



# Influence of energy supply pre- and postpartum on performance and metabolic parameters in dairy cows

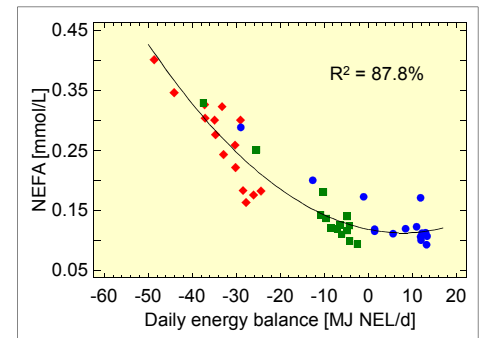
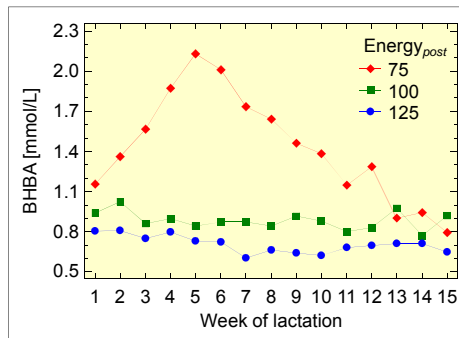
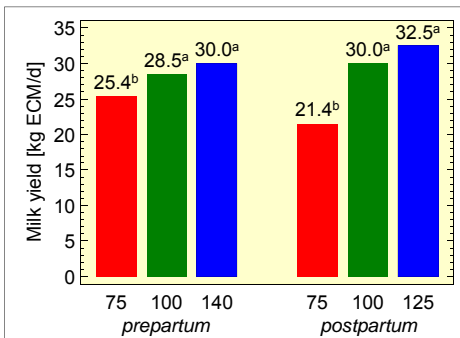
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## 1. Introduction

- Feeding in dry and transition period (energy supply) → crucial impact on performance, health and fertility in following lactation
- During early lactation generally negative energy balance → mobilization of body reserves, metabolic stress

## 3. Results (Main effects 1-105 d of lactation)

		prepartum			postpartum		
		75	100	140	75	100	125
DMI <sub>total</sub>	kg TM	17.9	18.8	18.8	13.7	19.4	22.4
Milk yield	kg	25.3	28.2	29.4	20.9	29.6	32.3
Milk fat	g/kg	4.17	4.24	4.28	4.41	4.21	4.07
Milk protein	g/kg	3.20	3.22	3.26	3.00	3.27	3.40
Glucose	mmol/L	2.8	2.8	2.8	2.5	2.9	3.0
BHBA	mmol/L	0.90	0.98	0.96	1.37	0.88	0.70
NEFA	mmol/L	0.15	0.17	0.19	0.26	0.14	0.13

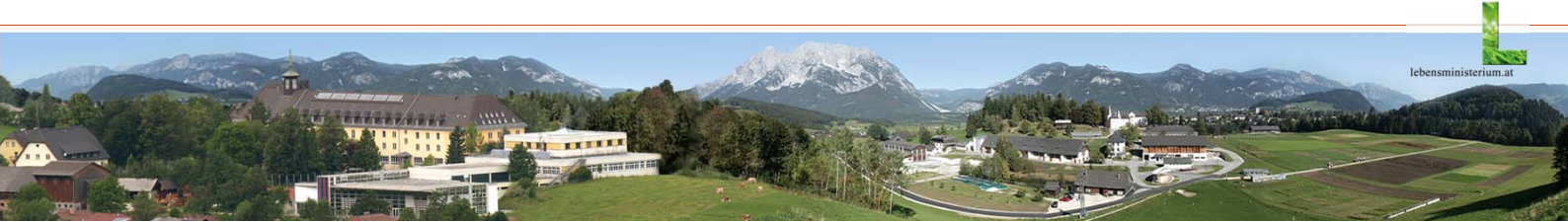
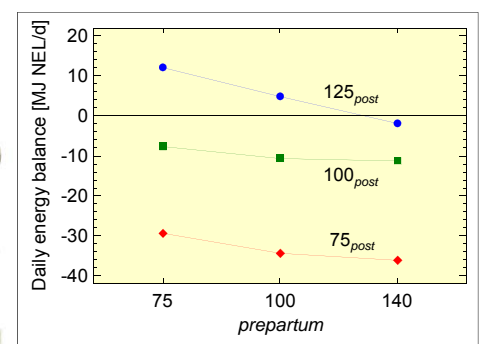


## 4. Conclusions

- Dietary energy supply below requirements (*pre-* and/or *postpartum*) → considerably lower milk yield, economic losses in milk production
- Energy level precalving → minor effects on milk components and metabolism parameters
- *postpartum* feeding according energy requirements – increasing negative energy balance → metabolic disorders (ketosis, fatty liver)

## 2. Materials & Methods

- 2-factorial feeding trial → 84 d before until 105 d after parturition (n = 81)
- Energy supply (according to GfE 2001)
  - » *prepartum*: 75 / 100 / 140%
  - » *postpartum*: 75 / 100 / 125%
- Dry matter intake restricted if  $E_{\text{intake}} > E_{\text{requirement}}$  (125<sub>post</sub> *ad libitum*)



## **Influence of energy supply pre- and postpartum on performance and metabolic parameters in dairy cows**

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During the transition period the metabolism of dairy cows undergoes tremendous challenges. Feeding strategies to minimize the disease incidence in the first weeks of lactation are needed. The objective of this study was to investigate the impact of different energy levels (E) before (PRE) and after parturition (POST) on performance and metabolism. Therefore 81 cows were used in a 2-factorial feeding trial ( $3 E_{PRE} \times 3 E_{POST}$ ) with diets meeting 75% (L), 100% (M) and 140<sub>PRE</sub>/125%<sub>POST</sub> (H) of their energy demands for 12 weeks before until 15 weeks after parturition. Procedure GLM of SAS was used for statistical analysis of milk production data, procedure MIXED for analysis of blood metabolites including weekly taken samples as repeated measurements.  $E_{POST}$  had the greatest impact on production and metabolism parameters. Energy corrected milk yield (ECM) was 21.4, 30.0 and 32.5 kg in groups  $L_{POST}$ ,  $M_{POST}$  and  $H_{POST}$ , respectively. Milk protein content was 3.00% in  $L_{POST}$ , 3.27% in  $M_{POST}$  and 3.40% in  $H_{POST}$ . The effect of  $E_{PRE}$  on milk yield also was significant (25.4, 28.5 and 30.0 kg ECM in groups  $L_{PRE}$ ,  $M_{PRE}$  and  $H_{PRE}$ ). Increasing negative energy balance when feeding dairy cows below recommended energy requirements led to significant changes in glucose (2.46, 2.93, 3.01 mmol/l in  $L_{POST}$ ,  $M_{POST}$  and  $H_{POST}$ , respectively),  $\beta$ -hydroxybutyrate (BHBA; 1.37, 0.88, 0.70 mmol/l), nonesterified fatty acids (0.26, 0.14, 0.13 mmol/l) and other metabolic parameters. Accumulation of ketone bodies in group  $L_{POST}$  was highest 4 to 6 weeks after parturition indicating ketosis. BHBA figures of group  $M_{POST}$  also reached subketotic levels.  $E_{PRE}$  had only minor effects on metabolic parameters. To avoid negative effects on milk production cows should not be fed below recommended energy requirements in the dry period whereas overfeeding increases risk of fatty liver postcalving.