

Utilization of Chick Pea Straw and Pea Straw in Feeding Growing Rahmani Lambs

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Abstract: Twenty one weaned lambs, 4-5 months old and 20.6 Kg average body weight, were used and classified into three groups (7 animals each), in a feeding trial to study the effect of chick pea straw (CPS) or pea straw (PS) instead of berseem hay (BH, control) as a roughage sources in the complete diets on growth performance. The trial lasted for 16 weeks. Diets were formulated to be isocaloric and isonitrogenous. Another 9 mature rams were used in a digestibility and N-balance trials, at the end of the growth trial. The results showed that, OM, CP, CF and NFE digestibilities of the diet containing CPS were lower than those of diets containing PS or BH (control) which showed similar values. Body weights at the end of the trial were similar for groups fed on the control or PS diets, being higher ($P < 0.05$) that those of the group fed on CPS diets. Body weight gain and ADG showed similar trend. Daily SV intake was the highest with PS diets followed by the control and being the lowest with CPS diets ($P < 0.05$). Feed conversion expressed as Kg DM, SV or DCP/Kg gain were similar for BH and PS groups, being better ($P < 0.05$) than those of CPS groups.

Key words: Chick pea · Pea straw · Feeding trials · Growth performance · Lambs

INTRODUCTION

Recently, the agricultural policy in Egypt aimed to increase the area cultivated by strategically crops on behalf of that cultivated by berseem. At the same time, several crops such as chick pea and pea are cultivated in the newly reclaimed lands. So, significant amounts of the straws of these crops are produced annually as residues (about 25 thousand tons from CPS [1] and 13 thousand tons from PS, [2]. On the other hand, several researches have shown that these straws (CPS and PS) had considerable amounts of nutrients that of suitable digestibilities [3].

So, this study was carried out on Rahmani growing lambs to evaluate the effect of using CPS and PS instead of BH in the diets as a source of roughages on lambs performance.

MATERIALS AND METHODS

This study was carried out at El-Husseini village, El-Bostan, region West Nubaria zone. A feeding trial was conducted with 21 Rahmani weaned lambs, 4-5 months

old and 20.6 Kg average body weight, to study the effect of using chick pea straw (CPS) and, Pea straw (PS) instead of berseem hay (BH, control) as a roughage source in the complete feed mixture diets on growth performance. The trial lasted for 16 weeks. Diets contained the tested roughage sources at 35% dietary level (on DM basis).

At the beginning of the trial the lambs were divided into three similar groups of 7 animals each according to body weights, and then these groups were randomly assigned to receive one from the three tested diet for growing trial. Each group was kept in a separate partly-shaded pen.

Diets were formulated to be isocaloric, isonitrogenous and approximately similar in their chemical composition through altering the proportions of the ingredients of the concentrate portion (Table 1). The concentrate and roughage portions of each experimental diets were well mixed and pelleted mechanically in a complete total mixed rations.

Diets were offered *ad lib*. The animals were individually fed twice daily at 8:00 a.m. and 2:00 p.m. Fresh water and blocks of mineral mixture were freely available all times. Feed intake was recorded daily

Table 1: Formulation and chemical composition of the experimental rations

Items	Treatments		
	BH Control	CPS	PS
Ingredients (%)			
Sunflower meal	25.00	24.00	24.00
Soybean meal, (44%)	4.00	9.00	5.00
Wheat bran	10.00	9.00	8.00
Yellow corn	23.00	20.00	25.00
Berseem hay	35.00	-	-
Chick-pea straw	-	35.00	-
Pea straw	-	-	35.00
Limestone	2.00	2.00	2.00
Common salts	1.00	1.00	1.00
Chemical composition (%)			
DM (%)	90.20	90.46	90.67
DM composition (%)			
CP	13.94	13.77	13.83
EE	3.35	3.56	3.47
CF	22.17	22.65	23.28
NFE	51.75	53.91	52.95
Ash	8.79	6.11	6.47
OM	91.21	93.89	93.53

while body weight was recorded bi-weekly for each animal before the morning feeding to calculate body weight gains, average daily gain (ADG) and feed conversion.

Digestibility and nitrogen balance (NB) trials were carried out with 9 mature rams weighing about 45 Kg LBW. Trial continued for 14 days as a preliminary period followed by 7 days as a collection one. Chemical composition of feed, faeces and urine were determined according to A.O.A.C. [4] methods.

Data were analyzed by using the general linear model procedure of SAS [5]. Duncan multiple range test [6] was applied to compare the means.

RESULTS AND DISCUSSION

No health problems were noticed for all animals on the different experimental diets. Nutrient digestibilities and nutritive values of experimental diets are presented in Table 2. Data showed that (PS) containing diet and control containing (BH) had similar values of digestibilities of OM, CP, CF and NEF of experimental diets, being higher than those of PS containing diets. Differences reached significances ($P < 0.05$) with OM digestibility and NFE digestibilities. The present results disagree with those reported by Foster *et al.* [7] who found that lambs given 30% ground maize and 70% chopped forage of 0, 25, 50, 75 or 100% pea hay with Lucerne showed linear decrease in DM digestibility of the diet from 59.7 to 53.3% with increasing proportion of pea hay.

Table 2: Nutrients digestibility and nutritive values of the experimental rations

Items	Treatments		
	BH Control	CPS	PS
Digestibility (%)			
OM	67.40 ^a	60.01 ^b	69.41 ^a
CP	68.02 ^a	61.86 ^b	68.50 ^a
EE	70.37 ^a	66.88 ^a	67.47 ^a
CF	56.51 ^a	49.26 ^b	58.42 ^a
NFE	69.27 ^a	61.78 ^b	70.30 ^a
Nutritive value (%)			
SV	48.93 ^{ab}	43.88 ^b	50.70 ^a
DCP	9.48	8.52	9.47

^{a,b}. Mean having the same superscripts or even participating in one, did not differ significantly, otherwise, they differ at ($P < 0.05$)

Data in Table 2 showed also that no significant differences in EE digestibilities were found among the experimental diets. The results of Table 2 also showed that SV of the diets containing PS or BH (control) were almost similar. This was due to the similarity of nutrient digestibilities (Table 2). On the other hand, CPS diets showed lower SV value than those obtained for PS diet with significant difference but without significance with control diet. This was due to the lower OM digestibility.

No significant differences in DCP content was found among experimental diets. However, the CPS diet tended to be lower in DCP content than the control or PS diets. This was due to the lower CP digestibility. The present nutritive values obtained by lambs in the growing period were higher than those reported by Aly *et al.* [8] on Rahmani lambs fed diets containing 40% roughage and 60% concentrate.

Results of nitrogen balance (NB) are presented in Table 3. No significant differences were observed concerning N intake. On the other hand, fecal N was insignificantly higher with CPS diets than the control or PS diets which showed close values. This was due to the lower CP digestibility of CPS diet. Nitrogen found in urine was somewhat lower for CPS diet, as compared with those of the control or PS diet. This could be attributed mainly to the lower CP digestibility. The data also, showed that NB of lambs fed CPS was significantly lower compared among the other two diets which recorded no significant values. Similar results were obtained by Forster *et al.* [7] who mentioned that N retention was not affected by diet when lambs were fed 30% ground maize and 70% chopped forage of 0, 25, 50, 75 or 100% pea hay with Lucerne. The same trend was obtained with NB values expressed as % from N intake indicating that N of CPS diet was utilized less efficient as compared with those of the control or PS diets. This was mainly due to lower CP digestibility.

Table 3: Nitrogen balance of mature rams as affected by source of roughage in the diets

Items	Treatments		
	BH Control	CPS	PS
N intake	25.20	25.04	24.78
Feecal N	8.07 ^b	9.58 ^a	7.82 ^b
Urinary N	12.53 ^a	11.54 ^b	11.97 ^a
N Balance	4.60 ^a	3.93 ^b	5.00 ^a
Balance % from N intake	18.24 ^a	15.71 ^b	20.15 ^a

^{a,b} Mean having the same superscripts or even participating in one, did not differ significantly, otherwise, they differ at (P<0.05)

Table 4: Growth performance of Rahmani weaned lambs as affected by source and level of roughage in the complete feed mixtures diets

Items	Treatments		
	BH Control	CPS	PS
Initial Body weight (BW,kg)	20.67	20.60	20.60
Final Body Weight (BW,kg)	40.41	35.20	41.40
DM intake (kg day ⁻¹)	0.84 ^a	0.76 ^b	0.87 ^a
SV intake (kg day ⁻¹)	0.41 ^b	0.33 ^c	0.44 ^a
DCP intake (kg day ⁻¹)	0.08 ^a	0.07 ^b	0.08 ^a
Body weight gain (BWG,kg)	19.74 ^b	14.60 ^c	20.80 ^a
Average daily gain (ADG,g)	176.00 ^b	130.0 ^c	186.00 ^a
Feed conversion (Kg kg ⁻¹ gain):			
DM	4.78 ^b	5.82 ^a	4.69 ^{ab}
SV	2.34 ^c	2.55 ^a	2.38 ^b
DCP	0.45 ^a	0.49 ^a	0.45 ^b

^{a,b,c} Mean having the same superscripts or even participating in one, did not differ significantly, otherwise, they differ at (P<0.05)

The data of growth performance of the experimental groups during growing period are presented in Table 4. Body weight (BW) of lambs of the three groups were similar at the start of the trial and the values were, 20.7, 20.6 and 20.6Kg for control, group 2 (CPS) and group 3 (PS), respectively. On the other hand, at the end of the growing period, groups fed on the control or PS diets recorded similar BW's and gain being higher (P<0.05) than those of the group received CPS diet by about 35 and 42% for control and PS diets, respectively. The obtained final body weight is relatively similar with that reported by Abdel-Rahman and Ahmed [9], 39.6 Kg for the same breed and fed diets containing 45% roughage and Abou-Raya *et al.* [10], 39-42 Kg but less than those reported by Awadalla [11], 52.9 Kg and Mohamed *et al.* [12], 57 Kg for the same breed and at the same age and fed 45% roughage and 55% concentrate.

The results in Table 4 also showed that daily DM intake of PS diet were almost similar to those of the control containing BH. On the other hand, diet containing CPS were consumed lower DM (P<0.05) as compared with the two other diets.

The results of Table 4 also showed that, during the growing period, PS group recorded the highest values of

body weight gains (BWG) and average daily gain (ADG) followed by those of the control, while the lowest value was recorded for those fed CPS diet. Differences among groups were significant (P<0.05). This was due to the same trend observed for nutrient digestibility, SV, daily SV and DCP intakes and NB as % from N intake (Table 2, 3 and 4). With the higher values, it was expected that lambs fed PS diets could retain more N and grow faster than those fed the controls and finally those fed CPS diets (being the lowest). These results are in agreement with those of El-Basiony[13] who found that calves fed diet containing berseem hay had higher (P<0.05) ADG than those fed PS diet. On the other hand, Forster *et al.* [7] reported that lambs given 30% ground maize and 70% chopped forage of 0, 25, 50, 75 or 100% pea hay with Lucerne showed no significant differences in daily weight gains. The average daily gain obtained in the present study (186 gm) were higher than that reported by Abdel-Rahman and Ahmed [9], 142 gm and Abdel-Gawad and Salem [14], 141 gm for the same breed and at the same age but lower than that reported by Awadalla [11], 253 gm for the same breed and age and fed diets containing 45% roughage.

Concerning DM, SV and DCP rate of conversions (Table 4), the results showed that lambs converted DM, SV and DCP of PS diets into gain as efficient as those of the control containing BH. On the other hand, lambs received CPS diets converted DM, SV and DCP of the diets to produce unit of gain less efficiently as compared with those fed the control or PS diets. These results agree well with those reported by El-Basiony [13] who found that calves fed berssem hay consumed less (P<0.05) DM and SV to produce unit of gain.

From this study, it could be concluded that PS could be successfully used in the diets of growing lambs as a source of roughage instead of BH with better performance and digestion coefficient

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