

# Research Summaries

## DAIRY I

Moderators: Chris Chase and Jody Wade

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### Efficiency of Converting Nutrient Dry Matter to Milk in Holstein Herds

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#### Introduction

Production of milk from feed dry matter intake (DMI), called dairy or feed efficiency, is not commonly measured in dairy herds as is feed conversion to weight gain in swine, beef and poultry; however, it has relevance to conversion of purchased input to saleable product and proportion of dietary nutrients excreted. The purpose of this study was to identify some readily measured factors that affect dairy efficiency.

#### Materials and Methods

Data were collected from 13 dairy herds visited 34 times over a 14-month period. Variables measured included cool or warm season (high ambient temperature <21 C or >21 C [69.8 F], respectively), days in milk, DMI, milk yield, milk fat percent, herd size, dietary concentrations (DM basis) and kilograms of crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF) and forage. Season, days in milk, CP % and forage % of diet DM, and kilograms of dietary CP affected dairy efficiency.

#### Results

When evaluated using a model containing the significant variables, dairy efficiency was lower in the warm season (1.31) than in the cool season (1.40). In terms of

simple correlations, dairy efficiency was negatively correlated with days in milk ( $r = -0.529$ ), DMI ( $r = -0.316$ ), forage % ( $r = -0.430$ ), NDF % ( $r = -0.308$ ), and kilograms of forage ( $r = -0.516$ ), NDF ( $r = -0.434$ ) and ADF ( $r = -0.313$ ), in the diet, respectively. Dairy efficiency was positively correlated with milk yield ( $r = 0.707$ ). The same relative patterns of significance and correlation were noted for dairy efficiency calculated with 3.5% fat-corrected milk yield. Diets fed to the herds fell within such a small range of variation (mean  $\pm$  standard deviation) for CP % ( $16.3 \pm 0.696$ ), NDF % ( $33.2 \pm 2.68$ ) and forage % ( $46.9 \pm 5.56$ ) that these would not be expected to be useful to evaluate the effect of excessive underfeeding or overfeeding of these dietary components. The negative relationships of dairy efficiency with increasing dietary fiber and forage may reflect the effect of decreased diet digestibility.

#### Significance

Results of this study suggest that managing herd breeding programs to reduce average days in milk and providing a cooler environment for the cows may help to maximize dairy efficiency. The mechanisms for the effects of the dietary variables on dairy efficiency need to be understood and evaluated over a broader range of diets and conditions before more firm conclusions regarding their impact can be drawn.