Chr. Hansen welcomes you to the 4-State Pre-Conference

Title: Improving Feed Efficiency in Dairy Cattle

Bill Braman, PhD, PAS
Chr Hansen, Inc
We are

- A global supplier of bioscience based ingredients to the food, health, pharmaceutical and agricultural industries
- We mainly produce cultures and dairy enzymes, probiotics and natural colors
- Our leading market positions stem from innovative products and production processes, long-term customer relationships and intellectual property

Chr. Hansen scientists
Chr. Hansen in brief

- Founded in 1874 in Copenhagen by Danish pharmacist Christian D.A. Hansen
- Listed on NASDAQ OMX Copenhagen
- 2011/12 turnover EUR 699 million
- Organic growth ambitions of 7-9% annually
- Approx. 2,450 employees
Chr. Hansen globally

- Customers in approx. 140 countries
- Production facilities on five continents
- Subsidiaries and representative offices in 30 countries
Our business

probiotic capsules
Every day millions of people consume products containing our ingredients

- In food and beverages
- And in other applications:
  - Probiotics for dietary supplements, infant formula and pharmaceuticals
  - Probiotic feed additives and silage inoculants
Cultures & Enzymes
Division

- We develop and produce cultures, enzymes and probiotics for the dairy industry in particular

- ... and for the food industry in general - e.g. for wine and meat

- Our ingredients determine taste, appearance, nutritional value and health benefits

- We are the global market leader in dairy ingredients

- Actually... every other cheese in the world contains our enzymes

milk
Natural Colors Division

- We develop and produce natural colors for the food industry
- We focus on natural colors in:
  - Beverages
  - Confectionery
  - Ice cream
  - Dairy and fruit preparations
  - Prepared Food
- Our colors originate from natural sources like berries, roots and seeds
- We are global frontrunners in encapsulation and stabilization techniques
Health & Nutrition Division

- We develop and produce products for dietary supplements, pharmaceuticals, infant formula and animal feed

- Our key offering is probiotic cultures with documented effect
  - For humans
  - For animals

- We believe in strong research and documentation through clinical study program trials
Our innovation
Company presentation

freeze dried cultures
Customer driven innovation

- Our customers engage in more than 1,000 development projects with us every year
- Our customers have access to individually adjusted solutions
- Our customers get high quality standards
  - We have at least three audits per week globally
- Our customers get quick access to our global and local technology centers
A company built on science

- 14% of employees work in R&D
- Major basic research facilities in Denmark
- Development centers in Denmark, USA, France, Germany and Singapore
- 19 application centers worldwide
Our way
Company presentation

CHY-MAX enzymes
Improving food & health

- Our vision ‘Improving food & health’ expresses our promise to the market

- Our personality is the way we think and act
  - See; is about knowledge, insight and being present
  - Move; is about drive, decision making and change
  - Reach; is about will and determination and going the extra mile

- Our values - ambition, performance, accountability, teamwork and honesty - are the base of our business
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Improving Feed Efficiency in Dairy Cattle

Importance?

- Hutjens - Optimal range of 1.4-1.8 lbs. FCM/lb. DM intake
- Affected by days in milk, age, growth, changes in body condition score, body weight, forage quality,
- Influenced by feed additives and environmental factors that impact feed efficiency values.
- Feed efficiency has implications on the environmental-manure volume, N, P, etc.
- Improving feed efficiency almost always improves profitability
Defining Feed Efficiency in dairy cattle

- Gross feed efficiency is some ratio of feed required to produce a certain amount of milk

- How we define milk outputs and feed inputs leads to many different definitions of feed efficiency

- Milk output (yield) can be defined in many ways:
  - milk, fat, or protein yield
  - cheese yield potential (which in fact varies depending on what cheese is made!)
  - milk energy, etc.
  - milk dollars probably makes the most sense
Defining Feed Efficiency in dairy cattle

• Feed inputs can be defined in multiple ways:
  - Quantity of dry matter
  - Mcal gross energy (GE)
  - Predicted Mcal of digestible (DE),
  - Metabolizable (ME) or net energy (NE) estimated from combining some ration model with chemical composition
  - Dollars of feed might be the best, but least definable input.
  - Other methods?
Defining Feed Efficiency in dairy cattle

- Defining feed efficiency in an economic form is difficult, and not constant and involves:
  - Fluctuating market conditions
  - Biological issues related to feed production
  - Manipulations of cattle biology and herd structure.
Improving Feed Efficiency in dairy cattle

- **Purpose of Pre-conference**
  - Identify biological tools to improve:
    - Animal performance
    - Improve Feed Inputs

- **Speakers**
  - Dr. Mary Beth Hall - Improving rumen efficiency
  - Dr. Christer Ohlsson - Improving ensiled forage efficiency
Improving Feed Efficiency in Dairy Cattle

- **Purpose of Pre-conference**
  - Putting Feed Efficiency to work

- **Panel** - collecting/measuring, interpreting data, and implementing feed efficiency improvements on farm
  - Jim Barmore
  - Dr. Marty Faldet
  - Keith Sather