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The Performance of Finishing Cattle Offered High or Low Cereal-Based Concentrate Diets with or Without Mycosorb

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Introduction

Diets containing high levels of mycotoxins may have a negative impact on intake in both ruminant and non-ruminant species. Studies in non-ruminants have shown that the inclusion of yeast-derived glucomannans from the inner portion of the yeast cell wall can act as a mycotoxin binder in animal feed thereby reducing the scale of the negative impact of the myotoxins on the animal. However, there is insufficient information on the effects of Mycosorb (a yeast derived glucomannan) inclusion in the diet of finishing cattle. The following study aimed to determine the response by finishing cattle to the inclusion of Mycosorb in concentrate diets (high or low level of cereal inclusion) offered *ad libitum*.

Materials and Methods

Eighty, 20-month-old Friesian bulls, with an average starting liveweight of 585 kg were used. Animals were weighed and allocated on a liveweight basis following a 7-week pre-experimental feed acclimatisation period (*ad libitum* cereal-based concentrate diet) to the following treatments:

1. Barley, soyabean meal, molasses plus minerals and vitamins (CB)
2. Treatment 1 ration plus 1.0 kg Mycosorb/tonne (MB)
3. Palm kernel, citrus pulp, maize gluten, barley, soyabean meal, molasses plus minerals and vitamins (CP)
4. Treatment 3 ration plus 1.0 kg Mycosorb/tonne (MP)

Throughout the duration of the experiment (91 days) the bulls were accommodated on concrete slats within a naturally ventilated house. They were grouped by treatment (four pens of 5 bulls per treatment), with a pen area allowance of 3.5 m^2/animal. Each animal was offered 1 to 1.5 kg straw daily together with fresh water *ad libitum*. The ingredients, chemical composition and mycotoxin levels of the high and low cereal-based rations are presented in Table 1. The data for live and carcass data, feed intake and feed conversion efficiency were subjected to 2 way (2 x 2 factorial arrangement of treatments) analysis of variance as appropriate for a randomised complete block design. Treatment contrasts were made using the least significant difference procedure with p = 0.05.

Results

Concentrate dry matter intake was not significantly different between the high and low cereal diets (Table 2) and the inclusion of Mycosorb in the rations did not affect concentrate intake. Overall liveweight gain was not significantly different between the high and low cereal diets (Table 2) and the inclusion of Mycosorb in the ration did not affect liveweight gains (Table 2). In the period 1 to 42 days the high cereal diet supported a higher rate of liveweight gain compared to the low cereal ration, however, the trend was not sustained in the second half of the experiment.

Concentrate dry matter intake, liveweight gain and feed conversion efficacy was not significantly different between the high and low cereal diets (Table 2). In the period 1 to 42 days the high cereal diet supported a higher rate of liveweight gain compared to the low cereal ration, however, the trend was not sustained in the second half of the experiment (Table 2). The inclusion of Mycosorb increased the conformation score post slaughter (Table 2).

Conclusions

The inclusion of 1.0 kg of Mycosorb per tonne of concentrate feed did not affect concentrate intake, feed conversion efficiency, liveweight or carcass gain during a 91 day period when finishing bulls had *ad libitum* access to either a high or low cereal-based concentrate diet.

Table 1. Ingredient inclusion and chemical analysis of the diets (g/kg) and mycotoxin content (ppb)

	High Cereal	Low Cereal
Ingredient rates (g/kg):		
Rolled barley	795	200
Soya bean meal	140	100
Mineral and vitamins	25	25
Maize gluten	-	160
Citric pulp	-	250
Palm kernal expeller	-	200
Molasses	40	60
Oil blend	-	5
Chemical analysis		
Dry matter (g/kg)	831	872
Crude protein (g/kg DM)	165	176
NDF[1] (g/kg DM)	168	306
Ash (g/kg DM)	63	80
DMD[2]	868	847
Mycotoxin (ppb)		
Aflotoxin	0	10
Zearalerone	59	153
Fumonisin	150	730
Ochratoxin	0	15
T-2 toxin	0	44
Vomitoxin	0	1630

[1]NDF = Neutral detergent fibre; [2]DMD = Dry matter digestibility.

Table 2. Treatment effects on concentrate dry matter intake, liveweight gain and carcass characteristics of finishing cattle offered *ad libitum* high or low cereal-based diets with or without Mycosorb

	Treatment				sem			Significance		
	CB	MB	CP	MP	R	M	R x M	R	M	R x M
Initial weight (kg)	586	586	588	584	2.5	2.5	3.5	NS	NS	NS
Final weight (kg)	749	744	735	736	6.2	6.2	8.1	NS	NS	NS
Liveweight gain (g/day)										
1 - 42 d	2080	2070	1460	1750	87	87	122	*	NS	NS
43 - 91 d	1550	1450	1730	1590	69	69	97	NS	NS	NS
1 - 91 d	1790	1740	1600	1660	62	62	88	NS	NS	NS
Carcass characteristics										
Carcass gain (g/d)[1]	1105	1103	1014	1032	33	33	47	NS	NS	NS
Carcass wt. (kg)	394	393	386	386	3.4	3.4	4.7	NS	NS	NS
KO[2] (%)	52.5	52.8	52.6	52.5	0.21	0.21	0.29	NS	NS	NS
KC[3] fat (kg)	11.5	10.9	11.8	11.8	0.41	0.41	0.58	NS	NS	NS
Fat score[4]	3.51	3.53	3.29	3.45	0.061	0.061	0.086	NS	NS	NS
Conformation score[5]	2.08	2.50	2.25	2.30	0.070	0.070	0.098	NS	***	NS
Concentrate DM intake (kg)										
1 - 42 d	12.4	12.0	11.4	11.6	0.21	0.21	0.31	NS[1]	NS	NS
43 - 91 d	12.2	11.9	13.0	12.3	0.21	0.21	0.30	NS	NS	NS
1 - 91 d	12.3	11.9	12.2	12.0	0.20	0.20	0.29	NS	NS	NS
Feed conversion efficacy[6]										
Liveweight 1 - 91	6.9	6.9	7.8	7.2	0.26	0.26	0.36	NS	NS	NS
Carcass 1 - 91	11.1	10.8	12.2	11.7	0.33	0.33	0.46	NS	NS	

R = Ration; M = Mycosorb; R x M = Ration x Mycosorb

[1]Calculated by assuming an initial killing-out rate of 500 g/kg; [2]KO = Killing Out; [3]KC = Kidney and Channel; [4]Based on fat score 1 (leanest) to 5 (fattest);

[5]Based on E = 5; U = 4; R = 3; O = 2; [6]gDM intake/g gain.