



Feed Efficiency in Dairy Cows: Economic Impact and Nutritional Tools to Improve It

26 May 2025

Compiled answers from Prof. Michael Hutjens (University of Illinois) and Dr. Dorothee Bölling (IFCN Dairy Research Network)

SECTION 1: Prof. Michael Hutjens (University of Illinois)

WHAT ARE THE MAIN FACTORS AFFECTING FEED EFFICIENCY ON A DAIRY FARM?

Prof. Michael Hutjens: Any change in feed intake and/or milk production will change feed efficiency. The main factors are forage quality (improve forage intake and nutrient availability), days open (reflects getting cow back in another lactation), somatic cell count (reflects mastitis risk), and SARA (subacute rumen acidosis which can lower bacterial amino acid and volatile fatty acid production).

WHAT ROLE DO RUMEN-PROTECTED AMINO ACIDS LIKE LYSINE AND METHIONINE PLAY IN PROTEIN EFFICIENCY?

Prof. Michael Hutjens: Once the diet is evaluated using a rumen model which predicts microbial amino acid yield and amino acids from RUP (rumen undegraded protein), if either amino acid is deficient, it can limit milk protein yield, lowering protein efficiency.

WHAT IS THE ROLE OF ENERGY AND PROTEIN IN OPTIMIZING MICROBIAL PROTEIN SYNTHESIS IN THE RUMEN, AND HOW DOES IT INFLUENCE OVERALL FEED EFFICIENCY?

Prof. Michael Hutjens: Matching energy (e.g., sugars are rapidly available) with protein (e.g., urea which is rapidly available) allows rumen microbes to grow at an optimal rate. Starch is slower (depending on particle

size) and soluble fiber is slowest. By optimizing rumen fermentation, maximum yields of volatile fatty acids (VFA) and bacterial amino acids occur.

HOW CAN WE SPECIFICALLY FOCUS ON FEED EFFICIENCY IN THE TRANSITION PERIOD?

Prof. Michael Hutjens: The transition period includes 21 days prepartum to 21 days postpartum. Colostrum is produced in the close-up period and is not harvested; no feed efficiency calculation can occur. I recommend measuring dry matter intake (2% of the cow's body weight) and balancing the diet for nutrients needed for colostrum synthesis and fetal growth. For fresh cows, target feed efficiency under 2.0 kg of ECM per kg of dry matter intake.

HOW IMPORTANT IS THE MILK YIELD OUT OF ROUGHAGE WHEN ROUGHAGE IS GROWN ON THE FARM, WHEN IT COMES TO COSTS AND FEED EFFICIENCY?

Prof. Michael Hutjens: Roughage raised on the farm or purchased should be of high quality as it impacts feed intake and nutrient availability. For feed cost evaluation, include the purchase or market costs. Feed costs are not a direct factor in calculating feed efficiency. In Illinois, on-farm roughage typically costs half the market price and allows better control over quality and harvest timing.

WATCH MICHAEL HUTJENS' WEBINAR:





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SECTION 2: Dr. Dorothee Bölling (IFCN Dairy Research Network)

WHY IS IT IMPORTANT TO CONSIDER BOTH MILK YIELD AND FEED INTAKE WHEN EVALUATING FEED EFFICIENCY, AND HOW DO THESE FACTORS INFLUENCE CARBON FOOTPRINT?

Dr. Dorothee Bölling: Feed efficiency is usually defined as “milk yield in kg standardized milk” divided by “feed intake in kg dry matter.” A higher milk yield or lower feed intake improves feed efficiency. Increased feed efficiency lowers the carbon footprint per kg of milk, as it improves output for the same or lower input.

HOW DO REGIONAL DIFFERENCES IN FEED SOURCING (PURCHASED VS. HOMEGROWN) AFFECT THE FEED COST STRUCTURE AND ULTIMATELY FEED EFFICIENCY ACROSS THE STUDIED FARMS?

Dr. Dorothee Bölling: Feed rations vary: roughage is often homegrown (e.g., grass or maize silage), while concentrates are typically purchased. Homegrown feed is often cheaper and gives farmers more control. High feed efficiency depends on high-quality feed, regardless of its source.

WHAT ARE THE PRIMARY FACTORS INFLUENCING FEED EFFICIENCY ON DAIRY FARMS, AND HOW CAN THEY BE MANAGED OR OPTIMIZED IN DIFFERENT FARM SYSTEMS?

Dr. Dorothee Bölling: Feed efficiency depends on cow-related factors (age, genetics, health, pregnancy), environmental factors (housing, temperature, grazing), and nutritional factors (feed quality, amino acid profile, forage type). Optimal cow welfare, good environmental conditions, and a well-balanced, high-quality diet are key to improving efficiency.

IN SCENARIOS WHERE FEED INPUT REMAINS CONSTANT, HOW DOES INCREASING MILK OUTPUT AFFECT THE COST PER UNIT, FARM INCOME, AND CARBON FOOTPRINT PER KG OF MILK?

Dr. Dorothee Bölling: Milk is the main revenue source; feed is the main cost (40–85% of total cost). Higher milk output with constant feed input lowers cost per kg milk, increases income, and reduces the carbon footprint per unit of milk produced.

WATCH DOROTHEE BÖLLING’S WEBINAR:



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