

## MANIPULATION OF BODY COMPOSITION IN CATTLE BY DIETARY MEANS. I. EFFECT ON CARCASS WEIGHT AND SUBCUTANEOUS FAT IN YEARLING HEIFERS.

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While avoiding production of undesirable excess carcass fat in cattle should be an ultimate objective, it becomes a difficult goal to achieve when fluctuations in the time for marketing are seen as real opportunities by producers in the south western of WA to improve returns. If extended periods of feeding could be implemented without over fattening cattle and maintaining carcass weight, the above two objectives would be achievable. A trial was conducted with yearling beef heifers to study the biological feasibility of maintaining carcass weight while using body fat as a source of energy.

Forty Angus x Friesian yearling heifers with an initial liveweight of 283(+18.3 kg) were allocated in groups of two and three head to 15 pens. All animals were fed ad libitum on a common high grain mixed diet (barley 80%, hay 18%, urea+salt+minerals 2%; CP 13.3 %, ME 10.7 MJ/kg DM) for up to 105 days in order to fatten them to a common level of subcutaneous fat level (P-8 site). As P-8 values reached 11-12 mm, heifers were allocated to one of five treatments: a initial slaughter group and four treatments for a further 30 or 45 days: two "fattening" regimes (G30 or G45, respectively), a continuation of the high energy grain diet and two "lean" regimes of fishmeal (1kg/h.day) plus hay ad libitum (FM30 and FM45, respectively) aimed to provide a sub-maintenance level of energy with a high level of undegradable protein. Liveweight changes and subcutaneous fat (P-8 site, by real-time ultrasound scanner) were recorded fortnightly. Individual hot standard carcass weights and final fat depth at the P-8 site were obtained at slaughter in an accredited abattoir.

All the fishmeal was consumed within three to four days of introduction. The feeding of fishmeal plus hay for 30 and 45 days maintained the carcass weight estimated to be present at the beginning of the treatments, while it caused a reduction in the rate of body fat deposition. The extended feeding of grain produced an increase in carcass weight and fat. Results are shown below (mean  $\pm$  sem; n=8):

Items	G30	FM30	G45	FM45
Live weight:				
Initial, kg	398 (4.2)	388 (9.9)	379 (11.3)	377 (10.3)
Final, kg	425 (3.5)	403 (8.8)	410 (9.9)	402 (10.6)
Change, kg/d	1.07 (0.17)	0.57 (0.23)	0.81 (0.09)	0.65 (0.13)
Hot standard carcass weight :				
Initial *, kg	206 (2.4)	200 (5.6)	195 (6.4)	194 (5.8)
Final, kg	222 (2.2)	205 (5.5)	220 (5.4)	199 (6.1)
Gain, kg	16.4 (2.6)	5.3 (3.2)	24.7 (2.1)	5.0 (2.7)
Change, kg/d	0.55 (0.09)	0.18 (0.11)	0.55 (0.05)	0.11 (0.06)
Subcutaneous fat (P8 site):				
Initial +, mm	11.4 (0.50)	11.8 (0.57)	11.5 (0.51)	12.3 (0.58)
Final, mm	13.9 (0.83)	12.1 (0.86)	13.4 (1.31)	12 (1.27)
Change, mm/d	0.08 (0.02)	0.01 (0.02)	0.04 (0.02)	0.002(0.02)

\*  $Y = 0.5691LW - 20.586$  ( $R^2=0.93$ ;  $P<.001$ ) a regression of HSCW on LW in initial slaughter group.

+  $Y = 1.014X + 0.868$  ( $R^2=.741$ ;  $P<.001$ ) a regression of final scanned P8 on abattoir P8.

The information presented here indicates the feasibility to manipulate the deposition of subcutaneous fat by dietary means in growing heifers, so that extended feeding periods may be considered a viable alternative to market cattle under more favourable conditions. Further trials are necessary to determine the effect of variable levels of fishmeal on retail carcass yields and cost/benefit analysis.