

ProtiWanze® as protein supplement in rations for dairy cattle.

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Introduction

Distiller's grains with solubles (DGS) are co-products released during the production of bio ethanol. Because in this process the starch from the raw material, wheat or other grains is converted into ethanol, a protein-rich co-product remains. ProtiWanze®¹ is a liquid DGS from wheat ethanol production from starches, which has been included in rations for pigs and cattle. Feeding a liquid feed to dairy cattle is relatively new and requires also applicable storage possibilities. ProtiWanze® can be stored in a tank or silo, with pumped capacity to dose and mix this product within dairy rations. Because ProtiWanze® can be mainly used in a (total) mixed ration the product should be included into the basic feed mixture. Anderson et. al. (2006) concluded that DGS can partly replace ground maize and soybean meal commonly fed to dairy cattle. To date in Western Europe no studies have been performed comparing rations including ProtiWanze® with rations including traditional protein-rich feed materials such as soybean meal and rapeseed meal. In this study feed intake, milk yield and milk composition, body condition and live weight of dairy cows receiving rations with ProtiWanze® was compared with that of cows receiving a diet with a conventional protein-rich mixture of soybean expeller and rapeseed meal.

Material and Methods

The study was conducted at Research farm "Nij Bosma Zathe" from Wageningen UR Livestock Research in the period between April 19, 2010 and July 4, 2010. The trial consisted of a pre experimental period of 3 weeks and an experimental period of 8 weeks. Results from the pre experimental period were used to divide 32 lactating cows into two equal groups of 16 animals. The "Control" group received a protein supplement as a mixture of soybean meal and rapeseed meal (33% / 67% as product); the other group ("ProtiWanze") received ProtiWanze® as a protein supplement. The rations were iso-caloric (VEM) and iso-nitrogenous (DVE). The protein supplement was mixed in a partly mixed ration, which also consisted of maize silage, grass silage and a mixture of rumen-protected rapeseed meal and wheat². The partly mixed ration was fed on group level, which was supplied at the fence once a day. A concentrate mixture was provided up to individual requirements during milking and in computerised concentrate feeders. The average supply of concentrates was similar for both treatments. Cows were milked twice daily at 6h30 and 17h00. Milk yield at each milking was registered automatically. Each week, milk samples were taken during four consecutive milkings. Samples of both morning milkings were added to have one composite morning milk sample per cow; samples of both evening milkings were added to have one composite evening milk sample per cow. Each composite sample was analysed for milk fat, protein, lactose and urea. Live weight and body condition score (BCS) were determined simultaneously at the start of the pre-experimental period (wk 1), the start of the experimental period (wk 4), in week 7 and at the end of the experimental period (wk 11). Weekly averages from milk production have been statistically analysed using ANOVA taking into account block effects and using the data collected during the pre-experimental period as covariate.

¹ ProtiWanze® is produced by "Biowanze", Wanze, Belgium.

² Blendix is supplied by Hendrix UTD.

Results and Discussion

Average feed intake (Table 1), which was measured daily per group, was 22.2 and 22.3 kg dry matter (DM) per cow for “Control” and “ProtiWanze” respectively.

The daily inclusion of the protein supplement in the “Control” treatment was 1.8 kg DM (2.0 kg product of soybean and rapeseed meal). The daily inclusion of the protein supplement in the “Protiwanze” treatment was 1.8 kg DM (6.4 kg ProtiWanze®). Cows drank on average 119 and 118 l of water per cow per day, for “Control” and “Protiwanze”, respectively.

Table 1. Feed intake during the experimental period (expressed per cow per day).

Experimental period	Unity	Treatment	
		Control	Protiwanze
<i>Feed intake</i>			
Grass silage	kg DM	7.1	7.1
Maize silage	kg DM	6.6	6.6
ProtiWanze®	kg DM	0.0	1.8
Mix of soybean and rapeseed meal (Combi)	kg DM	1.8	0.0
Mix of rumen-protected rapeseed meal and wheat (Blendix)	kg DM	1.7	1.7
Concentrates	kg DM	5.0	5.1
Total	kg DM	22.2	22.3
Total	kg product	48.1	52.6
<i>Water intake</i>			
Water intake from feed	kg	25.9	30.3
Water intake by drinking	l	119	118
Total	kg	145	148

Table 2. Milk parameters during the experimental period

Parameter	Control	Protiwanze	Lsd ¹	P-value
Milk production, kg/day	31.8	31.4	1.7	0.65
FPCM, kg/day	32.7	32.7	1.7	0.96
Milk fat concentration, %	4.15	4.20	0.16	0.47
Milk protein concentration, %	3.54	3.61	0.06	0.06
Lactose concentration, %	4.49	4.52	0.08	0.17
Urea concentration, mg/kg	294	296	16	0.90

¹Lsd = Least significant difference.

Milk yield per cow per day averaged 31.8 kg for “Control” and 31.4 kg for “ProtiWanze” treatment (Table 2). No significant differences in milk yield, milk composition and milk protein production between treatments were observed. There was a tendency ($P = 0.06$) for a higher milk protein content (0.7 g / kg milk) on “ProtiWanze” treatment compared to “Control”. During the experimental period body weight increased on average by approximately 15 kg without a treatment effect. The increase in body weight was not reflected in increased Body Condition Scores of the cows. Calculated energy and protein balance indicated that both groups were fed due to feeding standards. From this trial we concluded that ProtiWanze® at a level of 8% of total DM intake in dairy rations results in similar animal performance compared to a mixture of soybean and rapeseed meal.

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References

Anderson, J.L., D.J. Schingoethe, K.F. Kalscheur and A.R. Hippen. (2006). Evaluation of dried and wet distillers grains included at two concentrations in the diets of lactation cows. *J. Dairy Sc.* 89: 3133-3142.