



Abstract Summary

Title: Assessment of Rumen Protected Choline Supplementation on Milk Production and Blood Metabolites in Mid-Lactation Dairy Cows

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Objective: Characterize the impact of choline supplementation on production and blood metabolites in mid-lactation Holstein cows

Treatments:

- Multiparous Holstein cows (161 ± 3 DIM; n=64) were enrolled into a 56-day feed efficiency study and were randomly assigned to one of the following treatments:
 - RPC (17.7 g/d choline ion)
 - control (0 g choline ion)

Results:

1. There was no difference in DMI, body weight or body weight change between treatments.
2. Milk yield, milk components and ECM were similar between groups.
3. Residual feed intake and gross feed efficiency were similar between groups.
4. The RPC group had greater MUN, but BUN was not different.
5. Blood BHB, triglyceride, glucose, creatinine, alanine aminotransferase, and aspartate aminotransferase were similar between groups.
6. AST:ALT tended to be greater in RPC and albumin was lower in the CTL group.

Take Home Message: The benefits of feeding RPC during the transition period on postpartum milk energy output reported in the literature were not observed in mid-lactation animals in this study.



Full Abstract

Assessment of Rumen Protected Choline Supplementation on Milk Production and Blood Metabolites in Mid-Lactation Dairy Cows

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Choline is a key nutrient involved in methylation, phospholipid synthesis, and lipid metabolism. Although choline supplementation during the transition to lactation period has proven beneficial for health outcomes and production metrics, few studies have examined choline supplementation's impact on mid-lactation animals. Our objective was to characterize the impact of choline supplementation on production and blood metabolites in mid-lactation Holstein cows. Multiparous Holstein cows (161 ± 3 DIM; $n = 64$) were enrolled into a 56d feed efficiency study and randomly assigned to either concentrated rumen-protected choline prototype supplementation (RPC; 17.7 g choline ion; Balchem Corp.) or control (CTL; 0 g choline ion). Daily feed intake and milk yield were recorded electronically. Feed and milk samples were collected weekly. Body weights were taken at the beginning, middle, and end of the trial. Blood samples were taken in the final week of the trial. Data were analyzed using the PROC GLIMMIX procedures of SAS (v9.4). Results are reported as (mean [95%CI] CTL vs RPC). There was no difference in DMI ($31.5 [30.7,32.3]$ vs $31.1 [30.3,31.9]$ kg, $P = 0.47$), body weight ($P = 0.24$) or body weight change ($P = 0.45$) between groups. Milk yield ($51.9 [49.6,54.1]$ vs $50.1 [47.9,52.2]$ kg, $P = 0.25$), milk components ($P \geq 0.25$) and energy-corrected milk (ECM; $P = 0.54$) were similar between groups. Residual feed intake and gross feed efficiency were similar between groups ($P \geq 0.43$). The RPC group had greater MUN ($14.2 [13.7,14.7]$ vs $14.9 [14.4,15.4]$ mg/dL, $P = 0.05$) but BUN was not different ($17.4 [16.4,18.5]$ vs $17.7 [16.7,18.8]$ mg/dL, $P = 0.64$). Blood BHB, triglyceride, glucose, creatinine, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) were similar between groups ($P \geq 0.21$). AST:ALT tended to be greater in RPC ($3.9 [3.4,4.3]$ vs $4.4 [4.0,4.8]$, $P = 0.07$) and albumin was lower in the CTL group ($3.7 [3.7,3.8]$ vs $3.8 [3.7,3.9]$ g/dL, $P = 0.05$). The benefits of peripartum RPC supplementation on postpartum milk production and ECM reported in the literature were not observed in mid-lactation animals in the current study.

Keywords: Feed efficiency, energy corrected milk