NUTRITION NOTES
Innovation + Research from Kent Nutrition Group JULY 16, 2018

IMPROVED USE OF FORAGE TEST RESULTS

Dairy diets are made up of a combination of forage and grains. Depending on its quality, as much as 70% of what a dairy cow eats can be forage. At our mills we do routine quality control testing to determine the nutrient content of our grain and mineral ingredients. To balance the diets of high-producing dairy cows, our dairy nutritionists also need to know the nutrient content of each forage. Since the quality of forage is constantly changing, periodic sampling and sending to specialized forage labs is necessary. Remember, the purpose of our supplemental grains and minerals is to make up the difference between what is supplied by on-farm feedstuffs and what is needed to support targeted production. To accurately determine what is needed, it is necessary to know the nutrient content of each feedstuff. An inherent problem with forage testing is variability! Variation may be due to: true difference, analytical error, or sampling error. True differences can be due to changing: maturity, species, hybrid, or processing. Weiss and St-Pierre (2016) reported that analytical error is generally small, while sampling error can be quite large! When samples are split and subsamples analyzed, differences normally are minimal. However, if multiple samples are taken at the same time, test results can be very different. Therefore, using only one sample to balance a diet can result in development of a feed that doesn't properly supplement the forage. It may under or over feed nutrients.

Forages that contain a range of particle sizes are most difficult to sample. Corn silage is an example of this because it is made up of different size: stems, leaves, cob, and grain. A sample containing more of the grain fraction will test higher in starch and may result in a supplement formulated with too little starch. Weiss and St-Pierre calculated that about 40% of the variation when analyzing corn silage is due to sample error. Haylage wasn't much better, with about 35% of the variation due to sample error. No matter how carefully samples are taken, it is difficult to overcome the heterogeneous character of ensiled forages. On the other hand, fine ground grains contain particles of similar size making them easier to accurately sample. However, sampling grain and hay using specialized probes improves how representative the sample is.

Since it is apparent that one forage test doesn't tell the whole story, it is recommended that an average of samples taken over time is the best approach. Weiss & St-Pierre suggest the average of three samples taken over a two weeks best represents its "true" nutrient value. As samples are taken over time, unless a new silo is opened or records indicate different forage, averaging should continue. KNG's ration balancing software provides an electronic means of importing and averaging test results. Averaging can be simple, weighted, or exponential. Simple average is a non-weighted average where each sample is weighed the same. Weighted averaging assigns decreasing weights as samples become older. Exponential averaging applies weighting factors which decrease exponentially as the samples become older. This has the effect of enhancing the most recent test results.

Kent Nutrition Group uses a state of the art rumen model to balance dairy diets. Into this we enter quality grain and mineral ingredients that are subjected to rigorous quality control testing. We then enter the results of forage analyses done by accredited forage labs. Our goal is to combine grain ingredients, minerals, and forages to build an economic diet that best satisfies the nutrition needs of the high producing dairy. Our nutritional advisors then provide the management support to piece it all together. Now, by averaging forage test results we can advance and improve the effectiveness of our grain and mineral supplements.

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