

## The Effect of TMR Variability on Herd Productivity

A recent study that appeared in the Journal of Dairy Science<sup>1</sup> takes an in-depth look at how the fed TMR compares to the formulated TMR (accuracy), daily variation of the TMR (precision), and variability of ration characteristics. Researchers collected TMR and refusals 7 days per month for two years on 22 dairy farms. Production data were collected from monthly DHI tests, during which TMR data were also collected.

The average TMR delivered exceeded formulated TMR for concentration of NEL, NFC, ADF, Ca, P, Mg and K and underfed for concentration of CP, NDF and Na. This could be caused by poor management/feeding protocols or training, thus giving large variations in TMR delivered compared to formulated. The greatest variability between fed and formulated was seen for ash, Ca, Na and trace minerals. It is important to note that some variations may be due to differences in grain portions of the ration that are not regularly measured, as the variation in nutrient composition of these ingredients is thought to be minimal.

Regarding physical properties of the ration, the variability from day to day was high for refusal rate, percent long, medium, short, and fine particles, and effective NDF. While other factors may affect refusal rate, variability in particle size would be attributed to manageable factors. In the study, researchers noted that improvements in milk yield and 4% fat-corrected milk (FCM) were associated with lower variation in percent long particles. In addition, they found that increased variability in particle size distribution resulted in milk with lower milk components.



In this study diets were fed more precisely than accurately as the variability from fed and formulated TMR was greater than day to day variation of the TMR. The daily variation of macronutrients in the TMR was limited but macro and trace minerals had a much larger variation. While it would be beneficial to minimize the daily variation in minerals, this may not be realistic as these can change due to changes in forages and/or sampling error of all ingredients. Milk yield and 4% FCM were positively associated with lower daily variations in NEL. Every 0.5 percentage increase in NEL coefficient of variation (CV) was associated with a 7 pound decrease in milk yield. Coefficient of variation was calculated as the ratio of the standard deviation to the mean, therefore it would take a much larger change in dietary concentration of NEL to influence the CV. Decreased variability in NEL is also associated with increased milk fat yield, while a decrease in the daily variation of dietary crude protein increased milk protein percent.

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Variation between fed and formulated TMR can be reduced through analyzing ingredients more often and comparing TMR analysis to what is formulated. The ability to monitor DM more intensively has increased over the years and there are now tools on the market that can give us DM of an ingredient in seconds. These advances in technology have allowed us to make changes immediately and help keep TMR more consistent. Overall, this research reveals that on average farms are doing a reasonably good job of keeping daily TMR variation low, but fed to formulated variation was slightly higher, yet not extreme. In cases where precision and accuracy of the TMR are in question getting an analysis of the TMR in conjunction with TMR particle size over several days may give an insight to the TMR actually delivered to the cows.

<sup>1</sup> Sova, A. D., S. J. LeBlanc, B. W. McBride, and T. J. DeVries. 2014. Accuracy and precision of total mixed rations fed on commercial dairy farms. *J. Dairy Sci.* 97:562-571.