

LIFETIME METHANE PRODUCTION IS REDUCED WHEN BEEF CATTLE ARE REPEATEDLY TREATED WITH AN HORMONAL GROWTH PROMOTANT

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In Australia, livestock are presently responsible for 14% of national greenhouse gas emissions (Australian Greenhouse Office 2001). The national inventory reports that since 1991 methane gas emissions from Australia's beef cattle population have increased by 4.2 % (Australian Greenhouse Office 2001). The US Environmental Protection Agency (1999) promotes the use of hormonal growth promotants as a tool for greenhouse mitigation in beef cattle, because they reduce the time required to reach market weight by enhancing growth rate, feed efficiency and lean tissue accretion. The objective of this study was to quantify the reduction in methane gas output from beef cattle repeatedly treated with oestradiol under experimental field conditions in tropical Australia.

Lifetime methane production of crossbred beef cattle, finished on pasture to slaughter live weights of 400, 520 and 640 kg were determined by simulation modeling. Methane production was determined for cattle that were either repeatedly treated with 20 mg oestradiol-17 β (Compudose 100[®], Elanco Animal Health) every 100 d or not treated (Control). Average values for live weight at different ages, dressing percentage and retail beef yield (RBY) were measured in experiments conducted at "Duckponds" station in central Queensland (Hunter *et al.* 2001). Rates of methane production used in these calculations were based on respiration calorimeter measurements (mean \pm standard deviation) for Brahman cattle that were fed on tropical forage diets (Kurihara *et al.* 1999) with comparable growth rates to the cattle investigated in this study. RBY = carcass weight – (carcass fat trimmed in excess of 3 mm thickness + bones).

Table 1. The effect of hormonal growth promotant treatment on lifetime methane output for beef cattle

Slaughter weight (kg)	Management Treatment	Slaughter age (months)	Lifetime methane output*		Reduction in methane output
			(kg)	(kg/kg RBY)**	
400	Control	19	77 \pm 4	0.51 \pm 0.03	10%
	Oestradiol	17	68 \pm 3	0.46 \pm 0.02	
520	Control	28	154 \pm 8	0.80 \pm 0.04	9%
	Oestradiol	26	140 \pm 7	0.73 \pm 0.04	
640	Control	37	259 \pm 13	1.16 \pm 0.06	16%
	Oestradiol	33	219 \pm 11	0.98 \pm 0.05	

* mean \pm standard error, **RBY = retail beef yield

Under extensive grazing conditions in northern tropical Australia, which are characterized by relatively low growth rates (<0.3 kg/day) in the dry season and higher growth rates (>0.5 kg/day) in the wet season, repeated treatment of beef cattle with oestradiol was associated with a 7 to 11% reduction in age at slaughter and a 9 to 16% reduction in lifetime methane production.

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