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IMACT OF USING CHAMOMILE FLOWER ON THE PERFORMANCE OF RAHMANI SHEEP

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ABSTRACT

Twenty one growing Rahmani lambs were used to investigate the effect of chamomile (*Matricaria chamomile*)on growth performance of Rahmani lambs aged 3 months old and weighing on average 19.87 kg. Lambs were divided randomly into three equal groups (7 lambs each). Animals in groups G1, G2 and G3 received 0,1 and 2 g chamomile /head / day, respectively in their diets. Moreover, 12 Rahmani rams were used to evaluate the nutritive value of the tested rations. Feeding allowances were calculated according to NRC (1985).The data indicated that digestibilities of all nutrients were improved with increasing chamomile level (0,1 and 2 g/h/d) in sheep rations and the differences were significant between G1 and G3 in DM, CF and CP digestibilities. Also using chamomile in the tested rations (G2 and G3) led to a significant increase in nutritive value (TDN and DCP). Results showed that chamomile supplementation in sheep rations did not significantly affect rumen pH values. But, ammonia –N concentration postfeeding tended to decrease with the two chamomile levels (G2 and G3)compared to G1 (control) and the differences were significant between G1 and G3 at 2 hour only. Using chamomile in sheep rations had positive effects on ruminal total VFA's and total number of protozoa as well as microbial protein content. At the same time, the values of Hb, RBC's and WBC's tended to increase in animals given chamomile flowers, but without significant differences. Serum globulin was significantly higher with chamomile treatments (G2 and G3) compared with G1.Average daily body gain (DBG) was significantly lower with G1 than G3 during the 1st period (172.29 vs. 192.00 g) and whole period (165.86 vs. 181.29 g). But , the effect of the two chamomile treatments on DBG was not significant during the 2nd period. Feed utilization efficiency (based on DM, TDN and DCP) was better with increasing chamomile level (0,1 and 2 g/h/d) in diets of growing Rahmani sheep. Moreover, using chamomile in lambs rations improved also economical efficiency.

Keywords: Rahmani lambs, chamomile flowers , nutritive value, rumen and blood parameters, feed efficiency, growth performance, economical efficiency.

INTRODUCTION

Aromatic plants are available in Egypt, since 37347 Feddan are cultivated by aromatic plants produced 84795 tons/ year (Wideneki et al., 1998). Many attempts were carried out to use natural materials such as medicinal plants which widely accepted as feed additives to improve the efficiency of feed utilization and animals productive performance. Moreover, adding medicinal herbs in animal rations was the preventive solution to avoid the hazard of side effects using chemicals (Abou- Zeid, 1986, Singh et al., 1993, Kholif, 2000, Ayyad 2003 and Mohamed et al., 2003). In a recent study, Shehata et al.(2002) observed that using medicinal herbs such as chamomile

in Zaraibi goats had a positive effect on milk yield and milk fat and protein yield as well. The same authors reported that using chamomile in dairy goats' diets at a level of 5g/kg BW reduced somatic cell counts from 459,000 cells /ml to 251,000 cells /ml. In another study, serum total lipids and cholesterol were reduced while protein and triglyceride were increased as a result of adding both chamomile and thyme in goat's rations (Zeid and Ahmed, 2004). They found also that the daily milk yield was the highest (1.586 kg) with chamomile treatment followed by thyme treatment(1.540kg) and lastly the control which recorded the lowest value (1.407kg) without any adverse effect on milk composition. This study aimed to investigate the effect of using chamomile flowers at different levels(0,1 and 2 g/head/day) on sheep performance.

MATERIALS AND METHODS

This study was carried out at El-Serw Experimental Research Station, Animal Production Research Institute, Agricultural Research Center. Twenty one Rahmani lambs, selected from El-Serw Station herd, with an average age of 3 months and weighing on average 19.87. kg were used. The animals were divided into 3 equal groups (7 lambs each) according to their live body weight. The animals were weighed at the beginning then biweekly. The lambs were fed for 30 days as a transitional period on the same experimental rations before the start of the experimental work.

Rahmani Lambs received diets in groups. lambs in G1 received concentrate feed mixture (CFM), yellow corn (YC) and berseem hay (BH)as a control diet, while those in G2 and G3 received the control diet plus 1 and 2g chamomile per head daily, respectively. Feeding allowances of crude protein and energy were calculated according to NRC(1985). Thus, the yellow corn was used with concentrate feed mixture to adjust the nutritional requirements and also for assurance a constant roughage concentrate (R/C) ratio. Values of R/C ratio was 40:60 in all treatments. The ratio of YC was about 25% from concentrate mixture (CFM+YC) in all treatments. The CFM consists of 20% un-decorticated cottonseed meal, 30% yellow corn, 7% soybean meal, 27% wheat bran, 7% rice bran, 5% molasses, 2.5% limestone, 1.0% common salt and 0.5% minerals mixture. The chemical analysis of the dietary ingredients (CFM, YC and BH) and control diet is shown in Table (1) .

Table (1): Chemical analysis of the feedstuffs and control ration (%dry matter basis).

Item	Concentrate feed mixture(CFM)	Yellow corn (YC)	Berseem hay (BH)	Control ration(G1)
DM	91.35	92.03	88.73	90.41
OM	93.27	98.10	87.25	91.59
CF	16.15	2.61	29.09	19.20
CP	15.31	8.43	11.07	12.61
EE	3.35	4.31	2.09	3.03
NFE	58.46	82.75	45.0	56.75
Ash	6.73	1.90	12.75	8.41

On the other hand, three digestibility trials were conducted on 12 adult Rahmani rams averaged 68.43 kg body weight. The rams were divided into 3 equal groups (4 rams each) to receive the three mentioned diets. Each digestibility trial lasted for 42 days, at which 35 days were considered as a preliminary period for adapting the animals to the tested rations, followed by 7 days as a collection period. During the last day of each digestion trial rumen and blood liquor samples were taken from each animal. Water was available all times. The rations were offered twice daily at 8 am and 3pm.

Blood samples were collected from the jugular vein once at 4 hours post feeding. The whole blood samples were directly analyzed hematologically. Another samples were centrifuged at 4000 rpm for 20 min. Part of the separated sera was directed for enzymes activity determination while the other part was stored frozen at – 20 °C till the biochemical analyses. Commercial kits were used for all colorimetric biochemical determinations.

Composite samples of feed ingredients and experimental rations were taken and grounded. Sampling of daily output feces were taken after drying at 60°c for 48 hrs and then ground. The grounded samples were stored in stopper bottles for chemical analysis. Proximate chemical analysis of the dietary ingredients and feces was carried out according to A.O.A.C.(1995).

Data were statistically analyzed by variance test according to Snedecor and Cochran (1982) while the differences among means were tested using Duncan's Multiple Test (Duncan, 1955).

RESULTS AND DISCUSSION

Digestion coefficients and nutritive values:

Data of the digestibility trials presented in Table (2) showed that the daily DM intake (g/kg $W^{0.75}$ and g/kg BW) of Rahmani rams was not significantly affected with different treatments. The feed intake of rations per kg $W^{0.75}$ ranged from 43.20 to 43.48 g vs. 15.0 to 15.13 g/kg BW. Similar values of daily DM intake (ranged from 40.84 to 40.98 g/kg $W^{0.75}$ in Rahmani sheep and from 40.00 to 40.16 g/kg $W^{0.75}$ in Zaraibi bucks) were observed by Abdelhamid et al.(1999a).

The digestibility of all nutrients were improved with the two chamomile supplemented groups (G2 and G3) compared with G1 (control) as shown in Table (2). Moreover, the DM, CF and CP digestibilities of G1 were significantly lower than G3 but insignificantly than G2. At the same time, the TDN and DCP values were significantly higher with the presence of chamomile flowers in sheep rations(G2 and G3) as shown in Table (2). The obtained results indicated also that the highest values in digestion coefficients of all nutrients as well as nutritive values (TDN and DCP) were recorded with the high level of chamomile (G3) followed by the lower level of chamomile (G2) and finally, the lowest values were recorded with the control treatment (G1). The positive effect of chamomile flowers on digestion coefficients and nutritive values was observed also by El- Saadany et al. (1996), Aboul-

Fotouh et al. (1999), Allam et al (1999) and Zeid and Ahmed (2004). These findings may suggest that these supplements render the feeds more available for utilization, either by affecting positively the population of microflora or improving feed utilization through slowing feed rate of passage through the digestive tract which reflected in better absorption (Zeid, 1998). In a recent study, Mohamed et al.(2003) observed that the digestion coefficients of all nutrients (except EE) and TDN, SE and DCP were significantly improved by adding *Nigella sativa*, *Matricaria chamomile* or *Rosemarinus officinalis* to sheep rations. On the meantime, results obtained might indicate a stimulated rumen microflora activity through one of the following : a) Decreasing number and activity of antagonistic organisms, b) saving some important micro factors to rumen microflora (as micro elements , vitamins, hormones, enzymes or unknown factors which are required to the efficient digestion, absorption and metabolism) which are available as effective groups or components in medicinal plants, c) decreasing hazards of some harmful heavy metals and d) Minimizing effectively hazards of mycotoxins by inhibition of fungal growth and aflatoxin production (Allam et al., 1999)..

Table (2): Digestion coefficients and nutritive values of the tested diets by Rahmani rams.

Item	Treatments		
	G1	G2	G3
Body weight, kg	68.3±0.75	67±0.41	70±0.58
D M intake:			
G/h/d	B 1032.5±5.48	a 1012.3±3.96	b 1045.5±6.06
G/kg$^{w0.75}$	43.48±0.14	43.22±0.03	43.20±0.02
G/kg BW	15.01±0.03	15.00±0.01	15.13±0.01
Digestion coefficients % :			
DM	B 67.01±0.52	b 68.29±0.29	a 70.00±0.54
OM	70.29±0.43	71.42±0.24	72.52±0.85
CF	B 60.54±1.32	ab 62.31±0.61	a 64.35±0.42
CP	B 71.54±0.38	ab 73.59±0.54	a 74.80±0.90
EE	77.31±0.55	78.17±0.21	79.46±0.43
NFE	72.88±0.41	74.43±1.06	75.07±0.64
Nutritive value%:			
TDN	b 67.27±0.39	a 68.81±0.48	a 69.79±0.46
DCP	b 9.02±0.05	a 9.28±0.07	a 9.43±0.11

a-b :Means in the same row followed by different letters differ significantly at (P<0.05)

Rumen liquor parameters:

Results in Table(3) showed that chamomile supplementation in Rahmani rams diets did not significantly affect rumen pH values. This result agreed with those of Allam et al.(1999) and Mohamed et al.(2003) who reported that the pH value of rumen liquor was not significantly affected by medicinal plants supplementation such as chamomile flowers. Data show also, that ammonia-N concentration tended to decrease with two chamomile

supplemented groups (G2 and G3) compared with G1(control) especially after feeding. At the 2 hr post feeding, ammonia –N concentration (mg/100ml) of G1 was significantly higher (23.58) than G3 (21.93) but insignificantly than G2 (22.85). it could be suggested that these results might be attributed to the action of chamomile as buffer as reported by Mohamed *et al.* (2003) with ewes fed on some medicinal plants such as *Nigella sativa* and rosemary. Rumen total VFA's concentrations postfeeding (2,4 and 6 hrs) were the highest values with G3 then G2, while the lowest value was detected with the control group (G1) and the differences were significant at 4 hr alone. In another study, Allam *et al* (1999) observed that ruminal total VFA's concentration (m Eq/100ml) were increased from 8.64 in control diet to 11.39 in chamomile treatments (60 mg /kg BW, daily)during the 6 hr post feeding. Generally , the highest value of total VFA's concentration was at 4 hrs post-feeding which was reflected on lowering pH values at that time as reported by Ahmed *et al.*(2001) and Zeid and Ahmed (2004).

Table (3): Effect of experimental treatments on rumen pH value, ammonia-N concentration and total volatile fatty acids (TVFA's) of Rahmani sheep

Item	Hours	Treatments		
		G1	G2	G3
pH value	0	7.08±0.09	7.05±0.12	7.00±0.12
	2	6.73±0.05	6.70±0.07	6.69±0.04
	4	6.20±0.07	6.25±0.06	6.21±0.08
	6	6.43±0.05	6.50±0.06	6.48±0.09
Ammonia-N (mg/100ml)	0	14.60±050	15.05±0.57	15.13±0.47
	2	b 23.58±0.48	ab 22.85±.40	a 21.93±0.18
	4	23.48±0.40	23.28±0.73	22.90±0.49
	6	22.50±0.61	21.88±0.52	21.60±0.46
TVFA's (m Eq/100ml)	0	8.13±0.09	8.05±0.18	8.23±0.50
	2	10.08±0.30	10.25±0.14	10.43±0.11
	4	b 10.80±0.09	a 11.60±0.07	a 11.85±0.06
	6	10.53±0.09	10.95±0.10	11.40±0.14

a-b :Means in the same row followed by different letters differ significantly at (P<0.05)

Microbial protein content (Table 4) was significantly improved (0.678 and 0.685 g/100ml) with the two chamomile supplemented groups (G2 and G3, respectively)compared with the control group (0.575g/100ml). The same trend was observed also for total number of protozoa. Table 4 shows that total number of protozoa in rumen liquor was improved by about 9.0 and 10.0 % with the two chamomile treatments (G2 and G3, respectively)compared with the control group (G1).

Table (4): Effect of experimental treatment on ruminal microbial protein and total number of protozoa of Rahmani sheep

Item	Hours	Treatments		
		G1	G2	G3
Microbial protein (g/100ml)	0	0.338±0.02	0.343±0.03	0.340±0.01
	4	B 0.575±0.03	a 0.678±0.01	a 0.685±0.02
Protozoa	0	0.405±0.03	0.418±0.04	0.433±0.02
	4	0.765±0.03	0.833±0.02	0.840±0.01

a-b :Means in the same row followed by different letters differ significantly at (P<0.05)

Values of protozoa and microbial protein are within the normal ranges reported by Ahmed (1995) , Abdelhamid *et al.*(1999b) and Ahmed *et al.* (2000) for small ruminants(sheep and goats). The improvement of protozoa numbers and microbial protein concentration in the rumen of sheep fed chamomile supplemented rations may be due to the regulatory action of medicinal plants on NH_3 –N concentration in the rumen as reported by Mohamed *et al* (2003) and consequently maintaining the optimal environment for protozoa and other micro-organisms which gave high level of microbial protein synthesis in the rumen.

Blood components :

Data of blood components of Rahmani sheep fed different experimental rations are presented in Table(5). The results indicated that the values of Hb, RBC's and WBC's tended to increase in animals given chamomile flowers especially G3, but the differences were not significant. The same effect was observed also with glucose, total protein, urea-N and creatinine. Moreover , serum globulin was significantly higher with the two chamomile treatments (G2 and G3) compared with G1 whereas, serum albumin concentrations showed some fluctuations among groups. Meanwhile , serum activities of GOT and GPT were lower with the chamomile supplemented rations (G2 and G3) than the control group (G1) and the differences were significant with serum GPT alone as shown in Table (5). Zeid (1998) studied the effect of using some medicinal plants as feed additives and found that serum total protein and globulin was higher with chamomile treatment(60 mg/ kg BW) compared with the other herbs or the unsupplemented diet. Similarly, Zeid and Ahmed (2004) indicated that serum protein was significantly higher while total lipids were significantly reduced in goats as a result of chamomile flowers inclusion to the diet. Generally, the obtained data showed that most blood profile parameters were slightly different among groups tested though some differences was significant but, all values were within the normal ranges as reported by Kaneko (1989), Abdelhamid *et al.*(1999c), Ahmed (1999), Gabr *et al.*(2003) and Shehata *et al* .(2003) with both sheep and goats.

Table (5) : Blood parameters of Rahmani sheep fed the experimental diets

Item	Treatments		
	G1	G2	G3
Hemoglobin (Hb), g/dl	10.98±070	11.23±0.71	12.03±0.51
Hematocrite (Hct),%	36.25±0.85	35.50±1.32	34.00±0.91
Red blood cells (RBC's), $x10^6$/ul	9.83±0.71	10.08±0.81	10.80±0.49
White blood cells(WBC's), $x10^3$/ul	5.33±0.41	6.00±0.51	6.68±0.66
Glucose (mg/100ml)	72.75±2.02	72.0±3.11	74.25±1.49
Total protein (g/100ml)	6.63±0.13	6.95±0.10	7.03±0.11
Albumin (A), g/10ml	2.73±0.11	2.68±0.09	2.80±0.14
Globulin (G), g/100ml	b 3.90±0.04	a 4.28±0.06	a 4.23±0.06
A/G ratio	0.70±0.03	0.63±0.02	0.66±0.04
Urea –N (mg/100ml)	14.75±0.85	15.5±0.65	16.0±0.71
Creatinine (mg/100ml)	1.35±0.06	1.43±0.09	1.45±0.12
GOT (u/l)	84.50±3.10	82.25±3.90	76.50±3.30
GPT (u/l)	a 17.25±0.85	ab 15.50±0.65	b 14.0±1.08

a-b :Means in the same row followed by different letters differ significantly at (P<0.05)

Growth performance:

The effect of different feeding treatments on daily growth rate of growing lambs are presented in Table (6). The initial live body weight of all lambs in the three groups were approximately equal. The obtained results revealed that the daily body gain (DBG) was higher with increasing the level of chamomile (0,1 and 2 g/h/d) during the two growth periods. During the first period, the daily body gain (DBG) in G1 was significantly lower (172.29g) than G3 (192.00g) but insignificantly than G2(184.14 g). At the same time, the effect of the two chamomile treatments on DBG during the second period was not significant and the values were 159.86, 167.57 and 170.29g for G1, G2 and G3, respectively. During the whole period (1-180 day), final body weight (FBW) was significantly lower with G1(49.36 kg) compared with the two chamomile supplemented groups(51.93 and 52.46 kg for G2 and G3, respectively). Moreover, total body gain (TBG) and daily body gain (DBG) were significantly higher with G3 (32.63 kg and 181.29 g, respectively) compared with G1(29.86 kg and 165.86 g, respectively), whereas, G2 recorded medium values (31.64 kg and 175.71 g, respectively) Thus, the overall mean of daily body gain was improved by 5.94 and 9.30 % for G2 and G3 , respectively compared with the control (G1). Similarly, El-Hosseiny *et al.*(2000) found that using some medicinal plants such as chamomile flowers in growing kids rations had a positive effect on daily body gain.

Table (6): Effect of experimental treatment on growth performance thought the growth periods.

ITEM	Treatments		
	G1	G2	G3
First period (from 1-90 day)			
Av. Initial LBW(kg)	19.5±0.77	20.29±0.49	19.83±0.54
Av. final LBW(kg)	B 35.0±0.68	a 36.86±0.60	a 37.11±0.52
Av. total LBG (kg)	b 15.5±0.35	ab 16.57±0.32	a 17.29±0.49
Av. daily body gain (g)	b 172.29±3.73	ab 184.14±3.53	a 192.00±5.36
Second period (from 91-180day)			
Av. initial LBW (kg)	35.0±0.68	36.86±0.60	37.11±0.52
Av. final LBW (kg)	49.36±0.52	51.93±0.61	52.46±0.94
Av. total LBG (kg)	14.36±0.36	15.07±0.37	15.34±0.67
Av. daily body gain (g)	159.86±3.99	167.57±4.15	170.29±7.38
Overall mean (from 1-180 day)			
Av. initial LBW (kg)	19.5±0.77	20.29±0.49	19.83±0.54
Av. final LBW (kg)	b 49.36±0.52	a 51.93±0.61	a 52.46±0.94
Av. total LBG (kg)	b 29.86±0.36	ab 31.64±0.56	a 32.63±1.02
Av. daily body gain (g)	b 165.86±1.99	ab 175.71±3.05	a 181.29±5.73

a-b :Means in the same row followed by different letters differ significantly at (P<0.05)

Daily feed intake and feed efficiency:

The average daily feed intake of growing Rahmani sheep are summarized in Table (7). Lambs consumed approximately similar quantity of DM intake(ranged from 1483 to 1503 g/ head or 102 to 104 g/kg $W^{0.75}$). Whereas, DCP intake tended to increase (134.139 and 142g/h) or 9.43, 9.44 and 9.63 g/kg $W^{0.75}$) with the increasing chamomile level (0,1 and 2 g/head) in sheep rations. Similar values of daily DM intake (ranged from 102.6 to 104.1 g/kg $W^{0.75}$ in growing lambs) were observed by Shehata *et al.* (2003). On the other hand, the feed efficiency based on DM, TDN and DCP was better with the presence of chamomile in sheep rations (G2 and G3) compared with the control (G1). The feed efficiency, based on DM was improved by 4 and 8.04% with the two chamomile treatments (G2 and G3, respectively) compared with G1. A similar trend was noticed when feed efficiency was based on TDN where the best was G3(0.173) followed by G2(0.171) and lastly the control group (0.166). In this respect, Zeid (1998) indicated that the feed efficiency based on DM and TDN was improved by about 24.0 and 23 %, respectively as a result to using chamomile in growing kid's rations.

Table (7): Daily feed intake , feed efficiency and water consumption of fattening Rahmani lambs fed the experimental diets.

Item	Treatment		
	G1	G2	G3
Daily feed intake , g/h			
from CFM	670	676	677
from YC	225	227	228
from BH	588	594	598
Total DM intake, g/h/d	1483	1497	1503
DM intake , g/kgw$^{0.75}$	104	102	102
TDN intake, g/h/d	998	1030	1049
TDN intake, g/kgw$^{0.75}$	70.2	69.9	71.2
DCP intake , g/h/d	134	139	142
DCP, intake , g/kgw$^{0.75}$	9.36	9.44	9.63
Roughage: concentrate (R/C)ratio	40:60	40:60	40:60
Average daily body gain, g	165.86	175.71	181.29
Feed efficiency			
g gain /g DM	0.112	0.117	0.121
g gain /g TDN	0.166	0.171	0.173
g gain /g DCP	1.238	1.264	1.277
Daily water consumption:			
ml/head	5505	5170	4990
ml / g DM intake	3.71	3.45	3.32
ml /kg w$^{0.82}$	302.3	273.0	263.3

Water consumption:

The daily water consumption as ml/kg $W^{0.82}$ and ml/g DM intake tended to increase with G1(control ,without addition) compared with the two chamomile supplemented rations (G2 and G3) as shown in Table (7). The highest values of daily consumption (550.5ml/h or302.3ml/kg$W^{0.82}$)were recorded with G1 followed by G2(5170ml/h or 273.0ml/kg$W^{0.82}$) while the lowest values were detected with G3(4990ml/h or263.3ml/kg$W^{0.82}$). These results are in accordance with those of Zeid and Ahmed (2004) who indicated that the water consumption was lower by 13.65 and 4.42% with the addition of medicinal herbs (chamomile and thyme, respectively) in goat rations. They found also that adding chamomile and thyme minimized total excreted water (ml/kg $W^{0.82}$) by 22.55 and 6.32% than the control but, without significance. Thus these results indicate that using chamomile flowers in small ruminant rations seems more suitable for desert condition where water resources are somewhat restricted.

Economical efficiency:

Table 8 presents economical efficiency of feeding Rahmani lambs on the different experimental rations. The price of feed intake per kg live body weight gain was higher with the control group (G1) than G2 and G3. The addition of chamomile(2g/head) to sheep rations reduced feed cost/kg body weight gain from 660.98 to 619.01 p.t. Therefore, the economic efficiency was increased with the increasing chamomile in lambs ration(1.51, 1.58 and 1.62 for G1, G2 and G3, respectively). The economic efficiency was improved with the two chamomile supplemented rations(G2 and G3) by 4.64 and 7.28%,respectively compared with G1. Similar results were observed by El-Saadany *et al.*(2003). In this respect, Zeid (1998) reported that the feed cost per kg body gain was decreased from 706 to 577 p.t as a result to presence of 60 mg chamomile /kg BW in growing kids rations.

Table (8): Effect of chamomile supplementation in diets of growing Rahmani lambs on their economical efficiency

Item	Treatment		
	G1	G2	G3
Intake as fed (g/d)			
CFM	733.4	740.0	741.1
YC	244.5	246.7	247.7
BH	662.7	669.4	674.0
chamomile	0.0	1.0	2.0
Cost of feed consumed (p.t/d)*	109.63	111.25	112.22
Price of gain p.t. (p.t/d)	165.86	175.71	181.29
Feed cost of kg gain (p.t.)	660.98	633.15	619.01
Economical efficiency	1.51	1.58	1.62

* The prevailing prices per ton, at time of the study were, 800 L.E-CFM,1000 L .E.- YC, 400 L.E. –B H, 6000 L.E- chamomile and 10000 L.E. – live weight.

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تأثير استخدام زهرة الكاموميل على الأداء في الأغنام الرحمانى

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تم استخدام ٢١ حولى رحمانى نامى وذلك بهدف دراسة تأثير استخدام الكاموميل كأحد الأعشاب الطبية على أداء الحملان، ومعدل النمو اليومى، وكفاءة استخدام الغذاء،وكذلك الكفاءة الاقتصادية، ولتحقيق هذا الهدف البحثى تم تقسيم الحوالى عمر ٣ شهور ومتوسط أوزانهم ١٩,٨٧ كجم إلى ثلاثة مجاميع متساوية (٧ بكل مجموعة)، وأعطيت الحيوانات فى المجموعات الثلاثة (مج ١ ،مج ٢، مج ٣) مستويات مختلفة من الكاموميل هى صفر، ١ ،٢ جم / رأس / يوميا، على التوالى)، كما تم استخدام عدد ١٢ كبش رحمانى لتقييم العلائق المختبرة السابقة. وقد أعطيت الاحتياجات الغذائية طبقا لمقررات NRC لعام ١٩٨٥، وقد استمرت تجربة التغذية لمدة ١٨٠ يوما على فترتين متساويتين.

وقد أوضحت النتائج وجود تحسين فى معاملات الهضم لكل العناصر الغذائية مع زيادة مستوى الكاموميل فى علائق الأغنام ، والاختلافات كانت معنوية فقط بين مج١ ، مج ٣ فى معاملات هضم المادة الجافة والبروتين الخام والألياف الخام ، لكن استخدام الكاموميل فى كل من مج٢ ، مج٣ أدى إلى تحسين معنوى فى القيمة الغذائية متمثلة فى المركبات المهضومة الكلية والبروتين المهضوم. وقد أظهرت نتائج قياسات سائل الكرش أن الكاموميل لم يؤثر معنويا على رقم الحموضة، لكن أمونيا الكرش انخفضت مع استخدام الكاموميل وكان الانخفاض معنويا مع المستوى المرتفع (مج٣) عند الساعة الثانية بعد الأكل. أيضا حدث تجسن إيجابي فى الأحماض الدهنية الطيارة والعدد الكلى للبروتوزوا والبروتين الميكروبى مع استخدام الكاموميل. فيما يتعلق بقياسات الدم فقد لوحظ زيادة غير معنوية فى الهيموجلوبين وكل من كرات الدم الحمراء والبيضاء، فى حين كان التحسين معنويا فى الجلوبيولين مع مجموعة الكاموميل. وعلى العكس حدث انخفاض فى أنشطة الإنزيمات الناقلة لمجموعة الأمين مع استخدام الكاموميل وكان الانخفاض معنويا مع المستوى المرتفع مع الكاموميل (مج٣) فى الجلوتاميك بيروفيك ترانس أميناز فقط.

أظهرت تجربة التغذية أن معدل النمو اليومى قد انخفض معنويا مع عليقة المقارنة (مج١) مقارنة مع مج٣ أثناء فترة النمو الأولى من ١-٩٠ يوما (١٧٢,٢٩ مقابل ١٩٢,٠جم) وأثناء فترة التجربة الكلية من ١-١٨٠ يوما (١٦٥,٨٦ مقابل ١٨١,٢٩جم) فى حين كان التحسن غير معنوى مع مج ٢. وقد أظهرت النتائج أيضا أن الكفاءة الغذائية (محسوبة على أساس المادة الجافة والمركبات المهضومة الكلية والبروتين المهضوم) كانت أفضل مع زيادة مستوى الكاموميل فى علائق الحملان النامية. كما أدى استخدام الكاموميل أيضا إلى تحسين الكفاءة الاقتصادية.