

# Does Feeding Sugars Make Your Cows Sweet?

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High-starch diets increase dietary energy density, but often decrease rumen pH, dry matter intake (DMI) and milk fat content, and may not necessarily increase milk fat yield. Previous studies indicated that feeding sugar may not decrease rumen pH, and often increases DMI and milk fat yield. However, it is not known how type of sugar affects milk composition and animal performance. The objective of this study was to investigate effect of feeding different type of sugar on DMI, rumen fermentation and milk production of lactating dairy cows.

Twenty-eight multiparous lactating Holstein cows ( $141 \pm 50$  DIM;  $614 \pm 53$  kg of BW) were used in this study including 8 ruminally cannulated ones. Cows were assigned to four dietary treatments in a  $4 \times 4$  Latin square design. Control diet (CON) contained 27% starch and 4% sugar, high starch diet (STA) included 32% starch and 4% sugar, while two high sugar diets contained 27% starch and 9% sugar with sucrose (SUC) or lactose (LAC) as a supplemental sugar source. All diets contained 17% crude protein. Compared to CON, SUC diet had higher DMI (27.8 vs. 26.2 kg/d;  $P < 0.01$ ). In addition, both high sugar diets had higher DMI than STA (27.8 and 26.9 vs. 25.5 kg/d;  $P < 0.01$ ). There was no difference in minimum rumen pH or acidosis index among treatments, though LAC tended to have lower mean rumen pH than STA (6.17 vs. 6.32;  $P = 0.08$ ). Milk yield was not different among treatments, however, STA had lower milk fat yield compared to CON, SUC and LAC diets (1.26 vs. 1.36, 1.32 and 1.33 kg/d;  $P < 0.01$ ). In addition, compared to CON, STA tended to have lower milk fat concentration (3.51 vs. 3.67%;  $P = 0.08$ ). Milk protein yield tended to be higher for SUC diet than STA diet (1.32 vs. 1.26 kg/d;  $P = 0.08$ ). Moreover, both high sugar diets had higher CP concentration than CON (3.51 and 3.50 vs. 3.46;  $P = 0.04$ ). However, all STA, SUC and LAC diets had lower milk urea nitrogen (MUN) concentration compared with CON, (13.2, 12.9 and 13.3 vs. 14.5 mg/dl;  $P < 0.01$ ), which was probably due to more carbohydrate fermentation in the rumen for high-starch or high-sugar diets compared with CON diet, providing more energy for microbes to capture  $\text{NH}_3\text{-N}$ .

Implications: This study suggested that feeding high sugar diets to lactating dairy cows may not have negative effects on DMI and milk production, while feeding high starch diet decreased milk fat yield. In addition, feeding different type of sugar (sucrose or lactose) might not affect animal performance.