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Effects of rumen stable amino acids in dairy cows – actual results from practical trials with methionine and lysine

Introduction

During the last decades, milk performance in dairy cows significantly has been increased. Improvements in genetics, management as well as especially feeding are, amongst others, the main reasons for this development. Especially a lower feed intake during early lactation is limiting microbial protein synthesis, leading to a higher importance of absorbable amino acids from undegraded feed protein in rations for high yielding dairy. Extensive trials and literature of the last decades highlight methionine to be the first limiting amino acid in corn silage-based rations, also due to an additional intermediary metabolic effect. However, increasing usage of rapeseed meal as well as/or valorisation products like e.g. brewer´s grain, grain distillers or corn gluten feed has become lysine to be the next important and limiting amino acid as well. This study therefore had the goal to assess the effect of rumen stable methionine and rumen stable lysine in rations with rapeseed meal and other co-products, on milk performance and milk components in lactating dairy in praxis.

Material and methods

- Dairy farm with app. 130 HF-cows in Northern Germany were divided in two groups, having access to one milking robot each
- Average milk performance of the herd was 10,500 kg/cow/year
- No silage change during trial period (February – May 2019)
- All animals received an enhanced PMR as well as compound feed via the milking robot (Ø 4.8 kg /cow/day) (table 1)
- Cows were pooled pairwise after first milk control (week 0) according to calving date and then observed between 15th and 160th day of lactation, over three milk control periods (5th/10th/14th week)
- Percentage of heifers in both groups was 41 %
- Cows calving during trial period were pooled pairwise according to calving day as well, being integrated into group results
- The calculated provision of intestinal absorbable amino acids (according to Schuba and Südekum, 2012) was 85 % (methionine) and 95 % (lysine) of the recommended levels
- The trial group received compound feed with 2.5 % of a combination out of rumen stable methionine and rumen stable lysine (BEWI-FATRIX® LM101) (table 2)
- Hence, cows of the trial group received app. 14 g of absorbable methionine and 14 g of absorbable lysine/cow/day

Components	kg fresh matter per cow and day	Analysed ingredients	
Corn silage	32	**Dry matter:**	364 g/kg
Grass silage	10	**Crude protein:**	150 g/kg DM
Brewer´s grains, ensiled	5	**Crude fibre:**	207 g/kg DM
Barley straw	0.3	**Starch:**	268 g/kg DM
Corn (dried)	1.4	**Calculated levels:**	
Rapeseed meal	1	**nXP:**	145 g/kg DM
Soybean meal (HP)	1	**NEL:**	6.7 MJ/kg DM
Dried pulp	0.3		
Minerals and vitamins	0.2		

Table 1: Composition and ingredients of the enhanced PMR

Components (%)	Control group	Trial group
Corn (dried)	25.6	25.0
Rapeseed meal	23.8	23.2
Dried grain co-products (DDGS)	13.3	13.0
Corn gluten feed	10.3	10.0
Palm expeller	12.3	12.0
Bran	7.2	7.0
Minerals/vitamins etc.	4.2	4.1
BEWI-FATRIX® LM101	–	2.5
Calculated levels:		
Crude protein	198 g/kg	200 g/kg
NEL	6.9 MJ/kg	7.2 MJ/kg

Table 2: Composition and ingredients of the compound feed

Results

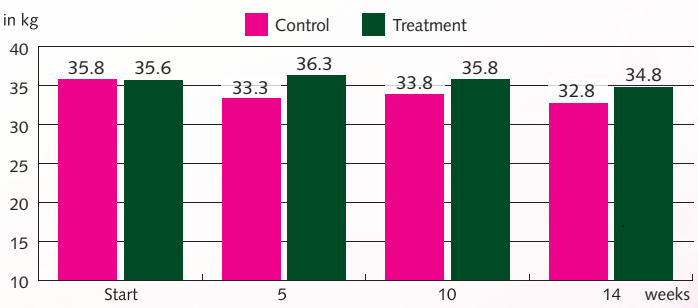

Figure 1: ECM, kg per day during trail period (weeks)

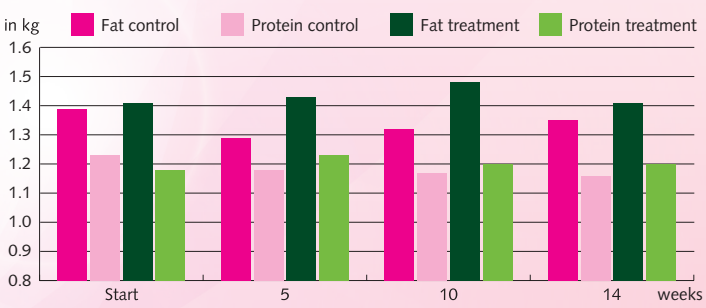

Figure 2: Fat and protein yield, kg per day during trail period (weeks)

Conclusion:

- The addition of rumen stable methionine and rumen stable lysine lead to an increase in milk performance of 2.3 kg. At the same time, an increase in milk fat synthesis of 0.12 kg/day was observed as well as a tendencial increase in milk protein yield.
- The effects of added rumen stable amino acids (methionine and lysine) in this study underline and confirm the importance of an adequate amino acid supply of dairy cows in case of rations where higher amounts of co-products are included.

Literature:

SCHUBA, J. u. K.-H. SÜDEKUM (2012): Pansengeschützte Aminosäuren in der Milchkuhfütterung unter besonderer Berücksichtigung von Methionin und Lysin. Übers. Tierernährg. 40, 113-149

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