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Productive Performance, Feed Utilization Efficiency and Blood Profile of Male Zaraibi Goats Fed Rations Containing Sesame Seeds Unsuitable for Manufacturing As An Inexpensive and Untraditional Source of Protein.

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ABSTRACT

This research work was carried out to investigate the effect of using Sesame seeds in goats rations on some rumen parameters, blood profile, feed utilization and growth performance of Zaraibi kids. Fifteen Zaraibi kids (17.53±0.24 kg live weight and 5 months old) were divided into 3 groups (5 kids each). The control group (G1) was fed a ration consisting of concentrate feed mixture (CFM) and corn silage (CS) according to NRC (1981) recommendation. Sesame seeds (SS) were used to replace 10 and 20% of total CP of rations for groups G2 and G3, respectively. The feeding trail lasted for 15 weeks. The obtained results showed that the daily DM intake tended to decrease (71.69, 67.24 and 68.01 g/kg $w^{0.75}$) as a result to substitution of CFM with SS in goat's rations (G1, G2 and G3, respectively). In the same time, the daily water consumption as ml/g/DM intake was slightly higher with increasing level of SS in the rations. Concerning ruminal parameters, the effect of the experimental rations on ruminal pH values and ammonia-N concentration were not significant. But, ruminal total VFA's during 3 and 6 hrs post-feeding were significant as higher ($P<0.05$) with G2 and G3, compared with G1. The obtained results indicated also that most tested blood profile parameters were not significantly affected by tested experimental rations. Daily body gain (DBG) recorded the highest value (76.67 g) with G2 followed by G3 (72.62 g) and lastly G1 (65.00 g) and the differences were significant. The DBG increased by 17.95 and 11.72% with G2 and G3, respectively compared with control groups (G1). The best feed utilization efficiency based on DM was recorded with G2 (8.67) followed by G3 (9.01) in comparison with G1 (10.40). Moreover, the improvement in feed efficiency, based on CP, was 15.20 and 10.40% with two tested groups (G2 and G3, respectively) compared with control (G1). Thus, the feed economic efficiency was noticeably better (by 24.07%) as a result to using of SS at two tested levels 10 and 20% compared with control group.

Keywords: Sesame seeds- Zaraibi goats- growth performance- feed economic efficiency

INTRODUCTION

Nutrition is a major factor affecting the physiological and metabolic status of from animals. In Egypt, there is a wide gap between the available feedstuffs and farm animals requirements. During summer season, green forages with reasonable protein content are not adequately available. According, there is a clear drop in productive performance of different farm animals. Many attempts were carried out to introduce some green forages or seeds containing higher protein content such as Sesbania sesban and Erythria indica (Soliman *et al.,* 1997 and Pugalenthi *et al.,* 2004). Legume seeds are valuable sources of protein, oil, carbohydrates, minerals and vitamins. They are playing an important role in human nutrition mainly in developing countries (Mohamed and Rangappa, 1992 and Yanez *et al.,* 1995). Sesame (*Sesamum indicum L.*) seed is a drought-tolerant crop adapted to many soil types (Ram *et al.,* 1990). Full-fat Sesame seed and the meal after oil extraction are not only excellent sources of edible nutrients (45 to 50% lipid, 15 to 20% protein and 10 to 15% carbohydrate (Lee *et al.,* 2005). The amino acid composition of protein is similar to that soybean meal with the exception of low lysine (Mamputu and Buhr, 1991) and higher methionine in Sesame (Dipasa, 2003). The fiber content of the seed ranges from 2.7 to 6.7% (Beckstrom-Sternberg and Duke, 1994). Nzikou *et al.* (2009) studied the quantitative evaluation of the nutritional constituents of the nutritional constituents of Sesame seeds such as protein, energy and minerals and they reported that Sesame seeds is a good source rich in all the essential nutrients needed by the live stocks. Literature on using Sesame seeds (SS) in feeding Zaraibi goats is scarce. Therefore, the aim of this work was to investigate the effect of feeding Sesame seeds as a source of protein to partly replace the expensive CP of the concentrate feed mixture on feed utilization and economical efficiency as well as growth performance. Some metabolic parameters (rumen and blood) were also studied.

MATERIALS AND METHODS

This study was conducted at the Animal Production Research Station, El-Serw, belonging to Animal Production Research Institute, Agricultural Research Center, Egypt.

Animals and feeding :

Fifteen growing Zaraibi kids, selected from El-Serw Station Herd, with an average age of 5 months and 17.53±0.24 kg weight were used. The animals were divided according to their body weight into 3 similar groups (5 each) to study the effect of using Sesame seeds (SS) as a source of protein in goat's diets at levels, of 0 (G1), 10% (G2) and 20% (G3) of total crude protein of rations. Each group was housed in a semi-roofed yard. The animals were weighed at the beginning then biweekly. Zaraibi kids were fed for 3 weeks as a transitional period on the same experimental rations before the start of the experimental work. Feeding the experimental rations lasted for 15 weeks. The nutrient requirements were calculated according to NRC (1981) of goats. The concentrate (CFM) and roughage (corn silage) were offered at 60:40 ratio as reported by Tawfik et al. (2005) and Soliman et al. (2010) on growing lambs and Zaraibi kids, respectively. Animals were fed mixed rations in groups. The CFM consisted of 26 % undecortecated cotton meal, 40

% yellow corn, 27 % wheat bran, 3.5 % molasses, 2 % limestone, 1 % common salt and 0.5 % minerals mixture. The chemical composition of the tested ingredients was determined (Table 1). Water was available at all times and was measured as average for each group (per ml/h/l). Diets were offered twice daily at 8.0 am and 3.0 pm any refused were daily recorded. Proximate chemical analysis of the feeds was carried out according to A.O.A.C. (1995).

Rumen samples:

Rumen fluid samples were taken from 3 animals of each experimental group using stomach tube before feeding (0 time) and at 3 and 6 hrs post-feeding at the end of growin g period. The samples were filtered through 3 layers of gauze and immediately subjected to the determination of pH value by pH meter. Ammonia nitrogen (NH3-N) concentration was measured according to the method of Conway (1957), Microbial protein was determined according to Schultz and Schultz (1970), whereas total volatile fatty acids (VFA's) was determined according to the technique described by Warner (1964).

Blood samples:

Blood samples were collected from the jugular vein once before feeding (3 animals in each) at the end of growing period. Blood samples were centrifuged at 4000 rpm for 20 min. Part of the separated serum was directed to enzymes activity determination, while the other part was stored frozen at-20 0c till the biochemical analysis. Commercial kits were used for colorimetric biochemical determinations.

Economic efficiency :

Economic efficiency was calculated as total output/ total input according to the local prices (where 1 ton of CFM cost 2550LE, CS cost 300 LE and 1 ton Sesame seeds coat 1800 LE while1 kg live body weight of male Zaraibi goats for 35LE).

Statistical analysis:

Data were statistically analyzed using One-Way Layout with Means Comparisons Procedure SAS (2003). Significant differences among means were evaluated using Duncan's Multiple Range Test of SAS (2003). The model used for the analysis of all parameters was:

$$Yij = \mu + Ti + eij$$

Where: μ is the overall mean
Ti is the treatment type
eij is the random error term

RESULTS AND DISCUSSION

Chemical composition :

The chemical analysis as shown in Table 1 indicated that Sesame seeds (SS) contained 17.0% CP, 45.70% EE, 52.63% NFE, 5.90% CF and 4.50 % Ash. Similar results were reported by Lee et al., 2005, Beckstrom-Sternberg and Duke, 1994, Kaneko et al., 2002 and El- Saidy et al., 2009. In this respect, Nzikou *et al.* (2009) reported that the Sesame seeds contained 5.7% moisture, 20% CP, 3.70% Ash, 3.2 CF, 54.0% fat and 13.4 carbohydrate, in addition, the seeds were found to be good source of minerals such as potassium, phosphorus, magnesium, calcium and sodium.

Table (1): proximate chemical analysis of feed ingredients.

Feed	DM	On DM basis					
		OM	CF	CP	EE	NFE	Ash
Concentrate feed mixture, CFM	91.30	94.17	15.50	14.00	3.33	61.34	5.83
Sesame seeds, SS	94.50	95.50	5.90	17.00	45.70	26.90	4.50
Corn silage, CS	30.00	90.90	29.10	9.00	3.09	49.71	9.10

Daily feed intake and water consumption:

The average daily DM intake of Zaraibi kids is summarized in Table 2. The total DM intake as g/h tended to decrease (676, 665 and 654.3 g) with increasing level of Sesame seeds (0, 10 and 20%) in rations of Zaraibi kids. The corresponding values of intake when related to metabolic body size were 71.69, 67.24 and 68.01 g/h $kgw^{0.75}$, respectively.

Table (2): Average daily feed intake and water consumption of Zaraibi kids fed the experimental rations.

Item	Groups		
	G1	G2	G3
Daily DM intake, g/h:			
CFM	405	348	290
SS	--	47.7	95.3
CS	271.0	269.3	269.0
Total DM intake	676	665	654.3
DM intake, %BW	3.39	3.13	3.20
DM intake, $g/kgw^{0.75}$	71.69	67.24	68.01
Roughage: Concentrate (R/C) ratio	40:60	40:60	41:59
Water consumption:			
L/h/d	2.21	2.13	2.05
ml/kg BW	111	100	100
ml/kg $w^{0.75}$	234	215	213
ml/g DM intake	3.27	3.20	3.13

The same trend was observed also with daily intake as % BW among the experimental treatments as shown in Table 2. This decrease in DM intake with increasing level of SS could be attributed to the crude protein content in SS which was higher than CFM (17.0 vs 14.0 %) as shown in Table 1. The obtained values of daily feed intake are within the normal range given by Ahmed et al. (2000) for Zaraibi kids fed restricted 100% high concentrate (ranged from 623.1 to 668.9 g/h). Also, El-Kholany et al. (2013) found that the daily DM intake when related to body weight (% B W) ranged from 3.19 to 3.39 in male Zaraibi goats fed diets containing Sesbania seeds as a source of protein.

Concerning water consumption, the obtained data indicated that the differences in water consumption as L / head and ml / kg w 0.75 tended to decrease with increasing level of SS as shown in Table 2. Similarly, the values of daily water consumption was lower (3.27, 3.20 and 3.13 ml/g DM intake) with increasing level of SS in goat rations (0, 10 and 20%, respectively). The values of water consumption in this study are nearly similar to those obtained by Ahmed et al., (2009) on growing Rahmani lambs (ranged from 1.90 to 3.16 ml/g DM intake) and Soliman et al., (2010) on growing Zaraibi kids (ranged from 2.22 to 3.30 ml/ g DM intake).

Ruminal parameters:

Results of pH values (Table, 3) indicated that maximum pH values were recorded at 0 time with all groups without significant differences among treatments and then gradually decreased to the minimum values at 3 hrs. post feeding and tended to increase again thereafter at 6 hrs. post feeding with all groups. Similar trend was found by Ibrahim et al. (2012) and El-Sayed and Sadek (2015) with growing lambs and Zaraibi kids, respectively. At the same time, ruminal ammonia-N concentration was greatly higher post-feeding than before feeding and that maximum values of NH3-N in the rumen were reached at 3 hrs. post-feeding then decreased with all groups without noticeable differences among tested experimental groups. Similar results were observed by El-Kholany et al., (2013) with using Sesbania seeds in goat's rations.

The obtained results indicated that microbial proteins content during 3 and 6 hrs. Post-feeding was significantly higher ($p< 0.05$) with G2 (0.582 and 0.508 g/100ml, respectively) compared with G1 (0.560 and 0.485 g/100ml, respectively), whereas G3 recorded medium values as shown in Table 3. Generally, the highest values of microbial protein (0.392, 0.582 and 0.508 g/100ml) and lowest values of ruminal ammonia-N concentration (16.20, 23.18 and 22.10 g/100ml) were recorded with G2 at all times (0, 3 and 6 hrs., respectively).

Concerning total VFA,s concentration, it could be noticed that ruminal total VFA,s concentration at 3 and 6hrs. post-feeding were significantly lower with control ration (G1) than those of two tested rations with no significant differences among them. These results may be possibly related to the high gross energy content of the Sesame seeds as reported by Lee et al. (2005) and El-Saidy et al., (2009).

Generally, the highest value of total VFA,s concentration was recorded at 3 hrs. post-feeding which was reflected on lowering pH values (Table, 3) at that time as reported by Ahmed et al. (2013) and Mehrez et al. (2013) with female and male Zaraibi goats, respectively. The obtained data of rumen parameters are within the normal range reported by Ahmed and El-Kholany (2012), El-Sayed and Sadik (2015) Gabr et al. (2015) with small ruminants (sheep and goats).

Table (3): Some rumen liquor parameters of male Zaraibi goats fed the experimental rations.

Item	Hours	G1	G2	G3
pH value	0	6.90±0.10	6.93±0.17	6.98±0.12
	3	6.57±0.09	6.48±0.04	6.52±0.04
	6	6.70±0.06	6.58±0.04	6.62±0.04
Ammonia-N (mg/100ml)	0	16.33±0.61	16.20±0.53	17.57±0.47
	3	23.20±0.55	23.18±0.53	24.20±0.46
	6	22.60±0.64	22.10±0.44	23.37±0.98
Microbial protein (g/100ml)	0	0.337±0.006	0.342±0.003	0.340±0.01
	3	0.560±0.008^{b}	0.582±0.01^{a}	0.572±0.008^{ab}
	6	0.485±0.007^{b}	0.508±0.008^{a}	0.503±0.007^{ab}
Total volatile fatty acids (mEq/100m)	0	8.80±0.25	9.00±0.29	9.10±0.31
	3	10.10±0.10^{b}	10.97±0.18^{a}	11.23±0.15^{a}
	6	10.00±0.12^{b}	10.83±0.09^{a}	11.00±0.12^{a}

a-b: Means in the same row with different superscripts differ significantly at P<0.05.

Blood profile:

The effect of the tested experimental rations on most blood parameters was not significant as shown in Table 4. At the same time, the values of Hb and RBC,s were increased with using of SS in goat's rations. Regarding the concentrations of total protein, albumin, globulin, creatinine, urea, uric acid and HDL they were statistically non-significant. But, the concentration of glucose, cholesterol, LDL and activity of AST were increased with increasing level of SS and the differences were significant in serum glucose, cholesterol and LDL only. These results may be possibly related to the high gross energy content of the Sesame seeds. In the same line, the highest values ($P< 0.05$) of triglyceride and activity of ALT were recorded with G3.

Generally the obtainedidata showed that mostiserum parametersiwere slightly differediamong the testedigroups, though some differencesiwere significantibut, all values wereiwithin the normalirange as reported byiKaneko (1989), Ahmed (1999), Ahmediet al, (2009), Sadek (2010), Amr et al. (2014) and Gabr et al. (2015) withiboth sheepiand goats.

Table (4): Blood profile of male Zaraibi goats as affected by different experimental rations.

Item	G1	G2	G3
Hemoglobin (Hb), g/dl	11.03±0.15^{b}	11.77±0.15^{a}	11.30±0.10^{b}
RBC's, 10^6/ul	12.67±0.17^{b}	13.63±0.19^{a}	13.00±0.25^{ab}
Total Protein, g/dl	9.33±0.66	8.27±0.13	8.77±0.23
Albumin (A), g/dl	4.07±0.18	4.03±0.24	4.07±0.12
Globulin (G) , g/dl	5.27±0.49	4.23±0.18	4.80±0.25
A/G ratio	0.78±0.04	0.96±0.10	0.85±0.07
Creatinine, mg/dl	1.13±0.09	1.03±0.07	0.97±0.03
Urea, mg/dl	26.67±1.45	28.00±3.51	33.67±2.03
Uric Acid	7.37±0.43^{b}	7.87±0.12a^{b}	8.47±0.29^{a}
Glucose, mg/dl	57.50±0.15^{c}	58.30±0.21^{b}	61.20±0.06^{a}
Cholesterol, mg/dl	82.50±1.44^{b}	103.50±7.79^{b}	132.50±10.10^{a}
Triglyceride, mg/dl	54.00±3.46^{b}	42.50±4.33^{b}	90.00±2.89^{a}
HDL Cholesterol, mg/dl	23.00±1.15	21.00±0.58	21.00±1.15
LDL Cholesterol, mg/dl	48.70±1.91^{b}	74.00±8.08^{ab}	93.50±10.68^{a}
Cholesterol /HDL	3.63±0.25^{b}	4.91±0.24^{ab}	6.45±0.83^{a}
LDL/HDL	2.15±0.19^{b}	3.50±0.29^{ab}	4.58±0.76^{a}
AST, ul	147.50±1.44	157.50±1.44	150.00±5.77
ALT, ul	66.00±0.58^{ab}	60.00±5.77^{b}	72.50±0.87^{a}
AST/ALT	2.24±0.00^{ab}	2.71±0.29^{a}	2.07±0.05^{b}

a-c: Means in the same row with different superscripts differ significantly at P<0.05.

Growth performance:

Performances of growing Zaraibi kids in relation to different feeding schemes are presented in Table 5. The obtained data showed that rthe final weight of growing Zaraibi kids was better as a result to using of SS in two tested groups (24.44 and 23.50 kg for G2 and G3, respectively) compared with control group (22.66 kg). Daily body gain (DBG) recorded the highest values (76.67g) with G2 followed by G3 (72.62 g) and lastly G1 (65.00 g) and the differences were significant. The positive effects of two SS rations especially G2 on growth performance may be due to the improve in metabolic parameters (rumen and blood) as reported earlier.

Feed utilization:

Feed conversion of the experimental rations is showed in Table 6. The best feed conversion (the lowest values) as kg DM intake/kg gain was recorded with G2 (8.69) followed by G3 (9.01). The bad conversion was recorded with G1 (10.40). The improvement in feed utilization efficiency with using SS at levels 10 and 20% were 16.63 and 13.37 % , respectively comparing with the control group. Similarly , the values of feed conversion expressed as CP intake/ kg gain was better in kids received Sesame diets (1.06 and 1.12 for G2 and G3, respectively) compared with control (G1, 1.25). Thus, the feed efficiency calculated as crude protein/kg gain were better in G2 and G3 compared with the control (G1) being 15.20 and 10.40%, higher than the control, respectively.

Table (5): Growth performance of Zaraibi kids fed the experimental rations.

Item	G1	G2	G3
No. of kids	5	5	5
Feeding periods, weeks	12	12	12
Initial weight, kg	17.20±0.58	18.00±0.77	17.40±0.51
Final weight, kg	22.66±0.52	24.44±0.66	23.50±0.64
Total body gain, kg	5.46±0.24^{b}	6.44±0.48^{a}	6.10±0.31^{ab}
Daily body gain, g	65.00±2.83^{b}	76.67±2.15^{a}	72.62±3.75^{ab}

a-b: Means in the same row with different superscripts differ significantly at P<0.05.

Table (6): feed utilization efficiency by Zaraibi kids as affected by the experimental rations.

Item	G1	G2	G3
No. of kids	5	5	5
Average body weight, kg	19.93	21.22	20.45
Metabolic body size, $w^{0.75}$	9.43	9.89	9.62
Average feed intake*during the experimental period, g/h/d			
CFM	405	348	290
SS	--	47.7	95.3
CS	271.0	269.3	269.0
Total DM intake	676	665	654.3
DM intake, g/$kgw^{0.75}$	71.69	67.24	68.01
CP intake, g/h	81.09	81.07	81.01
CP intake, g/ $kgw^{0.75}$	8.60	8.20	8.42
Feed conversion:			
Kg DM/kg gain	10.40	8.67	9.01
Kg CP/kg gain	1.25	1.06	1.12

***Group feeding.**

Generally, the obtained values of feed utilization are within the normal range given by Soliman et al. (1997), Ahmed et al. (2000) and Ahmed (2003) for male goats during growing period. In a recent study, Gabr et al. (2015) found that the feed efficiency of growing Zaraibi kids ranged from 8.51 to 9.4 kg DM intake / kg gain.

Economic efficiency:

Economic efficiency, estimated as price of gained weight divided by cost of feed consumed for that gain, is presented in Table, 7. The economic efficiency of feeding Zaraibi kids on different experimental rations is shown reduction in feeding cost (1.4031, 1.3318, 1.2615L.E) with increasing level of Sesame seeds (0, 10 and 20%) in the rations (G1, G2 andG3, respectively) Also, using Sesame seeds in goats rations reduced feed cost/kg gain to 17.37 L.E for both G2 and G3 compared with value of 21.59 L.E for control (G1). Thus, the economic efficiency was noticeably better (1.62, 2.01 and 2.01) as a result to using of Sesame seeds at level 0, 10 and 20% in diets of growing male Zaraibi goats. Generally, the economic efficiency was improved by 24.07 % with two Sesame seeds rations (G2 and G3), compared with G1 (control).

Table (7): Economic efficiency of Zaraibi kids fed different experimental rations.

Item	G1	G2	G3
Daily body gain, g	65.00	76.67	72.62
Daily feed intake (g/h) as fed:			
From CFM	444	381	318
From SS	--	50.48	100.85
From CS	903	898	897
Cost of consumed feed, (L.E./h)	1.4031	1.3318	1.2615
Price of weight gain, (L.E./h)	2.27	2.68	2.54
Feed cost/kg gain, (L.E.)	21.59	17.37	17.37
Feed economic efficiency, %	1.62	2.01	2.01

The prevailing prices, per ton, at time of the study are, CFM 2550 L.E., CS 300 L.E. and 1 ton SS 1800 L.E. while,1 kg live BW of kids was 35 L.E.

CONCLUSION

It could be concluded that using Sesame seeds-unsuitable for manufacturing at level of 10 (G2) and (G3) 20% had a positive effect on improving daily body gain of growing Zaraibi kids and the improvement was better with the low level (reached to 17.95 in G2 vs. 11.72% in G3). Moreover, feed utilization and economic efficiency were noticeable better with two tested groups (G2 and G3) without any adverse effects on metabolic parameters (rumen and blood). Further studies are however needed to evaluate the utilization of such new by-products at higher levels by some other farm animals during different physiological stages and management conditions.

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الأداء الإنتاجى وكفاءة تحويل الغذاء وصورة الدم فى ذكور الماعز الزرايبى المغذاة على علائق تحتوى بذور السمسم الغير صالحة للتصنيع كمصدر رخيص للبروتين.

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اجرى هذا العمل البحثى لدراسة تأثير استخدام بذور السمسم فى علائق الماعز الزرايبى على بعض قياسات سائل الكرش، صورة الدم، وكفاءة التحويل الغذائى ومعدلات النمو والكفاءة الاقتصادية لذكور الماعز الزرايبى، ولتحقيق هذا الهدف تم استخدام عدد ١٥ ذكر ماعز زرايبى نامى) بمتوسط وزن ١٧.٥٣±٠.٢٤كجم وعمر ٥ شهور (فى ثلاثة مجموعات متساوية، غذيت المجموعة الاولى) مج١ على العلف المركز وسيلاج الذرة طبقا لمقررات NRC (1981) وقد تم استخدام بذور السمسم لتحل محل ١٠، ٢٠% من بروتين العلف المركز للمجموعتين الثانية والثالثة) مج٢، مج٣على التوالى (وقد استمرت التجربة عدد ١٥ أسبوع وكانت أهم النتائج كالتالى: انخفض المأكول اليومى عندما كان منسوبا لحيز الجسم التمثيلى – مع استخدام بذور السمسم محل العلف المركز وسجل القيم ٧١.٦٩، ٦٧.٢٤، ٦٨.٠١جم/كجم حيز جسم تمثيلى للمجموعات الثلاثة على التوالى .وفى نفس الوقت حدث ارتفاع فى استهلاك الماء) مل/جم مادة جافة مأكولة (مع ارتفاع نسبة إحلال السمسم فى العلائق. فيما يتعلق بقياسات سائل الكرش، فقد لوحظ أن تأثير العلائق التجريبية الثلاثة على حموضة سائل الكرش وآمونيا سائل الكرش كان غير معنويا، فى حين ارتفع معنويا كلا من الأحماض الدهنية الطيارة الكلية والبروتين الميكروبى بعد الأكل مع مج٢و مج٣ مقارنة بالكنترول .أظهرت النتائج أيضا أن معظم قياسات سائل الكرش لم تتأثر تأثرا ملحوظا بواسطة العلائق المختبرة. فيما يتعلق بمعدل النمو اليومى فقد سجلت أعلى قيمة مع مج٢ (٧٦.٦٧جم) ثم مج٣ (٧٢.٦٢جم) وأخيرا سجلت أقل قيمة مع مج١ (٦٥.٠٠ جم) (والاختلافات كانت معنوية. بالنسبة لكفاءة التحويل الغذائى محسوبة على أساس المادة الجافة كانت أفضل مع مج٢ (٨.٦٧) ثم مج٣ (٩.٠١) فى حين كانت مج٣ هى الأسوأ (١٠.٤٠) ، أيضا بالنسبة لكفاءة التحويل الغذائى محسوبة على أساس البروتين الخام كانت أفضل مع مج٢، مج٣ بنسبة١.٠٦، ١.١٢%على التوالى مقارنة بالكنترول .لذلك كانت الكفاءة الاقتصادية الأفضل بنسبة (٢٤.٠٧%) فى معاملة السمسم مج٢، مج٣ مقارنة بالكنترول. وتوصى الدراسة باستخدام بذور السمسم الغير صالحة للتصنيع فى العلائق المتكاملة بنسبة تصل الى ٢٠% من بروتين العليقة الكلية كمصدر علف غير تقليدى جديد أدى إلى تحسن فى الزيادة اليومية فى وزن الجسم والكفاءة الاقتصادية دون تأثير على قياسات الكرش و الدم فى علائق الماعز الزرايبى. كما توصى الدراسة بمزيد من البحوث لاستخدامه فى علائق الحيوانات المزرعية خلال المراحل الانتاجية و الفسيولوجية المختلفة.