Nordic Feed Evaluation System

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NorFor scientific group
• A feed evaluation system for cattle
  • Net energy
  • Metabolizable protein
  • Feed intake

• Animal requirements and feeding standards
• Feed table
• Feed analysis and ring tests
• IT development
New feed evaluation system?

Key questions:

• What are the driving forces? Who wants a new system?
• Who are the customers?
• Who has the financial power to develop and operate a new system in a long term perspective

The Nordic dairy cattle advisory organisations
Changes in Nordic dairy cattle production

- Number of dairy farms has decreased (1990-2012)
  - Denmark ≈ 75% (3,800)
  - Sweden ≈ 70% (4,000)
  - Finland ≈ 70% (10,400)
  - Norway ≈ 60% (10,600)
  - Iceland ≈ 50% (660)

- Number of cows has decreased (1990-2012)
  - Denmark ≈ 20% (580,000)
  - Sweden ≈ 30% (345,000)
  - Finland ≈ 30% (280,000)
  - Norway ≈ 30% (240,000)
  - Iceland ≈ 15% (26,000)

A cost sharing strategy is important in development and implementation of a new feed evaluation system ➔ 12-14 mill €
NorFor is owned by

TINE
www.tine.no

Knowledge Centre for agriculture
www.vfl.dk

Växa Sverige
www.vxa.se

Farmers Association of Iceland
www.bondi.is
# Development of NorFor

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The four basic elements in NorFor

Biochemical

IT and data integration

National client. Ration formulation and optimisation

Production and feeding control
A semi-mechanistic feed evaluation system that:
- Takes into account interactions and non-linear relationships between animal characteristics, diet composition and feeding level when predicting nutritive values and animal performance

Standard vs. "real" feed value.
An individual feed has no fixed value

A ration evaluation system
Some model interactions

- Sugars+starch
- NDF degradation
- Energy
- Digesta passage
- Intake
- Microbial efficiency
- AA uptake
Biological elements in NorFor

The diagram shows the relationship between feed intake (kg DM/d) and MJ NEL per kg DM for two systems: NorFor and Static system. The feed intake ranges from 5.0 to 25.0 kg DM/d, and the MJ NEL per kg DM ranges from 7.80 to 6.30 MJ. The NorFor system has a downward trend in MJ NEL per kg DM as feed intake increases, while the Static system remains relatively constant.
Biological elements in NorFor

AAT = metabolizable protein
Biological elements in NorFor

Feed intake kg DM/d vs. Passage rate, %/h and NDF degradability:

- KP NDF
- NDF degradability

Efficiency, g/kg TOMD vs. Starch+"rest CHO", g/kg DM

- 10 kg DM
- 15 kg DM
- 20 kg DM
- 25 kg DM

Efficiency, g/kg TOMD vs. g AAT/MJ NEI

Amino acids
Milk protein
Amino aids
NorFor IT.
An Online and web-based system
The SNOPT™ Optimizer. A high performance non-linear optimiser.
Auto-balance a feed ration at the lowest possible cost
Performance speed: online, 100 individual cows, 5-10 sec
Possible variables: 112
- Ration cost: 1
- Feed intake: 7
- Energy: 9
- Protein and amino acids: 13
- Nutrients: 12
- Rumen metabolism: 23
- Total tract digestibility: 5
- Chewing time: 1
- Minerals: 23
- Vitamins: 7
- Nitrogen excretion: 4
- Climate: 1

NorFor standard
1. Ration cost
2. Fill value (feed intake)
3. Energy balance
4. Energy intake
5. AAT/NEL ratio
6. PBV
7. Fatty acids
8. Rumen load index
   (NDF degradation)
9. Degradable sugars + starch
Future

- Continuous development of the biological parts of the system
  - Move towards a substrate based system

- Integration with modern herd management systems
  - Biology and technology

- Develop response functions to better integrate production and economy
  - Marginal response functions

- International cooperation
Thank you for your attention