INFLUENCE OF LEVEL OF BARLEY IN HIGH CONCENTRATE DIETS ON THE CARCASS COMPOSITION OF FATENING AWASSI LAMBS.

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INTRODUCTION

Barley is the major constituent of the concentrate fattening diet used in Iraq. Therefore, considerable quantities of barley are currently being fed to livestocks mainly to improve feed efficincy and increase feed intake (Waldo,1973).Rations containing as much as 90% or more concentrate are now commonly fed in many farms. Several experiments have been conducted to investigate the benefit of using various amount of barley in a concentrate diets (Anderws et al.,1969; Ørskov et al.,1971).

Many farmers would find it economically advantageous for them to use the maximum amount of barley possible compatible with obtaining satisfactory animal performance and carcass composition as compared with other grains (S.e. Wheat or Corn).

The objective of this experiment was to study the effect of various levels of barley in high concentrate diet of Awassi lambs on the physical and chemical carcass characteristics.

MATERIALS AND METHODS

Thirty six Awassi lambs (5-6 months old , average weight 28.1 kg) were divided at random into three groups (12 animals/group). The animals were housed in three pens in an experimental animal house. Three high concentrate diets containing different levels of barley (0,45 and 90%) were fed to group 1,2 and 3 respectively (table 1).All diets were offered on group basis . The chemical composition of the diets is shown in table 1.

TABLE 1: Composition of the experimntal diets.

	Level of Barley %		
	0	45	90
Ingredients:			
Ground barley	-	45	90
Wheat bran	30	30	-
Ground Wheat	30	15	-
Ground Corn	30	-	-
Soyabean Meal	7	7	7
Premix +	3	3	3
Chemical Composition (%)			
Dry matter	90.0	91.2	92.0
Crude protein	14.7	14.9	13.9
NDF ++	22.7	22.0	24.1
Ash	8.3	7.1	8.7
DE+++	69.8	68.1	66.5

+Mineral and Vitamins mixture (Vita Plast) C.Richter and Co. KG , Wels Austria.
++ Neutral detergent fiber.
+++ Digestible energy.

Diets were gradually introduced to the lambs during a period of three weeks before the Start of the experiment. Diets were offered once daily (0800h) at a rate of 2.5% of average live body weight (LBW).Feed refusal were recorded every morning.Feed offered and refused were Sampled weekly and retained for Subsequent Chemical analyses. Lambs were weighed weekly at same time during the entire expermental period . The quantity of diet offered was adjusted weekly according to LBW. Water and mineral blocks were available ad libitum for all groups at all times.

Fasting over night (12h) proceeded slaughter of animals. Carcass dressed according to local muslim practice in Iraq. Hot Carcass weight (HCW), empty body weight (EBW) and the weight of different offals and organs were recorded after Slaughtering. Dressing percentages were obtained on LBW and EBW basis by Subtracting the weight of gut fill from the recoded live weight.

All Carcasses were chilled at 4°c for 24h. After chilling each carcass was weighed in air and under water to determine Carcass specific gravity. The Carcass were allowed to drip at 4°c for 24h (Rattray et al.,1973). At the end of 24h drip period, Carcass were cut into left and right ides after removing the fat-tail.The right side was cut into standarized whole sale cuts according to specification forrest et al.(1975). The rib eye area was measured in cross-section between the 13th ribs (Henderson et al.,1966).

Fat thickness over the rib eye area muscle was obtained by the averaging three seperate measurement. The 9-10-11 rib cut of each carcass was physically separated into lean,fat and bone.The separated lean and fat were pooled, minced repeatedly to obtain uniformed product. and sampled for moisture, protein, fat and ash determinations (AOAC,1980).

Data were subject to analysis of variance for completely randomized design (Stell and Torrie, 1980).

Results

Fasting weight, HCW, cold carcass weight (CCW) and dressing percentage as expressed on fasting weight (FW) and (EBW) were not affected by the level of barley in the diets (table 2) Omental and Kidney fat were not affected by dietary level of barley. The weights of retail cuts as g/kg of cold carcasses were not influnced by the diets (table 3).

TABLE 2. Effect of level of barley on FW, HCW, CCW (Kg) and dressing percentage as (%) of FW and EBW.

FW,HCW CCW, (Kg) and of FW and EBW

Charter+	Level of barley (%)		
	0	15	45
No.animals	12	12	12
FW.	37.7	41.6	37.5
HCW.	17.6	18.6	16.3
CCW.	17.2	18.6	15.7
Dressing percentage			
% FW	42.7	43.7	41.8
% EBW	49.6	50.8	49.9

+ Each value represent a mean of results for twelve animals.

TABLE 3. Effect of experimental diets upon the weights of retail Cuts, Omental fat, Kidney fat and fat tail (Kg).

Item+	Level of barley (%)		
	0	45	90
Neck	0.756	0.767	0.647
Shoulder	4.140	4.486	3.783
Rack	1.642	1.833	1.543
Loin	1.681	1.836	1.658
Breast	1.106	1.079	0.888
Flank	0.461	0.565	0.435
Leg	5.182	5.427	4.703
Kidney fat	0.165	0.159	0.119
Omental fat	0.375	0.343	0.315
Fat tail	2.628	2.265	2.015

+As kg of cold carcass

++Each value represent a mean of results for twelve animals.

Data of physical and chemical composition of the 9-10-11 rib cut, rib eye area (cm^2) and fat thickness on 12th rib are shown in table 4.

TABLE 4. Rib eye area (cm^2),fat thickness over -L-dorsi muscle and physical and chemical compostion of 9-10-11 rib cut for lambs in different groups.

Item+	Level of barley (%)		
	0	45	90
Rib eye area (cm^2)	2.77 ^{a}	4.36 ^{b}	2.54 ^{a}
Fat thickness (mm)	7.50 ^{b}	6.58 ^{b}	5.98 ^{a}
9-10-11 rib cut:			
physical composition (%)			
Lean	53.3	54.3	54.5
Fat	28.0	27.8	25.3
Bone	18.7	17.9	20.2
Chemical composition (%)			
Moisture	59.7 ^{b}	56.9 ^{a}	59.1 ^{b}
Protein	16.4 ^{a}	19.5 ^{b}	19.8 ^{b}
Lipids	18.6 ^{b}	18.2 ^{b}	15.7 ^{a}
Ash	5.3	5.3	5.4

+ Each value represent a mean of results for twelve animals.

a,b

Means in the same row without a common letter in their superscripts differ (P<0.05).

Significant difference (P<0.05) was observed in rib eye area (cm^2),the highest value was observed with 45% barley in the diet. Fat thickness was decreased (P<0.05) as the level of barley increased in the diets. Physical composition of 9-10-11 rib cut was not significantly different . Differences in percentages of Protein ,Lipid and moisture for 9-10-11 rib cut were significantly (P<0.05) associated with increasing level of barley in the diets. Chemical carcass composition except ash as calculated by specific gravity technique (table 5) showed a significant differences (P<0.05) between groups.

TABLE 5. Chemical composition of carcass as calculated by the specific gravity (sp.gr).technique.

	Level of barley (%)		
	0	45	90
Carcass:			
Sp.gr.	1.032	1.037	1.046
Chemical Composition (%)			
Moisture	52.09[b]	53.84[b]	57.13[a]
Protein	14.11[b]	14.53[ab]	14.91[a]
Fat	59.58[b]	27.50[b]	23.56[a]
Ash	4.20	4.13	4.30

+ Each value represent a mean of results for twelve animals.

a,b Means in the same row without a commone letter in their superscription differ (P<0.05).

CONCLUSION

A marked decrease in fat thickness (13.1 and 22.6%) was observed as the level of barley increased from 0 to 45% and from 0 to 90% respectively. Similar trends was observed with total lipid content in the 9-10-11 rib cut and with whole carcass as estimated by specific gravity techniques, this can be attributed to increase fiber content of the concentrate mixture (table1) (Mohmmed et al., 1985; Hassan et al.,1989). Since carcass Chemical Composition can be assessed by different procedures including 9-10-11 rib cut or specific gravity techniques (Latham et al.,1966) and the suitablities specific gravity technique for europian non fat tail sheep. The use of either may not be appropirate for the fat tail sheep particularlly the specific gravity technique. However, due to the many factors affecting the reliability of the specific gravity technique such as water temparature (Whiteman et al., 1953), chilling time (Kline et al., 1955) and possibly the fat tail (Hassan et al.1989).

The use of 9-10-11 rib cut technique might be more promising, particularly with fat tail sheep, when assessing the physical and chemical composition of Carcasses. Lipid percentage estimated by specific gravity was higher than that estimated by 9-10-11 rib cut .

These differences can be attributed to the fat tail weight which is included in the calculation of specific gravity technique.

Diet contained 90% barley produced carcasses with less lipids and high protein percentage (15.7 and 19.8% respectively) in comparison with control group which produced carcasses of high lipid and low protein percentages (18.6and 16.4% respectively). This as assessed by 9-10-11 rib cut technique might be due to the high fiber content of barley which resulted in a high fiber content of diet 3 (90% barley). The depression of fat deposion on this group can also be attribued to narrow energy: protein ratio since protein was maintained constant (14%) acrose treatment (Swan and laming ,1967).

This expriment would suggest that substantially higher level of barley can be successfully used than are normally used in high concentrate diets fed for fattening fat-tailed sheep.

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