

IMPROVING
DIGESTION
OF FORAGE NUTRIENTS



Improving Nutrient Digestibility to Enhance Forage Utilization in Lactating Dairy Cow Feeding Systems

This Digestion project is one of six main areas of research emphasis at the U.S. Dairy Forage Research Center

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Objectives:

1. Identify and measure plant chemical and physical characteristics and dietary interactions that may alter nutrient digestibility and excretion by lactating dairy cattle.
2. Determine the effects of level of intake and digestion kinetics on diet component digestibility with current industry-representative lactating cows.
3. Measure the impact of fermentative digestion on nutrient utilization, quantify the transformations of nutrients into end-products of fermentation, and use molecular techniques to characterize and quantify changes in populations of ruminal bacterial species as affected by diet and animal.
4. Develop an integrated system for evaluating forage genotypes and validate the usefulness of in vitro, in situ, and small ruminant digestibility in assessing the utilization of nutrients by lactating dairy cows representing current levels of production.

Approach:

1. The effects of PPO-modified plants, silage inoculants and lauric acid on protein utilization will be studied. Digestibility of corn silage with altered lignin/phenolic characteristics and alfalfa with down-regulated COMT and CCOMT to modify lignin will be evaluated with lambs and lactating cows.
2. Intake and digestibility from lactating cow trials will be compiled and digestibility of dry matter, fiber and soluble organic matter will be regressed on intake. Digestion kinetics will be measured on ration ingredients from trials.
3. In vitro fermentations using mixed ruminal microbes will be used to measure changes in digestion kinetics and microbial populations associated with direct-fed microbials, monensin, non-fiber carbohydrate sources, forage species, and pH.
4. In vitro, lamb, and lactating cow digestibilities will be compared to develop an integrated system for evaluating new forage genotypes.

U.S. Dairy Forage Research Center

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