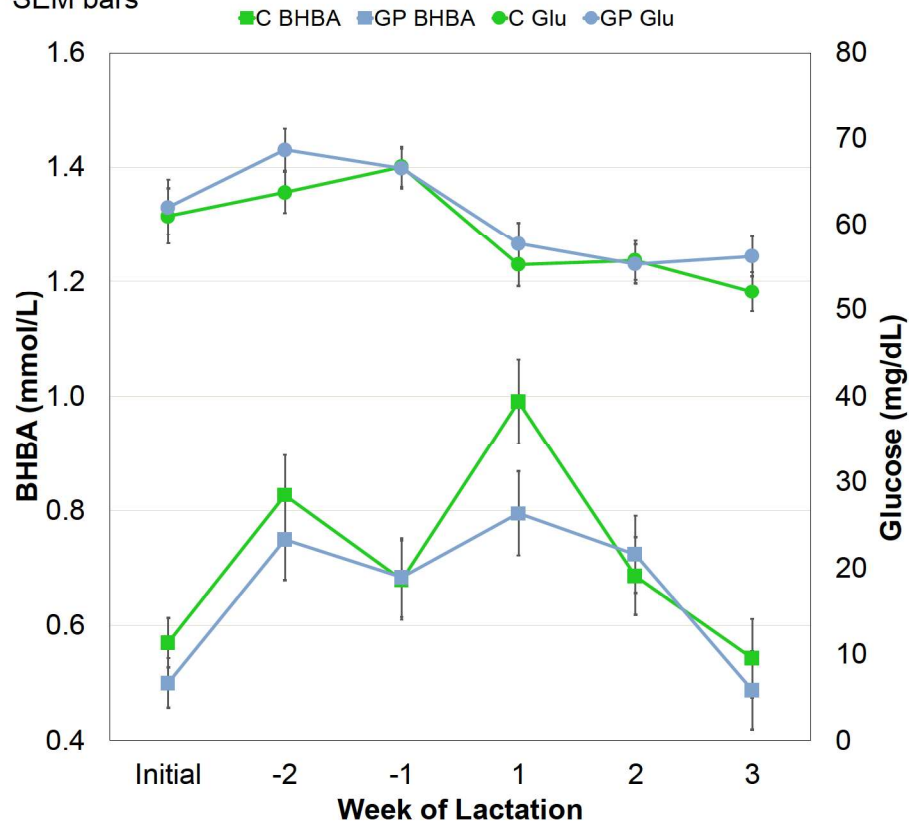
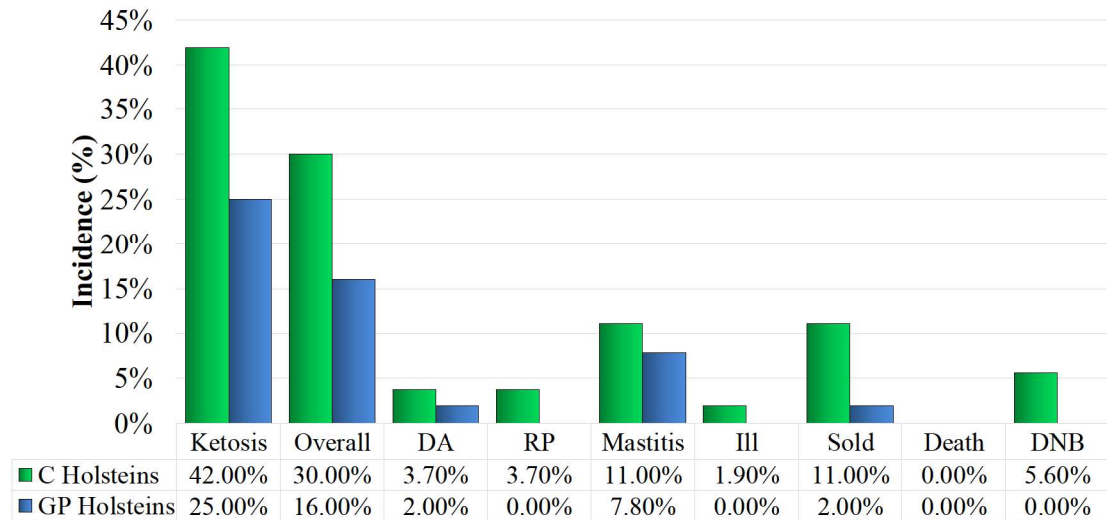


Figure 2: Ketosis and health events incidence in the first 60 DIM for Holsteins



¹Cows were counted once per event so chronic cows did not affect results

²DA = displaced abomasum

³RP = retained placenta

⁴DNB = Do Not Breed (cows that are set to be culled after the current lactation)

Health, Glu, and BHBA Conclusions

- Tendency for higher GP Holsteins to have higher Glu ($P=0.09$)
- GP Holsteins had lower BHBA only in week 1 ($P=0.008$).
- Supplementation with GP reduced incidence of ketosis ($P=0.14$) and health events ($P=0.05$).



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Milk Production Results

Figure 3: Milk yield for Holsteins

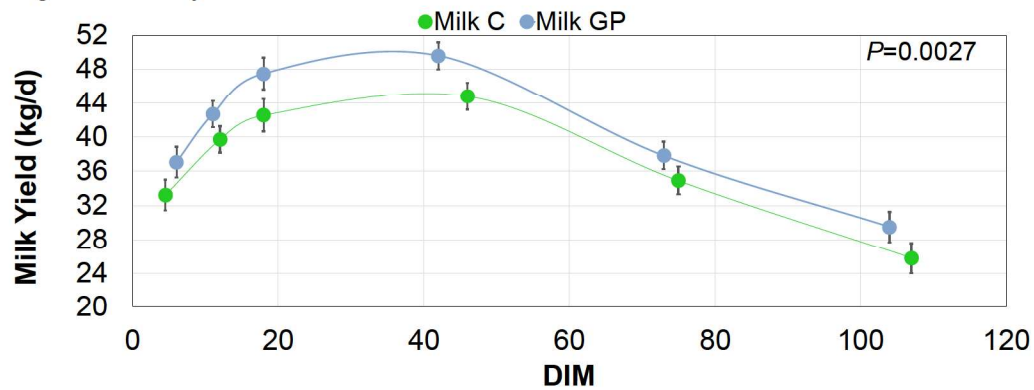


Figure 5: Component yield for Holsteins

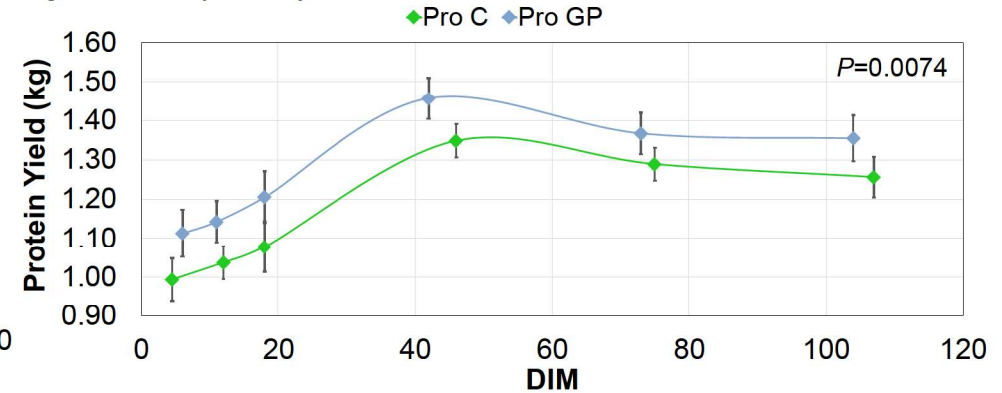
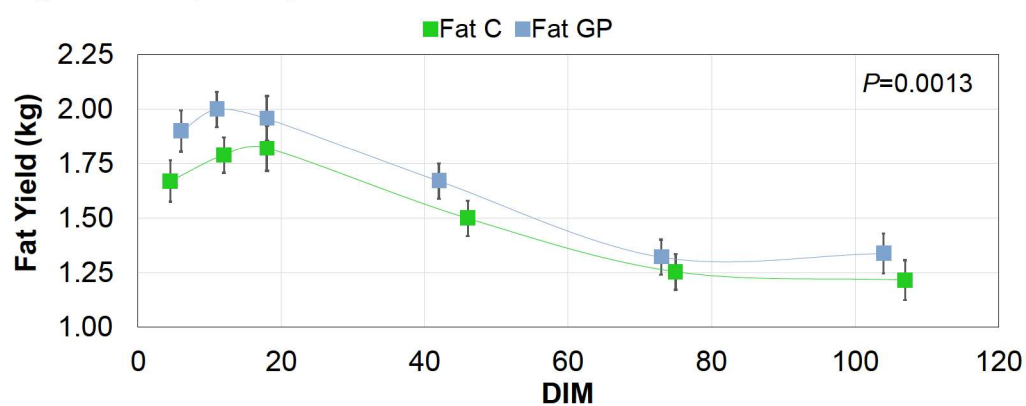


Figure 4: Component yield for Holsteins



Milk Production Conclusions

- During treatment, GP Holstein production was greater than C Holsteins by 4.1 kg/d milk yield ($P=0.0011$), 0.22 kg/d fat yield ($P=0.0002$), and 0.12 kg/d protein yield ($P=0.0042$).
- Post treatment, GP Holstein production was still greater than C Holsteins by 2.5 kg/d milk ($P=0.0487$), 0.08 kg/d fat ($P=0.17$), and 0.08 kg/d protein ($P=0.055$).
- This resulted in an overall increase of 6.49 kg/d more FCM and 6.41 kg/d ECM in the first 120 DIM for GP Holsteins.