TRITICALE AND WHEAT IN DIETS FOR FINISHING CATTLE

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SUMMARY

In two experiments, intake, growth rate and conversion ratio of young cattle fed triticale or wheat mixed with milled hay were compared. In experiment 1, diets containing 40, 60 and 80% milled grain were fed. In experiment 2, milled and whole grain were compared in diets containing 80% of triticale or wheat. The cattle were slaughtered on attaining 5mm fat cover over the 13th rib.

Growth rate was similar on all diets but intake and feed conversion ratio were higher on lower proportions of grain. Milling triticale did not affect intake, growth or conversion ratio to carcass weight while milling wheat resulted in similar growth rate but lower intake and feed conversion ratio. There were no cases of rumenitis or liver abscesses.

Key words: cattle, triticale, wheat, milling.

INTRODUCTION

Reports from the USA indicate that triticale is a useful feed grain for cattle. In comparisons of cattle fed triticale or barley (McElroy 1968; Lofgreen et al 1970; Males and Falen 1984) or triticale or wheat (Reddy et al 1975) intakes, growth rates and conversion ratios were similar on the different grains. Wheat and barley have been shown to be of similar nutritive value for finishing cattle (Morris et al 1969). Rapid introduction of cattle to cereal grains can cause acidosis predisposing them to rumenitis and liver abscesses (Jensen and Mackey 1979). Cattle on triticale based diets had higher incidence of rumenitis and liver abscesses than cattle fed other cereal grains (McElroy 1968; McCloy et al 1971; Dinusson et al 1973; Reddy et al 1975). Milling wheat (Arnett 1971; Axelsen et al 1979) and barley (May and Barker 1984) improved efficiency but Sishimuta et al (1977) reported that milling triticale did not affect growth or efficiency. Clarification is required of (i) the effect of feeding triticale with coarsely milled roughage on the incidence of rumenitis and liver abscesses and (ii) the need for milling triticale.

The health and performance of yearling cattle fed triticale and wheat based diets in two experiments are reported here. In the first, diets containing a range of grain to hay ratios were fed, and in the second whole and milled grains were compared.

MATERIALS AND METHODS

Triticale and wheat were fed to cattle in two experiments at Vasse Research Station, Busselton, W.A. In experiment 1 diets that contained milled grain and coarsely milled hay in the ratios 40:60, 60:40 and 80:20 were compared. In experiment 2 whole and milled grain in diets containing 80% grain were fed. The 80% milled grain treatment was common to both experiments.

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Fourteen month old Angus steers and heifers of mean fasted live weights 249 ±SD 16 and 218 ±SD 15 kg respectively and 18 month old Kimberley Shorthorn heifers of mean fasted live weight 203 ±SD 12 kg were fed. All cattle were fat score 1 (Ryan et al 1982) at the start of the experiments. Ninety six cattle were randomly allocated to eight treatments from within fasted live weight strata from each cattle type, treated with anthelmintic, implanted with a growth promotant and individually fed ad lib. in 100 m^2 pens. Fatness was assessed. ultrasonically (Greathead and Barker 1984) every 14 days and the cattle were slaughtered on attaining an estimated backfat cover of 5mm at the 13th rib. Fasted live weight, hot carcass weight, actual backfat thickness and incidences of rumenitis and liver abscesses were recorded at slaughter. Carcass weight gain was calculated as the difference between hot carcass weight and estimated initial carcass weight calculated from initial fasted live weight (McIntyre and Ryan 1982). The comparison of the Angus steers and heifers is reported in these proceedings (Barker and May 1988).

In vitro dry matter digestibility (DMD) of the grains and hay was estimated using the technique of McLeod and Minson (1978) preceded by an amylase digestion phase. The crude protein contents of triticale, wheat and hay were 11.3%, 12.2% and 14.0% and their DMDs were 85.2%, 83.4% and 49.4% respectively. Milled grains were treated by hammer-milling through an 9mm screen to crack most grains while minimizing flour production. The hay was milled through a 30mm screen to ensure that most particles were at least 10 mm long. The diets were made i&nitrogenous at 2.25% N by adding urea; they contained 33 ppm monensin and were mixed in a horizontal auger mixer. Limestone, superphoshate, salt and trace elements were added so that the diets contained adequate and balanced amounts of N, S, Ca, P, Na, Cu, Co and Zn. The cattle were gradually introduced to the diets over 12 days and feed intake was recorded daily. The data were adjusted by covariance to constant carcass backfat thickness at the 13th rib and analysis of variance was conducted to compare main effects and interactions of type and proportion of grain in experiment 1 and type of grain and milling treatment in experiment 2.

RESULTS

The animals were clinically normal and there were no cases of rumenitis or liver abscesses.. Performance of the. animals in experiments 1 and 2 is summarised in Tables 1 and 2 respectively.

Table 1. Effect of different ratios of both triticale and wheat in grain/hay diets on performance of young cattle.

	Type of grain			% grain in the diet				LSD
	Triticale	Wheat	p†	40	60	80	p†	p=.05
Days fed	76.1	76.9	.75	76.9	74.8	77.7	.62	
Intake (kg D.M./d)	7.8	7.4	.07	8.4	7.8	6.6	<.001	0.5
Relative intake ‡	3.0	2.8	.04	3.2	3.0	2.5	<.001	0.2
Live gain (kg/d)	1.02	0.97	.31	1.00	1.03	0.95	.47	
Carcass gain (kg/d)	0.74	0.72	.48	0.71	0.77	0.70	.15	
Live CR §	8.0	8.0	.99	8.8	7.9	7.2	.01	1.0
Carcass CR §	10.7	10.6	.60	12.0	10.3	9.9	<.001	0.8

† p = Significance level
‡ Relative intake = kg daily dry matter intake/100 kg live weight.
§ CR (conversion ratio) = kg feed dry matter/kg gain

In experiment 1 there were no significant interactions between grain type and proportion of grain in the diet. Performance of the cattle on the two grains was similar except that those fed triticale had a higher intake per unit live weight. Length of feeding period and growth rate were not affected by percentage of grain in the diet, but both intake and conversion ratio declined as the proportion of grain in the diet increased.

Table 2. Effect of milling triticale and wheat on performance of young cattle

	Main effects					
	Type of grain			Process		
	Triticale	Wheat	p	Whole	Milled	p
Days fed	78.6	76.8	.39	79.2	76.2	.18
Live gain (kg/d)	1.05	1.03	.77	1.05	1.03	.75
Carcass gain (kg/d)	0.70	0.70	.90	0.69	0.71	.61

	Interactions					
	Whole		Milled		Interaction	LSD
	Triticale	Wheat	Triticale	Wheat	p	p=0.05
Intake (kg D.M./d)	7.2	8.1	7.0	6.3	.002	0.7
Relative intake	2.8	3.1	2.7	2.4	<.001	0.2
Live CR	7.9	8.2	7.2	7.1	.613	1.0
Carcass CR	10.5	12.0	9.9	9.2	.029	1.4

In experiment 2 neither type of grain nor processing treatment affected length of feeding period or growth rate. Conversion ratio to live weight was reduced from 8.0 to 7.2 by milling (p=.021) but did not differ between grains. There were significant interactions between type of grain and processing treatment for intake, intake per unit live weight and conversion ratio to carcass weight. Hilling wheat reduced both intake and conversion ratio to carcass, but milling triticale did not significantly affect these parameters.

DISCUSSION

No health problems were encountered when young cattle were fed diets of up to 80% triticale grain with coarsely milled hay. This suggests that the high incidences of rumenitis and liver abscesses reported in the USA (McElroy 1968; McCloy et al 1971; Dinusson et al 1973; Keddy et al 1975), when diets of similar composition were fed, were not a consequence of feeding triticale per se. The nutritive value of the triticale was similar to wheat and the performance of the cattle fed the wheat based diets was similar to that previously reported in Australia (Morris et al 1969; Pryor and Lawes 1972; Axelsen et al 1979).

The high intakes and good growth rates and conversion ratios recorded on the diets containing up to 60% moderate quality hay were consistent with those recorded in previous experiments (Fiay and Barker 1983).

The similar performance of cattle fed whole and milled triticale agrees with the finding of Nishimuta et al (1977) and contrasts with the large effects of milling wheat upon intake and conversion ratio. The reduced intake and similar growth rate of the cattle fed milled compared to whole wheat were similar

to the findings of Arnett (1971) and Axelsen et al (1979) and contrast with the similar intake but increased growth rate reported for cattle fed milled compared to whole barley (May and Barker 1984). All agree that feeding whole barley or wheat is associated with a large increase in feed conversion ratio. The possibility of feeding whole triticale with little or no decline in growth or efficiency is an important consideration when comparing the value of cereal grains as cattle feed.

We conclude that (i) triticale does not cause rumenitis or liver abscesses if fed with at least 20% coarsely milled roughage and (ii) triticale and wheat are of similar feed value for finishing cattle when fed milled but, though milling wheat is necessary for its efficient utilization, milling triticale is of doubtful benefit.

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