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Response of Milk Production of Dairy Zaraibi Goats to Feeding Rations Containing Different Levels of Sesame Seeds Unsuitable for Manufacturing as an Inexpensive and Untraditional Source of Protein.

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ABSTRACT

The effect of using sesame seeds (SS) at different levels in rations of lactating goats on their performance for milk production and feed conversion efficiency was studied. Fifteen lactating Zaraibi goats with average body weight of 41.09 kg were divided randomly into three equal groups (5 in each group). The control group (G_1) was fed a ration consisting of concentrate feed mixture and Berseem hay (50: 50 %) according to NRC (1981) allowances of dairy goats. Sesame seeds were used to replace 10 and 20% of concentrate protein for groups G_2 and G_3, respectively. The experimental period for the tested rations lasted for 16 weeks. The obtained data indicated that the average feed intake (as dry matter) generally reduced as a result to replacing of CFM with SS in the rations. Concerning blood profile, the obtained results indicated that both treatments G_2 and G_3 positively and significantly affected some hematological parameters such as hemoglobin (Hb) and mean corpuscular hemoglobin concentration (MCHC %). Moreover, serum cholesterol and activity of enzymes were decreased with increasing level of sesame seeds in goats' rations and the differences were significant in enzyme activity only. But, the effect of tested ration on other biochemical and physiological parameters was not significant. Concerning milk production, the results indicated that the average milk yield was significantly better with G_2 and G_3 (1.523 and 1.491 kg/h/d) compared with G_1 (1.381 kg/h/d). Moreover, fat percentage was significantly higher as a result to using of sesame seeds in rations. But, the effect of tested rations on other milk constituents and milk quality parameters was not significant. The feed conversion efficiency, based on DM and CP was better with G_2 (0.98 and 0.140, respectively) then G_3 (1.00 and 0.143, respectively) and lastly G_1 (1.09 and 0.154, respectively). In addition, the economic return was noticeably higher by 15.25 and 18.64% with sesame seeds rations (G_2 and G_3, respectively) compared with the control. Accordingly, it could be concluded that the use of sesame seeds to replace up to 20% of CFM has a great effect on the economics of milk production of lactating Zaraibi goats.

Keywords: Zaraibi goats, milk yield, milk quality, blood metabolites, physiological parameters, sesame seeds.

INTRODUCTION

High milk yield and prolificacy (twining rate) of Zaraibi goat require attention while preparing their ration in terms of amino acids, enzymes, vitamins and other feed requirements which are important for dairy goats. Sesame seeds are rich in protein, oil, carbohydrates, minerals and vitamins (Nizikou *et al.*, 2009). Sesame seeds contain about 50% oil and 20-25% protein (Obeidat *et al.*, 2008) and rich in essential amino acids namely methionine and cysteine (Johri *et al*., 1988). Shirzadegan and Jafari (2014) studied the effect of different levels (0, 5, 10 and 15%) of sesame wastes on performance, milk composition and blood metabolites of Holstein lactating dairy cows and they found that milk fat percentage was significantly higher with increasing level of sesame seeds, but milk yield as 4% FCM was ranged from 28.72 to 29.71 kg and the differences among the diets were not significant. The same outher found that both blood glucose and cholesterol were not affected by experimental diets. Therefore, the main objectives of the present work was to recognize the effect of substitution concentrate feed mixture with sesame seeds on production performance of lactating Zaraibi goats.

MATERIALS AND METHODS

This study was conducted at El-Serw experimental station belonging to the Animal Production Research Institute, Agriculture Research Center, Giza, Egypt. Fifteen lactating Zaraibi does, selected from El-Serw Station Herd, with an average age of 3-6 years and 41.09± 0.33 kg weight were used. The animals were randomly divided into 3 equal groups (5 of each) according to live body weight and previous milk yield, to evaluate effect of using sesame seeds unsuitable for manufacturing as a source of protein at levels 0.0% (G_1), 10% (G_2), and 20% (G_3) from CFM protein. Each group was housed in a semi-roofed yard (4x3x5 m) and was randomly fed one of the tested rations. Does were fed for 3 weeks as a transitional period on the experimental rations before starting the experimental work. The feeding trials lasted for 16 weeks and all animals were raised under similar hygienic and managerial conditions. Zaraibi goats were offered their requirements of CFM and BH according to NRC (1981) allowances of does and the amounts of CFM and BH were estimated to cover 50% and 50% of dry matter requirements, respectively. The CFM consisted of 25% un-decorticated cotton meal, 45% yellow corn, 23% wheat bran, 3.5% molasses, 2.0% limestone, 1% common salt and 0.5% minerals mixture.

Drinking water was available at all times and was measured as average for each group (ml/day). Diets were offered twice daily at 8.0am and 3.0 pm and any refused amounts were daily recorded. Representative samples of feed ingredients were analyzed according to A.O.A.C. (1995).

The daily milk yield was recorded for each goat. Representative milk samples (about 0.5% of total milk produced) were taken once biweekly from each goat, from the morning and evening milking of the same day. Then the samples were analyzed for total solids (TS), fat, protein, solid nonfat (SNF) and ash as well as pH and acidity according to Ling (1963) procedures, while milk lactose was calculated by differences.

Blood samples were collected from the jugular vein from 3 does of each group once at the end of experiment. The whole blood was immediately

directed to hematological estimations. Another blood samples were centrifuged at 4000 rpm for 20 minutes. Part of the separated sera was directed to enzymes activity determination while the other part was stored frozen at -20 Cº till the biochemical analysis. Commercial kits were used for calorimetric biochemical determinations.

Feed conversion efficiency expressed as kg DM or CP required for yielding one kg milk. The economic efficiency was calculated as the ratio between output (price of milk yield) and cost of feed consumed according to the local price during the study (where 1.00 ton of Berseem hay coasted 1600 LE, ton of CFM coasted 3800 LE, ton of SS coasted 1800 LE and milk coast 5.75 LE./ kg).

Data was statistically analyzed using SAS (2003). The significant differences among means were assigned using Duncan multiple range test methods (Duncan, 1955).

RESULTS AND DISCUSSION

1-Chemical composition of sesame seeds :

The chemical composition of the tested ingredients was determined and given in Table 1. The obtained data in Table 1 indicated that sesame seeds contained 96.05% OM, 6.37% CF, 18.03% CP, 42.97% EE and 28.68% NFE, on DM basis. Similar results were reported by El-Emam *et al.* (2016) who found that sesame seeds contained 17.0% CP, 45.70% EE, 26.90% NFE, 5.90% CF, but ash was lower (by 13.92%) than that obtained herein (3.95 vs 4.50%). In another study showed that sesame seeds are rich in mineral content (potassium, phosphorus, magnesium, calcium and sodium), fat and protein as well as vitamins (Nzikou *et al*., 2009). Generally, the chemical composition obtained in this study is nearly similar to that obtained by Kaneko *et al*. (2002), Abdelhamid *et al*. (2004), Obeidat *et al.* (2008) and El-Saidy *et al.* (2009).

Table 1. Chemical analysis of feed ingredients.

Items	DM	Composition, % DM basis					
		OM	CP	CF	EE	NFE	ASH
Concentrate feed mixture, CFM	92.01	93.85	15.05	16.11	3.45	59.24	6.15
Sesame seeds, SS	93.97	96.05	18.03	6.37	42.97	28.68	3.95
Berseem hay, BH	90.05	87.65	13.10	29.96	2.35	42.24	12.35

2-Feed intake :

Results of daily feed intake in Table 2 indicated that the average DM intake generally decreased with replacing CFM by sesame seeds in goats' rations. The values of DM intake were 94.14, 92.22 and 90.72 g/kgw$^{0.75}$ for G_1, G_2 and G_3, respectively. The corresponding values of feed intake as % BW were 3.73, 3.64 and 3.57 for G_1, G_2 and G_3, respectively. In a recent study, El-Emam *et al*. (2016) observed that the total DM intake tended to decrease with increasing level of sesame seeds in rations of growing Zaraibi kids. Generally, the values of DM intake in the current study are within the normal range given by Ahmed *et al.* (2001) for dairy goats during the lactation period (ranged from 85.85 to 89.41 g/kgw$^{0.75}$).

Table 2. Dry matter intake*for lactating Zaraibi goats fed different experimental rations.

Items	Groups		
	G_1	G2	G_3
Number of does	5	5	5
Average body weight, kg	40.46	41.21	41.59
Metabolic body size, w$^{0.75}$	16.04	16.26	16.38
Daily feed intake (as DM):			
Concentrate feed mixture, ,g/h	761	685	609
Sesame seeds, g/h	---	63.5	127
Berseem hay, g/h	749	751	750
Total dry matter intake, g/h/d	1510	1499.5	1486
DM intake, %BW	3.73	3.64	3.57
DM intake, g/kgw$^{0.075}$	94.14	92.22	90.72
Roughage:concentrate(R/C) ratio	50 :50	50 :50	50:50

Group feeding

2-Daily water consumption :

Table 3 presents data of the drinking water consumed by the Zaraibi does during the mid-lactation period. In general, the water consumption tended to decrease as a result of using sesame seeds at levels of 10 and 20% in goats' rations. The values of daily water consumption were 289, 281 and 277 ml/kgw$^{0.82}$ of G_1, G_2 and G_3, respectively. The same trend was also observed with water consumption when related to metabolic body size and the values were 375, 365 and 360 ml/kg w$^{0.75}$, respectively. But, the values of water consumption as ml/g DM intake were approximately similar (ranged from 3.96 in G_3 to 3.98 in G_1). The values of daily water consumption in the present study are nearly similar to those obtained by El-Kholany *et al*. (2016) on Zaraibi goats during the mid-lactation period (ranged from 141 to 159% BW, from 343 to 389 ml/kgw$^{0.75}$ and from 3.14 to 3.81 ml/ g DM intake).

Table 3. The effect of the experimental treatments on daily water consumption*.

Items	Groups		
	G_1	G2	G_3
L/ head/ day	6.01	5.93	5.89
Ml/ kg BW	149	144	142
Ml/ kg w$^{0.75}$	375	365	360
Ml/kg w$^{0.82}$	289	281	277
Ml/g DM intake	3.98	3.95	3.96

- **Group feeding**

3-Blood metabolites:

The effect of using sesame seeds at levels of 10 and 20% of the CFM's protein in goats' rations on some hematological and biochemical parameters are presented in Table 4. The obtained data indicated that G_2 and G_3 positively and significantly affected some hematological parameters. There were significant differences in hemoglobin concentration and MCHC between G_1 (control) and both G_2 and G_3. But, the effect of using sesame seeds in goats' rations on most biochemical parameters such as glucose, total protein, total lipids, cholesterol and urea were not significant as shown in Table 4. Yet, the effect of the tested rations on

activity of ALT and AST was significant. Finally, serum minerals (calcium, phosphorus and manganese) were not affected as a result to presence of sesame seeds in the rations. In a recent study, El-Emam *et al.* (2016) studied the effect of sesame seeds in kids' rations and they reported that most blood parameters were slightly differed among the tested groups, since some differences were significant, but all values were within the normal range reported by Jain (1986) for hematological and Kaneko (1989) for biochemical parameters for healthy goats and in line with the finding of El-Emam *et al*. (2016) when used sesame seeds in ration of growing Zaraibi goats.

Table 4. The effect of using sesame seeds in goats' rations on blood metabolites

Items	Groups		
	G_1	G2	G_3
Hemoglobin (Hb), g/dl	10.80±0.19[b]	11.85±0.19[a]	11.65±0.09[a]
Hematocrit (Hct), %	33.15±0.43	33.01±0.51	33.20±0.33
Red blood cell (RBC's) $x10^6$/ml	12.50±0.13	13.10±0.14	12.90±0.35
White blood cells (WBC's) $x10^3$/ml	13.40±0.55	12.50±0.95	13.20±0.79
Mean corpuscular volume (MCV), fl	21.55±0.25	22.30±0.65	22.50±0.65
Mean corpuscular hemoglobin (MCH) pg	7.85±0.25	7.79±0.31	7.93±0.27
Mean corpuscular hemoglobin concentrate (MCHC),%	32.58±0.39[b]	35.91±0.45[a]	35.11±0.41[a]
Glucose, mg/dl	59.40±1.00	60.50±1.45	60.40±0.19
Total protein, g/dl	6.82±0.31	6.95±0.11	7.05±1.45
Globulin, g/dl	3.32±0.25	3.52±0.33	3.57±0.88
Albumin, g/dl	3.50±0.09	3.43±0.28	3.48±0.25
Total lipids, mg/ dl	370±9.93	350±11.35	340±10.50
Cholesterol, mg/dl	103.00±2.08	101.40±1.15	100.20±4.33
AST, u/l	116.20±1.67[ab]	111.50±0.88[ab]	108.10±2.19[a]
ALT, u/l	22.30±2.08[ab]	20.60±0.88[ab]	20.30±1.20
Tri glyceride, mg/dl	40.20±1.1	50.69±1.15	53.20±1.19
Calcium, mg/dl	10.08±0.37	10.10±0.42	10.09±0.51
Phosphorus (inorganic), mg/dl	4.90±0.21	4.95±0.15	4.92±0.23
Manganese, ml/dl	2.80±0.17	2.85±0.11	2.70±0.13
Urea, ml/dl	65.02±1.62	64.40±7.94	58.30±4.89

a-b: values in the same row superscripted with different letters differ significantly (P≤0.05).

4-Physiological parameters:

Data of physiological parameters of dairy Zaraibi goats fed tested experimental rations are presented in Table 5. The obtained results indicated no significant differences in respiration rate, pulse and rectal and skin temperature. Values detected among tested groups revealed that the animals, generally, were in good health condition.

Table 5. The effect of using sesame seeds in goats' rations on physiological parameters.

Items	Groups		
	G_1	G_2	G_3
Physiological parameters:			
Respiration rate	20.50±2.31	19.75±3.15	20.11±2.57
Pulse	81.70±5.81	81.85±6.01	82.05±3.91
Rectum temperature	38.91±0.20	39.50±0.17	39.65±0.25
Skin temperature	38.35±0.35	38.51±0.20	38.60±0.23

4-Milk yield:

Data presented in Table 6 and Figure 1 showed average milk yield during the 16 weeks period as affected by the tested experimental rations. The obtained results indicated that the daily milk yield was significantly affected as a result to using of sesame seeds in goats' rations during the all lactation weeks. Similarly, the average daily milk yield was significantly better with the two sesame seeds' groups (G_2 and G_3) compared with the control group (G_1). Similarly, the total milk yield had the highest value (170.60 kg) with G_2 followed by G_3 (167.00 kg) and the lowest value (154.50 kg) was recorded with G_1 and the differences were significant. Similar results were observed by El-Emam *et al*. (2016) on performance of growing kids. They observed positive effects on average daily gain and final body weight and hence growth performance and this may be due to the improvement in metabolic parameters in rumen and blood.

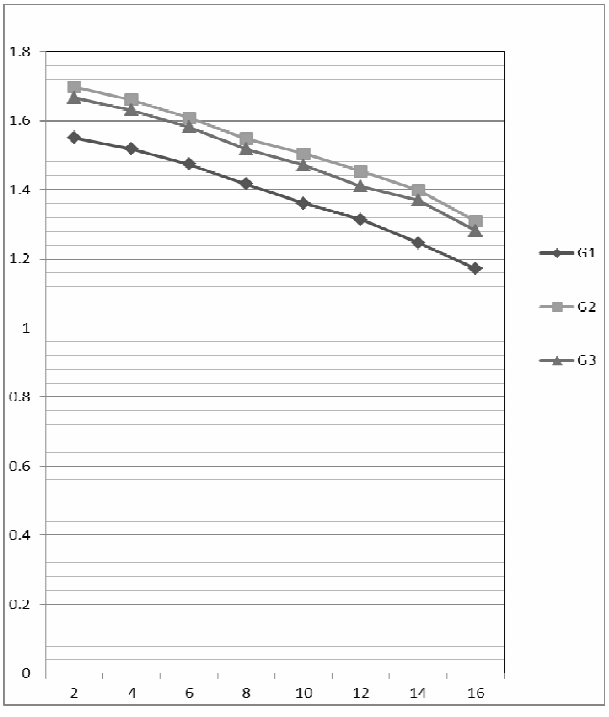

Fig. 1. Effect of experimental treatments on daily milk yield by lactating Zaraibi goats.

Table 6. Effect of the experimental treatments on daily milk yield (biweekly) by dairy Zaraibi goats.

Weeks	Groups		
	G_1	G_2	G_3
2	1.550 ± 0.06^{b}	1.698±0.04^{a}	1.666±0.41^{ab}
4	1.518±0.05^{c}	1.660±0.06^{ab}	1.630±0.05^{bc}
6	1.474±0.05^{c}	1.608±0.08^{ab}	1.582±0.08^{bc}
8	1.416±0.05^{b}	1.548±0.07^{a}	1.518±0.07^{ab}
10	1.360±0.05^{c}	1.504±0.06^{ab}	1.470±0.08^{bc}
12	1.314±0.06b^{c}	1.454±0.07^{a}	1.410±0.08^{ab}
14	1.242±0.08b^{c}	1.398±0.10^{ab}	1.370±0.09^{b}
16	1.172±0.921^{b}	1.310±0.13^{a}	1.282±0.14^{ab}
Average milk yield, kg/h/d	1.381±0.02^{b}	1.523±0.03^{a}	1.491±0.09^{ab}
Total milk yield, kg	154.50±0.155^{b}	170.60±0.076^{a}	167.00±0.125^{a}
Fat corrected milk	1.526±0.46	1.753±0.96	1.698±0.47

Means in the same row with different superscripts differ significantly at P<0.05.

5-Milk composition and its quality:

The obtained data in Table 7 indicated that milk fat percentage was significantly (P<0.05) increased with G_2 and G_3 (4.43 and 4.36, respectively) compared with G_1 (4.15). But, the effect of the tested experimental rations on other milk content (protein, lactose, total solids, solids nonfat and ash) were not significant (P≥0.05). However, the differences in milk quality parameters such as pH value and acidity as well as somatic cell counts (SCC) among the three groups were not significant (P≥0.05) and the obtained values were within the normal range given by Shehata *et al.* (2006) and Ahmed *et al*. (2008 and 2013a). In this respect, Shirzadegan and Jafari (2014) studied the effect of different levels (0, 5, 10 and 15%) of sesame wastes (SW) on milk production of dairy cows and they found that milk fat percentage significantly increased (3.65, 3.75, 3.78 and 3.88) with increasing level of SW (0, 5, 10 and 15%, respectively), but both lactose and total solids % were not significantly (P≥0.05) affected by the experimental treatments.

Table 7. Effect of the experimental treatments on milk composition and its quality of lactating Zaraibi goats.

Items	Groups		
	G_1	G_2	G_3
Average daily milk yield, k/h	1.381±0.02b	1.523±0.03a	1.491±0.09a
Milk constuents,%			
Fat	4.15±0.05b	4.43±0.03a	4.36±0.04a
protein	3.16±0.03	3.14±0.03	3.15±0.03
Lactose	4.47±0.08	4.45±0.07	4.45±0.07
Ash	0.72±0.02	0.71±0.01	0.71±0.01
Total solids	12.51±0.12	12.72±0.12	12.68±0.11
Solids non fat	8.35±0.07	8.31±0.06	8.32±0.06
Milk quality :			
Somatic cell counts (SCC) x 10^3	525±23	497±77	531±29
pH value	6.61±0.01	6.63±0.00	6.67±0..01
Acidity, %	0.163±0.001	0.165±0.001	0.170±0.001

Means in the same row with different superscripts differ significantly at P<0.05.

6-Feed conversion rate:

Data of average feed intake and average milk yield during the experimental period as well as feed conversion rate of the lactating goats are summarized in Table 8. The data indicated that the average milk yield recorded the highest value (1523 g/h/d) with G_2 followed by G_3 (1492 g/h/d) and lastly G_1 which recorded the lowest value (1381 g/h/d). Thus, the feed conversion calculated as DM and CP (intake/milk yield) was better in G_2 (0.98 and 0.140, respectively) and G_3 (1.00 and 0.143, respectively) compared with G_1 (1.09 and 0.154, respectively). Similar results were observed by El-Emam *et al.* (2016) using the same levels of sesame seeds (0, 10 and 20% of G_1, G_2 and G_3, respectively) in rations of growing Zaraibi kids. They reported that the best feed conversion as kg DM intake/kg gain was recorded with G_2 (8.69) followed by G_3 (9.01), while the bad conversion was recorded with G_1 (10.40). Finally, the obtained values in the present study of feed conversion are within the normal range given by Ahmed *et al.* (2013b) and El-Emam *et al.* (2014) for lactating goats. El-Kholany *et al*. (2016) stated that the values of feed conversion efficiency (kg DM/ kg milk) ranged from 0.904 to 1.015.

Table 8. Effect of the experimental treatments on feed conversion efficiency by lactating goats.

Items	Groups		
	G_1	G_2	G_3
Av. Daily milk yield, g/h	1381b	1523^{a}	1491^{a}
Av. Daily DM intake, g/h	1510	1488.5	1486
DM intake, g/kgw$^{0.75}$	94.14	92.22	90.72
Av. Dailey CP intake, g/h	212.65	212.92	212.80
CP intake, g/kgw$^{0.75}$	13.26	13.09	12.99
Feed conversion:			
Kg DM /kg milk	1.09	0.98	1.00
Kg CP / kg milk	0.154	0.140	0.143

Means in the same row with different superscripts differ significantly at P<0.05.

6-Economic efficiency:

Data of the effect of using sesame seeds in goats' rations on economic efficiency for the three tested rations are presented in Table 9. The obtained data indicated that the total feed cost was decreased (4.474,

4.283 and 4.092 LE/h) as a result to using of sesame seeds at levels 0, 10 and 20% in goats' rations (G_1, G_2 and G_3, respectively). On the contrary, the lowest value of price of milk yield was recorded with the control group (7.941 LE/h) compared with other groups (8.757 and 8.573 for G_2 and G_3, respectively). Thus, the total feed cost/kg milk was higher with G_1 (3.24 LE) compared with G_2 and G_3 (2.81 and 2.47 LE, respectively) and this may be attributed to the highest daily milk yield as well as the lowest price of feed consumption in both sesame seeds groups. Accordingly, the economic efficiency was noticeably higher (1.77, 2.04 and 2.10%) with increasing sesame seeds levels (0, 10 and 20%) in does' rations (G_1, G_2 and G_3, respectively). The same positive effect of sesame seeds on economic efficiency was observed also by El-Emam *et al*. (2016) with growing Zaraibi kids.

Table 9. The effect of using sesame seeds in lactating goat's rations on economic efficiency.

Items	Groups		
	G_1	G2	G_3
Daily feed intake (as fed):			
oncentrate feed mixture, ,g/h	827	744	662
Sesame seeds, g/h	----	67.57	135.15
Berseem hay, g/h	832	834	833
Cost of consumed feed, LE/h	4.474	4.283	4.092
Daily milk yield, kg /h.	1.381b	1.523a	1.491a
Price of milk yield, LE/h	7.941	8.757	8.573
Feed cost/ kg milk, LE/h	3.24	2.81	2.74
Economic efficiency, %	1.77	2.04	2.10

Means in the same row with different superscripts differ significantly at P<0.05.

CONCLUSION

It is concluded that the use of sesame seeds (unsuitable for manufacturing) to partially substitute CFM protein in dairy goats' rations had clear positive effects on milk production and feed conversion efficiency without any adverse effects on blood profile and physiological parameters. Moreover, the economic efficiency was noticeably higher by 15.25 and 18.64 % with G_2 and G_3, respectively compared with the control (G_1).

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مدي تأثر انتاج اللبن من الماعز الزرايبي الحلاب نتيجة لاحتواء العليقة علي مستويات مختلفة من بذور السمسم الغير صالحة للتصنيع كمصدر منخفض التكلفة للبروتين

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وزارة الزراعة- مركز البحوث الزراعية- معهد بحوث الإنتاج الحيواني- الدقي – جيزة – مصر.

أجري هذا البحث لدراسة تأثير استخدام بذور السمسم غير الصالحة للتصنيع لتحل جزئيا محل بروتين العلف المركز علي إنتاج اللبن وتركيبه، كفاءة التحويل الغذائي، واقتصاديات إنتاج اللبن من الماعز الزرايبي الحلاب. وقد تم استخدام عدد 15 عنزة زرايبي حلابة بمتوسط وزن 41.09 كجم وُزعت عشوائيا في ثلاثة مجموعات متساوية في العدد، غُذيت المجموعة الأولي (مج1) وهي مجموعة المقارنة علي العلف المُصنع ودريس البرسيم (بنسبة 50:50 % للمادة الخشنة الي المركزة) طبقا لمقررات NRC لسنة 1981م، وقد استخدمت بذور السمسم لتحل محل 10 و 20% من بروتين العلف المركز للمجموعتين الثانية والثالثة (مج2، مج3) علي التوالي ، واستمرت فترة التجربة لمدة 16 أسبوعا. وقد ظهرت أهم النتائج كالتالي: حدث انخفاض للمأكول اليومي من المادة الجافة نتيجة لاستبدال بذور السمسم محل العلف المركز.وفيما يتعلق بصورة الدم، فقد ظهرت تأثيرات ايجابية لبعض قياسات الهيماتولوجي خاصة تركيزالهيوجلوبين ومتوسط تركيز الهيموجلوبين بالخلية مع مجموعتي بذور السمسم (مج2، مج3)، كذلك انخفض كلا من تركيز الكوليسترول ونشاط الإنزيمات مع زيادة مستوي بذور السمسم في العلائق، والاختلافات كانت معنوية مع الإنزيمات فقط، في حين لم تتأثر معنويا قياسات الدم الأخري والقياسات الفسيولوجية مع المعاملات المختلفة.أما فيما يتعلق بمحصول اللبن، فقد أظهرت النتائج تفوقا معنويا مع مج2 و مج3 (1.523، 1.491 كجم/رأس/ يوم علي التوالي) مقارنة بالكنترول (1.381 كجم/رأس/يوم)، وكذلك حدث ارتفاع معنوي لنسبة الدهن في اللبن مع مجموعي بذور السمسم، لكن مكونات اللبن الأخري وقياسات جودة اللبن لم تختلف معنويا بين المجموعات المختبرة.وقد كانت كفاءة التحويل الغذائي (محسوبة علي أساس المادة الجافة والبروتين الخام) أفضل مع مج2 (0.98 ، 0.140 علي التوالي) ثم مج3 (1.00، 0.143 علي التوالي) وأخيرا مج1 (1.09، 0.154 علي التوالي)، وهذا انعكس علي الكفاءة الاقتصادية والتي أظهرت تفوقا ملحوظا بنسبة 15.25، 18.64% لمجموعتي بذور السمسم (مج2، مج3 علي التوالي) مقارنة بمجموعة المقارنة. وعليه يتضح من الدراسة الحالية أن استخدام بذور السمسم لتحل محل العلف المُصنع حتي 20% نجح وتفوق في إنتاج اللبن واقتصادياته من الماعز الزرايبي الحلاب.