CARCASS CHARACTERISTICS AS AFFECTED BY DRIED DATE PULP SUBSTITUTION FOR BARLEY IN THE FATTENING DIET OF AWASSI LAMBS

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INTRODUCTION

Shortage in forages for ruminant increased the demand for high-fibre ingredients in many parts of the world. Industrial and agricultural by-products were often used to cover that shortage and supply ruminants with part of their nutritional needs. Dates by-products such as date stones and pulp are widely used. Experiments carried out here dealt mainly with their nutritional value as a substitute for barley (Farhan and Al-khalisi, 1969; Al-Ani and Farhan, 1985) or other ingredients in the fattening diets of lambs and calves as influcening daily gain and feed efficiency. No informations are available on their effects on carcass characteristics and composition. Furthermore, a limited studies have shown that changes in the rate of whole body protein synthesis and fractional synthesis rates of protein are associated with dietary changes (Bryant and Smith, 1982) Aim of this experiment was to determine possible differences in carcass characteristics and physical and chemical carcass composition of Awassi lambs as affected by dried date pulp (DDP) substitution for barley.

MATERIALS AND METHODS

Animals and diets : Thirty-two Awassi intact male lambs (5-6 months old, average weight 28 Kg) were divided into 4 equal groups (eight lambs per group). The lambs were housed in four pens in an exprimental animal house. Four diets cotaining 4 levels of DDP (0,15,30 and 45 %) for grop 1,2,3 and 4 respctively (Table 1). The DDP progressively substituted barley in the concentrate diets. Diets content 16.7, 16.5, 16.8 and 16.1 % crude protein and 92,132,171 and 211 g/Kg dry matter acid detergent fibre for diets 1,2,3 and respctively . Diets were offered on group basis.

Table 1. Composition of diets

Diet No.	1	2	3	4
Ingredient % :				
Barley	45	30	15	0
DDP	0	15	30	45
Wheat bran	43	40	37	34
Soyabean meal	9	12	15	18
Min. mix.	3	3	3	3

Mangement : Diets were gradually introduced to the lambs during a period of 3 weeks befor start the expriment. The diets were offered once daily at 08.00 h am during the trial at about 5 % of average live body weight. Food refusal were recorded every morning. Foods offered and sampled weekly and retained for subsequent chemical analysis. The lambs were weighed once weekly to the nearst 0.5 kg at the same time throughout the experiment. The quantity of diet offered was ajusted weekly according to live body weight. Water and minerals blooks were available *ad libitum* for each all the time. Recording of live weight and daily food intake were maintained for 60 days fattening period.

Slaughter: The lambs were deprived from food only, allowed access to water for 12 h then weighed immediately befor slaughter to provide a fasted weight. Slaughtering was performed according to local Muslim practice by servering jugular vessels, oesophagus and trachea without stunning. The head, skin, feet, testicules and iternal organs were weighed separately. The carcass were weight hot and then chilled for 24 h at 4 c, then weighed again and cut evenly into left and right sides after removing that fat-tail from carcasses. The left side was discarded and the right side was cut into standarized whole sale cuts according to specification of Forrest et al. (1975). The cuts were then weighed separtely and dissected into lean, fat and bone. The values of each tissue were pooled to give total for the side. The energy concentration of the body was calculated assuming the energy values of 23.23 MJ /kg crude protein and 39.9 MJ/fat (Lonsalate, 1976).

Chemical analysis :Chemical analysis were conducted on the dissected soft tissue after preparation.Dissected lean and fat were pooled minced repeatedly to obtain uniformed samples for analys s following the AOAC (1975).

Statistical analysis: Analysis of variance was applied to compare the effect of diets on lamb performance,carcass characteristics and carcass composition.Least significant differences (LSD)(Steel and Torrie,1982) was used to compare any two treatment.

RESULTS

Growth rate and selected body characteristics are presented in table 2. Live-weight gain (LWG) was slightly reduced ($P < 0.05$) as DDP substitution increased above 15 % . Greatest LWG was found with diet containing 15% DDP. Fasting weight (FW),Hot carcass weight (HCW) and cold carcass weight (CCW) were slightly reduced with increasing DDP substitution. This reduction was not statistically significant($P > 0.05$) in comparison to the respctive control diet.Killing-out proportions in all term were not affected by DDP substitution ($P > 0.05$).

Table 2. Live-weight gain(LWG) and selected body characteristics,fasting weight (FW),hot carcass weight (HCW), cold carcass weight (CCW) and killing-out proportion (g/kg)

	DDP level (%)			
	0	15	30	45
Animal No.	8	8	8	8
Initial wt.	28.3	28.3	27.7	28.1
Finial wt.Kg	45.6^{a+}	45.4^{a}	42.9^{b}	40.[illegible]^{b}
LWG, g/day	266^{a}	285^{a}	253^{a}	213^{b}
FW, Kg	42.6	42.0	41.2	39.3
HCW, Kg	22.6	22.2	21.8	20.6
CCW, Kg	22.1	21.5	21.1	20.1
Killing-out proportion (g / Kg)				
HCW / FW	531	529	529	524
CCW /FW	519	512	510	512
CCW / EBW^{++}	561	567	558	558

+ Values within a line with different superscript are sign. different (P 0.05 or P 0.01)

++ EBW= Empty body weight.

Carcass side weights, weights and proportions of its dissected components are shown in Table 3. Substitution of DDP in the diets have no affect upon the weights of lean and bone tissues and significantly ($P < 0.05$)reduced fat tissue; But when expressed as proportion of side weights, a trend towards an increase ($P < 0.05$) in lean and bone and reduction ($P < 0.05$) in fat tissues were associated with increasing DDP level. Lean : fat ratio was significantly increased ($P < 0.01$) with the increase of DDP level.Significant reduction in omental fat($P < 0.05$) and fat-tail ($p < 0.01$) were associated with substitution level of DDP above 15 %

Table 3. Carcass side weight(S. wt.), weights and proportions (Prop.) of its dissected components; omental fat(Om.) kideny fat (Ki. fat) and fat-tail (g / kg empty body weight).

	DDP level (%)			
	0	15	30	45
Animal No.	8	8	8	8
Side wt.,kg	9.3	9.1	9.0	8.6
Tissue wt.,kg				
Lean	5.5	5.3	5.4	5.4
Fat	2.1^{a*}	1.9^{a}	1.8^{b}	1.6^{c}
Bone	1.7	1.8	1.8	1.6
Tissue prop. (g/kg S. wt.)				
Lean	588^{a}	583^{a}	600^{b}	626^{b}
Fat	224^{a}	210^{a}	203^{b}	183^{b}
Bone	186^{a}	202^{b}	195^{b}	189^{a}
Lean:fat ratio	2.6^{a}	2.8^{a}	3.0^{b}	3.4^{c}
Omental fat	15^{a}	14^{a}	12^{b}	11^{b}
Kidney fat	4.6	4.8	4.2	4.2
Fat-tail	95^{a}	89^{a}	80^{b}	78^{b}

* Values within a line with different superscrips are significantly different ($P < 0.05$ or $P < 0.01$).

Weights and proportions of chemical components of carcass side are presented in Table 4. Mositure and ash expressed as weight and proportion of side weights were not affected by DDP substitution, while a trend towards a progressive increase ($p < 0.01$) in protein and reduction ($P \leq 0.01$) in lipid cotent were observed with the increase in DDP level. Protein:lipid ratio was significantly increased ($P < 0.01$) with increasing level of DDP.

Table 4. Weights (kg) and proportions (g/kg side weight) of chemical components of the left carcass side

	DDP level (%)			
	0	15	30	45
Animal No.	8	8	8	8
Weights, Kg	4.6	4.7	4.6	
Mositure	4.6	4.7	4.6	4.1
Protein	1.3 ^{a*}	1.7 ^{b}	1.9 ^{b}	2.1 ^{c}
Lipid	2.8 ^{a}	2.1 ^{b}	1.9 ^{b}	1.7 ^{c}
Ash	0.6	0.6	0.6	0.6
Energy,MJ	140 ^{a}	121 ^{b}	119 ^{b}	122 ^{b}
Proportion				
Mositure	493	518	499	478
Protein	140 ^{a}	183 ^{b}	210 ^{c}	244 ^{d}
Lipid	301 ^{a}	232 ^{b}	211 ^{c}	198 ^{c}
Ash	65	67	69	71
Energy,MJ	15	13	13	14
Protein:lipid ratio	0.5 ^{a}	0.8 ^{b}	1.0 ^{c}	1.2 ^{c}

* Values within a line with different superscripts are significantly different ($P < 0.05$ or $P < 0.01$)

The weights of main joints and their composition are prensented in Table 5. Weights of shoulder,loin and leg (g/kg side weight) were not effected ($P > 0.05$) by DDP substitution,while the weight of rack was significantly ($P < 0.05$) increased with increase of DDP level in the diet above 15 % .

Table 5.Weights of main joints and their composition.

	DDP level (%)			
	0	15	30	45
Animal No.	8	8	8	8
Shoulder wt.	247	262	280	246
Lean	587 ^{a}	581 ^{a}	600 ^{b}	649 ^{c}
Fat	183 ^{a}	175 ^{b}	172 ^{b}	169 ^{b}
Bone	230 ^{a}	243 ^{a}	228 ^{a}	184 ^{b}
Rack wt.	179 ^{a}	168 ^{a}	186 ^{b}	217 ^{b}
Lean	513 ^{a}	537 ^{b}	549 ^{b}	540 ^{b}
Fat	273 ^{a}	216 ^{b}	229 ^{b}	229 ^{b}
Bone	214 ^{a}	246 ^{b}	221 ^{a}	231 ^{a}
Leg wt.	261	263	263	240
Lean	636 ^{a}	670 ^{b}	669 ^{b}	670 ^{b}
Fat	187 ^{a}	144 ^{b}	149 ^{b}	140 ^{b}
Bone	177	186	181	189

Weight of main joints (g/kg side wt.) and their copostion (g/kg joint wt.)

CONCLUSION

Substitution of DDP for barley in the diets increased crude protein and reduced lipid contents of soft tissues These confirme results of previouse expriment (Hassan et al., 1989) when corn cobs were substituted for barley in the fattening duet of Awassi lambs. Similarly Williams et al., (1980) reported higher crude protein and lower fat contents in soft tissue of forage compared with grain fed animals. Greater weights of lean and lower weight of fat in soft tissue of DDP fed lams likely accounts for higher weight of crude protein and lower weight of lipids. It has been reported that nutritional regime will not alter carcass chemical composition as long as animal -s are fed to constant slaughter weight (Marchello et al. 1974).Although in present expriment differences in slaughter weights among experimental groups were not significant difference in chemical and physical carcass composition were occured. These differences are mainly due to diets composition. Substitution of DDP for barley has altered the chemical composition of diet fibrous rather than starch carbohydrate source. Barley in the diet is known to increase the supply of glucose precursors and often produce a propionic type of fermentation. Glucose utilization for fatty acids synthesis was increased in a dipose tissue of fat of animal fed such concentrate diets (Bollard et al. 1972 ; Piperoven and Pearcess, 1982).Wherease DDP diets, due to their higher Neutral and Acid detergent fibre fractions (NDF and ADF respectively)(Alani et. al. 1989) is expected to produce acetic type of fermentation and resulted in leaner animals(Ballard et. al.,1972 ;Piperoven and Pearcess, 1982) reported that the fatty acid synthesis increased in a dipose tissue of fat animal fed a concentrate diet rather than those fed high crude fibre diets. On the other hand changes in physical and chemical carcass composition might be due to possible improvement of amino acids (AAs) supply accomponicd with icreasing levels of SBM in DDP diets. This possible increase may have improved protein turnover . Supported data by Bryant and Smith (1982) who domenstrated a higher rate of protein synthesis in wethers fed good quality diet rather than low quality diet.

In conclusion, differences in diet composition caused by dietary substitution of DDP for barley resulted in a significant differences in carcass composition of Awassi lambs. Results also suggests that substitution of DDP for barley in fattening diet of Awassi lambs will help economizing the system and produce a leaner lambs.

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