Amount and digestibility of NDF affects rumen nutrient pool sizes and passage kinetics of dairy cows

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INTRODUCTION
• Nutrient digestibility is a function of rate of digestion and passage
• NDF content is known to limit DMI of high producing dairy cows by contributing to gut fill
• Higher quality forage with improved NDF digestibility (NDFD) affects rates of digestion and passage, DMI, and milk yield
• Understanding how the amount and digestibility of NDF affect rumen pool size and turnover rate will allow improved feeding practices with higher quality forages

OBJECTIVE
To determine how the amount and digestibility of dietary forage, primarily from corn silage, affects intake, production, rumen NDF pool size and passage kinetics in lactating dairy cows

MATERIALS & METHODS
Experimental Design
• 4 x 4 Latin square (21-d periods)
• 13 d of dietary adaptation, 8 d of sampling
• 8 ruminally cannulated, multiparous lactating Holstein cows (88 DIM, 685 kg BW)
Diet Formulation
• 2 levels of forage – High (H) and Low (L)
• 2 sources of CS - Conventional (CCS) and BMR (BMR)
• Within forage level diets balanced on NDF basis, similar %NDF from CS
• LCCS – Low forage conventional corn silage
• HCCS – High forage conventional corn silage
• LBMR – Low forage BMR corn silage
• HBMR – High forage BMR corn silage

RESULTS
• The high forage diet of lower NDFD (HCCS) significantly reduced DMI and milk yield
• NDF intake was significantly higher on the HBMR diet
• Ruminal digesta mass (kg) and volume (L) was lowest for LBMR.
• HCCS diet had the lowest turnover rate, highest turnover time and lowest TTD of DM, OM, ADF, NDF cellulose and hemicellulose.
• Ruminal turnover rate of OM and NDF is higher for low NDFD forage-based rations (Low and High BMR)
• Ruminal turnover rate and TTD were reduced for low NDFD forages at a high rate of inclusion in the ration

IMPLICATIONS
• High NDFD forage-based rations have increased turnover rate of OM and NDF regardless of % forage in diet
• These nutritional considerations may affect the passage and digestion of other nutrients including starch, protein and fatty acids
• Optimal level of forage in TMR for production and rumen health will vary with quality of NDF (NDFD) and may be greater than 65% of ration