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**THE EFFECT OF OESTRADIOL-17 β (COMPUDOSE®) ON
LIVEWEIGHT GAIN, HERBAGE INTAKE AND CIRCULATING
HORMONE CONCENTRATIONS IN STEERS AT PASTURE**

**A thesis presented in partial fulfilment
of the requirements for the degree
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To my family

For their immense support and encouragement throughout my life.

To Universidad Automoma Chapingo

For giving me the opportunity to learn about agricultural sciences.

To Mexico

For teaching me how important and wonderful life is.

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ABSTRACT

World food production needs to increase as world population is increasing. One method of achieving this is to improve the efficiency of food production. Efficient meat production in steers is affected by growth rate, mature weight and composition of the growth. It is possible to manipulate growth rate by the administration of sex steroids. Compudose® (oestradiol-17 β) improves liveweight gain (14-17%) and feed conversion efficiency (10-12%) in beef cattle under feedlot and grazing conditions. There is little information available on feed intake and hence efficiency of liveweight gain under New Zealand pastoral systems. Therefore, this study was designed to evaluate over a 203 day period the effect of Compudose® on liveweight gain, herbage intake, grazing behaviour and circulating hormone and metabolite concentrations in steers grazing ryegrass-white clover pastures. Twenty 14-month-old Friesian steers and sixteen 14-month-old Angus cross were randomly assigned within breed to either Compudose® or no-Compudose®. Herbage intake and grazing behaviour were measured on two occasions (days 34-50 and days 168-184). Blood samples from the steers were taken at 50-day intervals throughout the trial. Compudose® steers gained a mean of 856 g/d compared with 710 g/d by control steers ($P < 0.001$). The total fasted and unfasted LWG of treated steers was improved by 29.6 kg (20.5%) or 36.3 kg (25%), respectively, over the untreated steers. There were no significant ($P > 0.05$) differences in the amount of herbage eaten between treated and untreated groups (7.4 vs 7.1 kg DM/hd/day). Feed conversion efficiency in the implanted group was improved by 15.7% over the untreated steers. Grazing behaviour, hormone and metabolite concentrations between treated and untreated steers were not significantly different ($P > 0.05$). The use of Compudose® resulted in a net income of \$55 per implanted steer. In conclusion Compudose® implants proved to be a useful management tool to increase performance and productivity in finishing steers under New Zealand pasture-based systems.

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LIST OF ABBREVIATIONS

A x (HxF)	Angus x Herford x Friesian
Cr	chromium
Cr ₂ O ₃	chromium sesquioxide
CRC	Intraruminal chromium controlled release capsule
cm	centimetre
d	day
DOMD	Organic matter digestibility of the dry matter
DM	Dry matter
DMD	Dry matter digestibility
DMI	Dry matter intake
FO	Faecal output
GH	Growth hormone
h	hour
ha	hectare
hd	head
IGF1	Insulin-like growth factor 1
IU	International units
kg	Kilogram
LWG	Liveweight gain
ME	Metabolisable energy
MEI	Metabolisable energy intake
MJ	Megajoules
mg	milligram
min	minute
ml	millilitre
mm	millimetre
NEFA	Non esterified fatty acids
ng	nanogram
OM	Organic matter
OMI	Organic matter intake

OF	Oesophageally fistulated
SE	Standard error of the mean
vs	versus
W ^{0.75}	metabolic liveweight
µg	microgram

Levels of statistical significance

NS	Not significant
*	0.01 < P < 0.05
**	0.001 < P < 0.01
***	P < 0.001