Effect of heat treated field beans on the performance of Swedish lactating dairy cows

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CONCLUSION

- ✓ This study suggests that in organic farming no improvement on lactation performance of dairy cows were achieved by the inclusion of heat treated FB or peas as compared to a control diet without any protein supplement, provided that RDP requirements are met.
- ✓ Only RSE supplementation resulted in an improvements in animal performance compared to the control diet.

INTRODUCTION

- ✓ In Sweden, the availability of organic protein feeds is rather limited (e.g. lack of soybean).
- ✓ In organic farming there is a high demand to use locally produced protein feeds for ruminants.
- ✓ Organic diets for dairy cows are to a large extent based on grasses and legumes with relatively high levels of rumen degradable protein (RDP).
- ✓ One alternative to increase microbial protein (MP) input is using protein-rich feeds that are artificially protected from ruminal degradation.
- ✓ The first objective of this study was to evaluate if the feeding value of heat-treated field beans (FB) could be improved.
- ✓ The second objective was to compare different protein supplements, which could be used in organic farming, on the performance of lactating dairy cows fed a grass silage based diet.

MATERIALS AND METHODS

- ✓ Twenty-four lactating Swedish Red cows 95 days in milk in a cyclic change-over trial with three 21-d experimental periods.
- ✓ The control diet consisted of grass silage and dried rolled barley [60:40, dry matter (DM) basis]. In the experimental diets, barley was replaced with rapeseed expeller (RSE; 104 g/kg diet DM), or isonitrogenous supplements of peas (232 g/kg diet DM), untreated FB (UFB; 140 g/kg diet DM), heat-treated FB (TFB; 140 g/kg diet DM) or heat-treated FB, providing the same dietary MP concentrations as UFB (TFB-MP; 80 g/kg diet DM).
- ✓ Heat-treatment of FB was done with a farm-based roasting equipment.
- ✓ Methane (CH4) and carbon dioxide emissions were measured with the GreenFeed system (C-Lock Inc., Rapid City, SD, USA).

GreenFeed to measure methane production

RESULTS

The effect of diet treatments on feed intake, milk yield and nutrient consumption of dairy cows

Item	Ration							Contrasts (P – value)				
	CON	RSE	Pea	UFB	TFB	TFB-MP	SEM	C vs. O	R vs. O	UFB vs. Pea	UFB vs. TFB-MP	UFB vs. TFB
DMI, kg/d	18.2	19.0	19.0	18.7	18.7	18.6	0.37	0.13	0.33	0.58	0.80	0.98
CP intake, kg/d	2.90	3.55	3.44	3.35	3.32	3.15	0.072	<0.01	<0.01	0.33	0.04	0.79
ECM, kg/d	24.6	26.6	24.9	25.8	25.8	25.3	0.91	0.18	0.17	0.40	0.97	0.62
Milk fat, g/kg	43.3	44.8	45.4	46.1	45.5	44.1	1.63	0.70	0.17	0.72	0.71	0.30
Milk protein, g/kg	37.6	37.3	36.6	36.9	36.9	37.5	0.53	0.07	0.049	0.29	0.44	0.07
Milk urea, mmol/L	3.01	3.79	3.94	3.90	4.42	3.57	0.154	<0.01	<0.01	0.16	0.80	0.03
CH_4, g/d	390	383	397	389	403	406	9.6	0.53	0.09	0.45	0.12	0.20