methodology by publishing research on the relationship between gas fermentation and corn silage biomass yields — the other important fermentation end product.

He found an inverse relationship between gas production and microbial biomass yield when the variables were related to individual corn silages that had been integrated in a unit of time. This is due to differences in the metabolic pathway when the starch is processed as gas fermentation products, all of which enter the fermentation system, providing a high-energy product (acetate) for use as a diagnostic tool.

Blummel et al. proposed a parameterization of the rate of truly degraded substrate to gas production (Kd) is available for microbial growth when propionate is produced. The fermentation system is that without knowing which volatile fatty acids (VFAs) are being produced, the energy content from the fermentation process can also be accurately predicted. Several researchers have employed gas chromatography to detail VFAs produced from feedstuffs in making feed mixtures.

Recently, Chai et al. (2013) published equations for predicting the production of VFAs from feedstuffs and the variability of feed ingredients. He has spent the past 15 years developing, refining and field testing an online system (Photo), which, when combined with gas chromatography, has contributed immensely to the practical, on-farm utility of gas fermentation data.

The commercial release of RFS Technologies by Dairyland Laboratories (2010) and RFS Technologies (2010) marks the first time field nutritionists have had ready access to gas fermentation data for use as a diagnostic tool.

Using gas fermentation data

Johnston and Tricarico (2007) reported gas fermentation data (Table) of corn silages harvested across the U.S. and Canada from 2003 to 2006. Their data clearly illustrate the effects genetics and the growing environment can have on corn silage fermentation kinetics.

The bottom line of nutritional diagnosis

The promotion of gas fermentation data, like those available from the Fermentrics Gas Fermentation System, provides a directly measured estimate of the carbohydrate (B, B1, B2) digestion rates needed to more accurately populate feed libraries in ration-balancing software. Insight can also be gained (and benchmarks established) to avoid the nutritional perils of excessively rapid or slow gas fermentation (and extents) of carbohydrate fermentation.

Now that gas fermentation has entered the research lab and is available to consulting nutritionists, interpreting data and reviewing conclusions to practical on-farm solutions will require time and experience no different from what’s required following the introduction of other analyses such as physically effective NDF, ruminal volatile fatty acid (VFA) or kernel processing scoring. My few experiences with gas fermentation suggests that it can be a powerful diagnostic tool to assist nutritionists in making data-driven ration adjustments.

References


The summary

Feedstuffs.