GROWTH PERFORMANCE AND BODY COMPOSITION OF AWASSI LAMBS TREATED WITH PROGESTERONE

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SUMMARY: Twenty Awassi intact male lambs aged 5-6 months and weighing 28 kg on average were allocated to be sham-implanted controls or implanted with progesterone. The lambs were offered ad libitum a diet containing (per kg dry matter) an estimated 11.9 MJ metabolizable energy and 0.15 kg crude protein. Lambs were slaughtered 70 days following implantation. Progestrone implantation resulted in a significant increase (a) live weight gain ($p<0.01$), feed conversion ratio and gut fill ($p<0.05$), (b) cold and hot carcass weight, empty body weight and killing-out proportion ($p<0.05$), (c) shoulder proportion in side, carcass lean proportion and proportion of lean in shoulder and rack cuts ($p< 0.05$). Hormonal treatment resulted in significant reduction in proportion of total fat ($p<0.01$), and proportion of fat in the soulder, rack, loin and leg cuts ($p<0.05$). In conclusion progesterone implantation increase growth rate and lean to fat ratio in fat tail lambs.

INTRODUCTION: Anabolic compound have been widely used to imporve growth rate and feed efficiency of meat producing animals (Galbraith and Topps, 1981; Coelho, et al., 1981, Yasin and Galbraith, 1981; Schanbacher, 1984; Basson et al., 1985 and Sulleman et al., 1986). Melengestrol acetate (MGA) is an orally active progesterone which is applied to improve feed utilization and estrus suppression (Glimp and Cundiff, 1971). MGA was reported to have a large and persistent residue (Neff, 1983). Lambs treated with synthetic progesterone that is chemically indentical to progesterone produced naturally, shown increased in body gain and did not leave residues that are harmful to human health (Hamra et al., 1989). The objective of this experiment was to investigate the response of Awassi lambs to subcutenous progesterone implant. Special attention was give to its effects on tissues sensitive to this hormone to provide

further information on the biological activity of progesterone in fat-tail lambs.

MATERIALS AND METHODS: Twenty Awassi intact male lambs (5-6 months old and average body weight 28+1.6 kg) were individually penned and offered ad libitum a roughage and concentrate diet containing (kg/kg dry matter (DM)): barley 0.45; soyabean meal 0.07; wheat bran 0.30; ground corn 0.15 and a mineral/ vitamin supplement 0.03. The diet contained an estimated 11.9 MJ metabolizable energy and 0.15 kg crude protein per kg DM. The lambs were blocked by weight and randomely allocated into two equal groups. One untreated group considered to be a control group. The second treated group recieved solid silastic progesterone impant containing 200 mg progesterone (pregn-4-ene-3, 20 dione). Implant was 1 cm in diameter and 1 cm in length and inserted subcutaneously in the axillary region of a forelimb. Implants left in place for 10 weeks and removed 24 hrs before slaughtering. The lambs were deprived from feed only, allowed access to water for 12 hrs then wighed immediately before slaughter to provide fasted weight. Slaughtering was performed according to local muslim practice in Iraq as described previously by Hassan et al. (1989). Empty body weight (EBW), hot carcass weight and the weights of different offals and organs were recorded after slaughtering. The carcass then chilled for 24 hrs at 4 C and then weighed a gain and cut evenly into left and right sides after removing that fat-tail from carcass. The left side was cut into standrized whole sale cuts according to specification of Forrest et al. (1975). The cuts were then weighed separately and dissected into lean, fat and bone. The values of each tissue were pooled to give total for the side.

STATISTICAL ANALYSIS: Live weight gain of the lambs was calculated from the regression of live body weight on time. All data were analyzed using T-test according to Steel and Torrie (1980).

RESULTS: Animals performance are presented in table 1.

Table 1.Growth performance and selected body characteristics

	Treatment groups		Se. of
	control	Treated	differences
No. of animals	10	10	
Final weight (kg)	35.0	37.1	(1.50)*
Live weight gain (LWG, g/d)	100	130	(11.5)**
FCR+ (DMI/LWG)++	9.3	7.5	(1.10)*
Gut fill (kg)	3.1	4.6	(0.53)*
Empty body weight (EBW,kg)	31.9	32.5	(0.36)*
Hot carcass weight (HCW,kg)	15.6	17.3	(0.79)*
Cold carcass weight (CCW,kg)	14.9	16.8	(0.67)*
Killing-out proportion (g/kg)			
HCW / fasting weight	438	465	(33.6)NS
HCW / EBW	489	532	(16.3)*

* P<0.05 ; ** P<0.01 ; NS, not significant
\+ FCR, Feed conversion ratio
++ DMI, Dry matter intake.

The implanted lambs with progesterone had on average, significantly greater mean values for final live weight ($p<0.05$) and live weight gain ($p<0.01$) than the control. They also had a significantly ($p<0.05$) greater average DM and weight of gut content (gut fill). The lambs treated with progesterone tended to have a better feed conversion ratio and EBW, hot and cold carcass weights ($p<0.05$). Implanted lambs had a greater killing-out proportion ($p<0.05$) when expressed as a proportion of EBW than in control lambs.Carcass side weighty and proportions of its dissected components are shown in Table 2.Subcutenous progesterone implanted had significance effects upon side weights ($P<0.05$), also the proportion of dissected lean tissue was significantly ($p<0.01$) greater and total fat was significantly ($p<0.01$) less in treated lambs than in controls. The proportions of bone and fat-tail tended to be greater in treated lambs but not significantly ($p>0.05$) so. Lean:fat ratio was significantly greater and that for total fat to bone ratio was significantly lower in treated lambs

than in controls ($p<0.05$).

Table 2. Carcass side weight and porportion of its dissected components

	Treatment groups		Se.of
	Control	Treated	differences
Carcass side weight (kg)+	7	8.4	(0.32)*
Tissues in side (g/kg)			
Lean	543	580	(13.9)**
Bone	229	240	(10.3)NS
Fat- tail	64	77	(5.6)NS
Total fat	228	180	(9.7)**
Lean: total fat (kg/kg)	2.38	3.17	(0.37)*
Total fat: bone (kg/kg)	0.995	0.721	(0.008)*

+ Carcass and fat- tail side weight
* $p<0.05$, ** $p<0.01$; NS, not significant

The weight of main cuts and their composition are shown in Table 3.The proportion of shoulder in the side of treated lambs was greater than those of controls ($p<0.05$), while the proportions of rack, loin and leg in side weight were not significantly different from those of controls ($p>0.05$). However, implantation resulted in a significantly greater proportion of lean tissue in the shoulder and rack cuts ($p<0.05$) and significant reductions in dissectable fat tissue ($P<0.05$).While implantation resulted in asignificantly ($p<0.05$) lower proportion of dissectable fat tissue in lion and leg . Implantation had no effects on proportion of bone.

Table 3. The weight of main cuts (as a proportion of side weight (sw) and thier composition

	Tereatment group		Se.of
	Control	Treated	differences
Shoulder(g/kg sw)	364	401	(13.3)*
Tissues in cut (g/kg)			
Lean	501	532	(7.9)*
Fat	249	218	(9.3)*
Bone	250	260	(8.9)*
Rack(g/kg sw)	75	70	(8.5)NS
Tissues in cut (g/kg)			
Lean	420	453	(9.1)*
Fat	368	337	(7.1)*
Bone	212	210	(5.9)NS
Loin (g/kg sw)	85	87	(3.9)NS
Tissues in cut (g/kg)			
Lean	539	554	(16.9)NS
Fat	301	275	(7.8)*
Bone	160	171	(4.4)NS
Leg(g/kg sw)	409	408	(3.9)NS
Tissues in cut (g/kg)			
Lean	604	611	(10.9)NS
Fat	185	170	(3.9)*
Bone	211	219	(6.6)NS

* $P<0.05$; NS, not significant

DISCUSSION: Lambs treated with progesterone had, on average a significantly greater LWG than control lambs. A similar trend was observed for hormaonally implanted lambs in other studies (Sinnettsmith et al., 1983; Spencer et al. 1983a, 1983b and Sulieman et al 1986). Improvement due to the progesterone has an aldosterone-like effect and might cause some weight increase presumable due to electrolyte and fluid retention (velle, 1977). Greater gut fill has been recorded in lambs implanted with progesterone. Although LWG

was reflected in the weight of carcasses obtained from treated animals. Similar results reproted by Spencer et al. (1983a). However, Sulieman et al (1986) in study with lighter and younger lambs found that improvement in LWG was not reflected in the weights of carcasses obtained from treated animals, mainly because a large increases in the contents of the digestive tract in implanted lambs. Nevertheless, the non significant improvement in killing-out proportion related to the fasting weight in this study was a direct consequence of the greater gut fill with treated lambs. In addition to the differences in average side weight between treated and control lambs, some clear differences in carcass composition emerged, when calculated as proportion of carcass weight. Dissected lean tissue was significnatly increased and that of total fat significantly reduced in treated lambs. A trend towards an increase in the proportion of bone was also observed. These results are consistent with previous observation (Schaubacher et al;1980; Galbraith and Topps, 1981 and Sulieman et al 1986) that certain anabolic compounds increase the protein but decrease fat proportion of carcasses in ruminant animal. Although non significnat differences were recorded between control and implnated lambs for the weight of rack, loin and leg, a significnat increases in the proportion of shoulder in the lambs treated with progesterone, perhaps reflecting a greater forequarter development in the treated animals. A similar significant and non significnat trend were observed for hormonally implanted lambs shown by Coelho et al (1981) that implantation with progesterone was associated with significantly higher proportions of dissected lean tissue in the shoulder and rack and reductions in the fat tisue in the shoulder, rack, loin and leg.These results indicate a general increase in leanness and decrease in fat throughout the carcass.

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