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EFFECT OF INCLUSION OF DRIED RUMEN CONTENTS TO RATIONS ON THE PRODUCTIVE PERFORMANCE OF LACTATING BALADI GOATS.

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SUMMARY

Four Baladi goats were ranked in a 4 × 4 Latin square design for 16 weeks in two experiments. The first experiment was to study the effect of dried rumen contents (DRC) in three treatments compared to control on the bases of live body weight, DMI, ruminal environment, blood parameters, nutritive value and nutrients digestibilites. The control diet consisted of (50% CFM + 50% berseem hay (BH)), T_1 (50% CFM + 12.5% DRC, 37.5% BH), T_2 (50% CFM + 25% DRC + 25% BH) and T_3 (50% CFM + 37.5% DRC + 12.5% BH). A second experiment was carried out to evaluate milk production and milk compositions of animals fed on the above mentioned treatments and eventually, evaluate feed efficiency of the treatments.

Results of the first experiment showed that ruminal fluid from animals fed three treatments had lower values of NH_3-N, TVFAs, TN and NPN compared to the control. However, ruminal pH values were slightly higher of the goats were fed rations containing DRC compared to the control. Blood serum of animals fed with T_1, T_2 or T_3 rations had lower values of albumin, A/G and glucose as compared to the control. However, T_3 ration caused higher values of globulin and TP, and not significantly ($P>0.05$) for urea and cholesterol. Blood serum creatinine was not affected by the treatments. No significant differences were found between T_2, T_3 and control groups in respect of blood serum AST activity, while T_1 showed higher AST value ($P<0.05$), but all of the values were within the normal physiological range. Blood serum ALT activities were also within the normal physiological range. Live body weight was not affected by treatments.

Dry matter intake (DMI) was decreased gradually by adding DRC in rations of lactating goats. Results of nutrient digestibilities showed that T_1 ration containing 12.5% DRC improved the digestibilities of DM, OM, CF and EE compared to control and other treatments (T_2 and T_3). Also, T_1 and control rations showed the same trend of high values of TDN, DE, ME and NE as compared to T_2 and T_3.

In the second experiment, milk yield, 4% FCM and lactose content of milk were decreased gradually by increasing the level of DRC as compared to the control. Milk total solid content was increased gradually by increasing level of DRC in the ration. Milk fat and SNF content were not affected by T_1 and T_3 as compared to control but T_2 caused higher value ($P<0.05$). Milk protein content was the same in

T_1 group than the control. Milk ash content was not affected by the treatments except for T_2 which was significantly ($P<0.05$) lowest than other treatments.
It could be concluded that the best replacement of BH was for ration that containing 12.5% of DRC which showed nearly the same results than that of control.

Keywords: *sun dried rumen contents, goats, digestibility, blood, feed efficiency.*

INTRODUCTION

There is a gap between animal requirements and available animals feed, therefore, it is very important to search about non traditional sources of feeding stuffs for ruminant rations. Rumen contents as a low cost slaughter house by product as waste containing considerable amounts of nutrients and after certain inexpensive treatments can be used in the nourishment of livestock.

Rumen contents possesses great potential for use as a ruminant feed ingredient, where it contains the partially digested feeds, ruminal flora (bacteria, protozoa, fungi, actinomycetes), saliva, water, microbial enzymes, volatile fatty acids and many other metabolites (Hungate, 1966; whittemore and Moffat, 1976 and Tizzoni, 1964). One of the obstacles for using this material is its high moisture content. Employing sun drying procedure is a good approach for tackling this problem (Abdelmawala, 1990). El-Tahan (1991) calculated the total quantity of slaughter house wastes produced in Egypt between years (1980 - 1990) and found as 26168.9 to 29420 tonnes fresh rumen content, yearly.

The main objective of this study was to determine the effect of addition of the dried rumen content (DRC) to the ration of Baladi dairy goats on some rumen and blood parameters, digestibility of nutrients, nutritional value of ration and their effect on milk production and composition.

MATERIALS AND METHODS

The present experiment was carried out at a private farm in Atfieh city, Helwan, Egypt, and at the Dairy Science Department, National Research Center, Dokki, and Giza, Egypt.

Collecting rumen content:

The rumen contents were collected at a public slaughterhouse of Atfieh city immediately after slaughtering ruminant animals in winter season. These wastes were transported to the farm for managing the following treatments.

Preparing and storage rumen content:

After collecting the rumen contents, batches were sun dried in 3-5 cm layer depth, for 15 days. During this period they were turned upside down and well mixed 5-7 times a day till reach 90-92% DM content, then collected and stored in plastic bags till feeding time.

Animals and diets:

Four Baladi lactating goats (2-3 years old, average live weight 23 kg) were investigated in four consequtive treatment groups using 4 × 4 Latin square design for 16 weeks and consisted of four equal periods (28 day each), each period consisted of 21 days preliminary period followed by a period of 7 days for collection the experimental samples. The experiments started after 7 days of parturition. The control diet consisted of 50% concentrate feed mixture (CFM) and 50% berseem hay (BH). The three experimental diets were: T_1 (50% CFM + 12.5% DRC + 37.5% BH) T_2 (50% CFM + 25% DRC + 25% BH) and T_3 (50% CFM + 37.5% DRC + 12.5% BH). The chemical composition of feedstuff ingredients and tested rations are shown in Table (1). The CFM for each animal was offered individually twice daily at 1.00 p.m. and 7.00 p.m., while roughage was offered at 7.00 a.m., 10.00 a.m. and 5.00 p.m. Except collecting days, the roughage feed was offered once daily at 7.00 a.m., concentrate feed mixture were offered once daily at 7.00 p.m., water was available to animals at all times.

Table (1): Chemical composition of concentrate feed mixture (CFM), berseem hay (BH), dried rumen contents (DRC) and calculated rations (% Dry matter basis).

Item	Ingredient			Calculated rations			
	CFM	BH	DRC	Control	T_1	T_2	T_3
Dry matter	91.19	92.12	91.84	91.65	91.62	91.58	91.55
Organic matter	86.36	86.80	85.44	86.58	86.41	86.24	86.07
Ash	13.64	B.20	14.56	13.42	13.59	13.76	13.93
Crude protein	12.39	12.92	12.39	12.65	12.59	12.52	12.45
Ether extract	3.83	1.55	2.08	2.69	2.75	2.82	2.89
Crude fiber	19.91	28.17	38.30	24.04	25.30	26.57	27.80
NFE	50.24	44.16	32.30	47.20	45.76	44.33	42.89

CFM: concentrate feed mixture, DRC: dried rumen content, BH: berseem hay. Control: (50% CFM + 50% BH) T_1: (50% CFM + 37.5% BH + 12.5% DRC), T_2 (50% CFM + 25% BH + 25% DRC), T_3 (50% CFM + 12.5% BH + 37.5% DRC).

Each value is a mean of 4 samples each ingredient or rations.

Analysis of feed samples:

Samples of ingredients and rations were analyzed for dry matter (DM), ash, crude fiber (CF), organic matter (OM) and ether extract (EE) according to method of A.O.A.C (1995) while nitrogen-free extract was calculated.

Analysis of rumen fluid:

At the end of each period, rumen fluid samples were collected from each goat at zero time (before morning feeding) and at 3, 6 hours after feeding by a stomach tube. The samples were strained through two layers of cheese cloth and then stored in glass bottles (10 ml) with 3 drops of toluene and a thin layer of paraffin oil just to cover the surface to stop microbial activity and to prevent volatilization and stored at- 18°C tell analysis. Ruminal pH was determined using a digital pH meter, total nitrogen (TN), non- protein-

nitrogen (NPN) and NH_3- N were determined according to A.O.A.C. (1995). Total volatile fatty acids (TVFA'S) were determined by steam distillation as described by Warner (1964).

Digestibility trial:

Four apparent digestibility trials were applied during the four experimental periods on four Baladi goats. Grab samples method was used and silica (acid insoluble ash) as internal marker was applied for determining the apparent digestibility. Faces grab samples were collected at 7.00 a.m. for three successive days from each animal. Solution of 10% H_2SO_4 was added to the representative samples then dried in oven at 70°C for 24 hours. The dried faces samples from each animal were mixed and stored at -18°C for chemical analysis. The digestibility coefficient was calculated according the following formula (Gallups *et al.*, 1945) and (Forbes and Garrigs, 1948).

$$\text{Digestibility} = 100 - \left[100 \; x \; \frac{\%\ indicator\ in\ feed}{\%\ indicator\ in\ feces} \; x \; \frac{\%\ nutrient\ in\ feces}{\%\ nutrient\ in\ feed}\right]$$

Sampling and analysis of milk:

Individual milk samples were collected during the last three days of each experimental period (16 weeks).

The Baladi dairy goats were hand milked (twice daily), milk yield was recorded and titratable acidity of milk was determined (Ling, 1963). Milk samples were also analyzed for fat (British standard institution, 1951), total solids (TS) (laboratory manual, 1949), total protein (TP) and ash contents (Ling, 1963) and lactose (Barnett and Abd El- Tawab, 1957). Solids not- fat (SNF) was calculated by difference.

Sampling and analysis of blood serum:

Blood samples were collected from jugular vein of each animal (dairy goats) at the last day of each period (4 hours after morning feeding). The collected blood samples were centrifuged at 4000 r.p.m. for 20 minutes to separate the serum. The obtained serum was stored at -80°C till analysis. Blood serum was analyzed for total protein (Weichselbaum, 1946), albumin (Doumas *et al.*, 1971), urea (Henry *et al.*, 1974), glucose (Siest *et al.*, 1981) and serum AST and ALT activities (Reitman and Frankel, 1957). Globulin and albumin/ globulin ratio were calculated.

Statistical analysis:

The data were analyzed using general linear method of statistical analysis system (SAS, 1998), Duncan multiple range test (Duncan, 1955) was carried out for separation among means.

1. Data of milk yield, milk composition, and nutrients digestibility were analyzed according to Latin square design where the model was:

$$Y_{ijk} = \mu + R_i + C_j + T_k + e_{ijk}.$$

Where Y_{ijkl} is the parameter under analysis of the ijkl goat, μ is the overall mean, R_i is the effect due to the lactation period on the parameter under analysis, C_j is the effect due to the animals on the parameter under analysis, T_k is the effect due to treatment on the parameter under analysis, e_{ijk} is the experimental error for ijk on the observation,

2. Repeated measures for rumen liquid parameter and blood serum parameters:

$$Y_{ijk} = \mu + R_i + T_j + (RT)_{ij} + B_k + (TB)_{jk} + (RB)_{ik} + E_{ijk}.$$

Where, R_i: period, T_j: treatment, $(RT)_{ij}$: interaction, B_{ki}: sampling time, $(TB)_{jk}$: interaction (TB), $(RB)_{ik}$: interaction and E_{ijk}: experimental error.

RESULTS AND DISCUSSION

Rumen fluid parameter:

Effects of treatment on characteristics of ruminal fermentation are shown in Table (2). No significant differences among treatments (T_1 and T_2) in ruminal fluid pH compared to control, however, T_3 recorded higher significant ($P<0.05$) values compared to control and other treatments. These results agrees with those reported by (Khattab *et al.*, 2006) and (Kholif 2008) who found that pH values were increased in rations containing rumen content compared to control. However, data indicated that the control group recorded slightly higher values of ruminal total volatile fatty acids compared with T_1 and T_2 and significantly ($P<0.05$) higher than T_3 which reflect that as the level of DRC was increased, TVFA's decreased. These results are in good agreement with the findings of Khaled (1995) and Kholif (2008) who found that control group recorded slightly higher TVFA's concentration compared with rations contained DRC. However, Singer (2002) and Khattab *et al.*, (2006) noticed linear increase in TVFA's of the ruminal fluid with increasing level of DRC in the rations. This may suggest that DRC had some digested nutrients of low fermentable value than that of berseem hay and/ or may be attributed to lower values of nutrients digestibilities of rations containing DRC (Table, 3). Also, it may be really different based or its original plant consumed by he slaughtered animal. Ruminal fluid ammonia content was significantly ($P<0.01$) higher as effect of feeding the control ration than the other treatments. This may suggest that DRC is of lower degradability for that reason it may cause lower energy supply for rumen microflora than that of berseem hay. Similar results were reported by Khattab *et al.*, (1996). However, Singer (2002) and Khattab *et al.*, (2006) noticed that ammonia concentration was increased with increasing DRC level in the rations. Also, ruminal non- protein- nitrogen followed the same trend of NH_3 - N.

Data indicated that incorporation of DRC in the ration affected negatively the ruminal total volatile fatty acids. A linear significant ($P<0.05$) decrease in ruminal total nitrogen was detected as the level of DRC was increased. These results may illustrate on the basis that DRC contained protein of lower degradability than that of berseem hay.

Table (2): Rumen fluid parameters of goats fed rations containing DRC and control ration.

Item	Control ± SE	T_1 ± SE	T_2 ± SE	T_3 ± SE
pH	6.55^{c}	6.57^{bc}	6.58^{ab}	6.61^{a}
	±0.048	±0.050	±0.047	±0.052
TVFA's (meq/ 100ml)	6.86^{a}	6.85^{a}	6.62^{ab}	6.45^{b}
	±0.404	±0.430	±0.343	±389
Ammonia nitrogen (mg/100ml)	28.41^{a}	26.20^{b}	25.80^{b}	25.47^{b}
	±1.593	±1.548	±1.413	±1.299
Non- protein- nitrogen (mg/100ml)	47.08^{a}	45.56^{ab}	44.22^{b}	40.91^{c}
	±4.008	±1.581	±1.545	±1.539
Total nitrogen (mg/100ml)	113.51^{a}	106.89^{b}	97.46^{c}	93.65^{d}
	±7.573	±4.182	±5.286	±5.112

a, b, c and *d* with different superscripts are significant ($p < 0.05$).
Each value is a mean of 12 samples each treatment.

Digestibility of nutrients and nutritive value:

Data of Table (3) showed that apparent digestibility of dry matter, organic matter, crude fiber, ether extract were increased in T_1 except that crude protein which lowered than

control and other treatments. However, the lowest values of DM, OM, CF, EE and NFE were recorded for T_3 which contained the highest levels of DRC. These may bc attributed to the higher fiber of the rations containing rumen contents that decreased the digestibility of other ingredients as was found previously by Titus and Fritz (1971) and Emmanuel (1978). However, Singer (2002) and Khattab *et al.*, (2006) found that rations containing rumen content improved values of digestibility co-efficient of all nutrients. These results may be attributed to the DRC contained partially inactivated microbial enzymes and/or several unknown factors presented in DRC that enhance rumen microorganism to improve nutrients utilization especially crude fiber (Khattab *et al.*, 1996) the reason of these improvement is not clear.

Control ration had slightly higher TDN and DCP than ration contained rumen content. These results are agreement with those obtained by Khattab et, al., (1996) and Khattab *et al.*, (2006) who found that nutritive values as TDN and DCP ware higher in control ration compared with rations contained DRC. These results may be due to the higher crude fiber contented in DRC.

Dry matter intake and live body weight:

Data presented in Table (3) showed that live body weight did not affect by treatments. Concerning the dry matter intake data of present study showed that total dry matter intake was gradually decreased with increasing the level of DRC Table (3). These results were agreement with those Khattab *et al.*, (2006) who suggest these results may be attributed to the high crude fiber content in DRC and may be also due to that berseem hay has more palatability than rumen content.

Table (3): Live body weight (kg), dry matter intake, digestibility coefficients of nutrients and nutritive value in rations containing different level of DRC.

Item	Control	T_1	T_2	T_3
Live body weight (kg)	23.74	23.75	23.73	23.72
Dry matter intake (g/h/d)	1019^{a}	934^{b}	880^{c}	870^{d}
Nutrient digestibilities (%)				
DM	59.70^{a}	60.14^{a}	59.45^{a}	55.71^{b}
OM	62.27^{a}	62.30^{a}	60.86^{ab}	58.07^{b}
CP	65.00	63.89	65.27	64.63
CF	42.36^{b}	46.06^{a}	42.93^{b}	40.94^{b}
EE	54.84^{bc}	58.20^{a}	57.37^{ab}	53.70^{c}
NFE	72.10^{a}	71.08^{a}	70.59^{a}	67.57^{b}
Nutritive value				
TDN (%)	56.15^{a}	56.13^{a}	54.70^{ab}	52.00^{b}
DCP (%)	8.22	8.04	8.17	8.05

a, b, c and *d* with different superscripts are significant ($P<0.05$).
Each value is a mean of 4 samples each treatment.

Blood serum metabolites:

Data in Table (4) showed blood serum parameters as affected by addition of rumen content in ration of Baladi goats. There were significant differences ($P<0.05$) among T_1, T_2 and control. Total serum protein content of goats was significantly ($P<0.01$) higher in the

group consumed control as compared with ration contained rumen content except T_3 which showed nearly the same value. Khattab *et al.*, (1996); Singer (2002); Khattab *et al.*, (2006) and Kholif (2008) found that serum total protein values did not differ between ration contained rumen content or control ration. Blood serum albumin tended to be lower as effect of feeding DRC than control ration. The increase of serum albumin in control ration may be due to increase DCP. The present results are in good agreement with those of (Kholif 2008). There were no differences between control, T_1 and T_2 except T_3. These results are in good agreement with those of Khattab *et al.*, (1996 and 2006) and Kholif (2008) who noticed that serum globulin values did not differ significantly between ration contained DRC or control. Blood serum A/G tended to be lower in T_2 and T_3 than control except T_1. Khattab *et al.*, (2006) and Singer (2002) found that control ration had higher serum A/G ratio compared with ration contained DRC Blood serum glucose decreased as the level of DRC increased. These results may be due to the parallel decrease in TVFA's of rumen fluid (Table 2). These results close with the finding of Kholif (2008) who found that serum glucose was slightly higher in control ration compared with ration contained DRC. Blood serum of cholesterol, creatinine and urea were not significantly affected by treatments. Blood serum of ALT and AST are within normal range and there was no indication of adverse effects on goat health.

Table (4): Blood serum parameters as affected by addition of dried rumen content in rations of Baladi goats.

Item	Control ± SE	T_1 ± SE	T_2 ± SE	T_3 ± SE
Total protein (g/ l)	76.5^{a}± 1.73	71.0^{b}±2.10	72.3^{b}±2.90	72.1^{a}±2.54
Albumin (g/ l)	35.5^{a}±2.03	33.7^{b}±3.11	33.3^{b}±2.53	31.7^{c}±1.70
Globulin (g/ l)	41.0^{b}±1.70	37.3^{b}±3.80	39.0^{b}±408	46.3^{a}±3.58
A / G ratio	8.7^{b}±0.81	9.1^{a}±1.50	8.6^{ab}±1.62	6.8^{c}±0.78
Urea (g / l)	214.5±24.8	210.0±20.5	208.0±6.8	259.5±14.6
Cholesterol (mg/ l)	603.9±68.2	619.1±34.7	617.7±39.5	656.3±64.8
Glucose (mg / l)	668.0^{a}±36.3	659.2^{ab}±20.0	644.2^{ab}±29.3	633.2^{b}±20.7
AST (U / l)	140.0^{b}±28.8	203.8^{a}±27.6	128.8^{b}±22.6	116.3^{b}±14.5
ALT (U/ l)	182.5^{ab}±25.1	202.5^{a}±26.4	142.5^{c}±24.6	162.5^{ab}±20.6
Creatinine (g / l)	3.3±0.57	4.4±0.84	3.1±0.45	4.7±0.75

a, b, c and *d* with different superscripts are significant ($P<0.05$).

Milk yield and composition:

Data of milk composition and constituent yields of the experimental goats are summarized in Table (5). Milk yield was significantly ($P<0.05$) decreased gradually as the level DRC increased in rations of goats by about 7.18%, 18.34% and 19.07% in T_1, T_2 and T_3, respectively than that of control. There were symmetric results between milk yield and serum glucose where T_1, T_2 and T_3 recorded lower milk yield and lower serum glucose values (Table 4) compared with control which recorded higher milk yield and higher serum glucose. These results are in good agreement with the findings of Clark *et al.* (1977) who claimed a positive relationship between blood serum glucose and milk yield. These results may be due to one or more of the following reasons, 1) higher TVFA's content in rumen of animals given control (Table 2), 2) lower values of nutrients digestibilities, TDN and DCP of treatments (Table 3), 3) lower milk lactose of treated animals (Table 5). These results are in good agreement with Kholif (2008) who found that milk yield decreased in rations

containing DRC Also, 4% FCM values were significantly (P<0.05) decreased in T_1, T_2 and T_3 by about 6.99%, 18.12% and 18.53% than that of control. Kholif (2008) found that 4% FCM was decreased in rations contain DRC.

Milk protein content was not significantly higher (P>0.05) in T_1 than that of control. however, milk protein contents of T_2 and T_3 were significantly (P<0.05) lower than that of control. Milk fat content was not affected by T_1 and T_3 compared with control, however, milk fat content was significantly (P<0.05) higher in T_2 compared with control. Milk total solids and SNF content were not affected insignificantly (P>0.5) by treatments. Milk ash content was slightly lower in control compared with other treatments. The higher value of milk acid was recorded for control, whereas the lowest value was recorded for T_3. Milk lactose content was significantly (P<0.05) lower in animals fed on DRC compared with control. The same trend was observed in milk yield (Table 5). It is of interested to notice that lactose percent for different group parallel with blood glucose.

Generally, feed efficiency calculated as milk yield/ DMI and 4% FCM/ DMI were improved significantly (P<0.05) with animals fed on T_1 compared with other treatments and there no significant difference between control and T_1 concerning feed efficiency.

Table (5): Milk yield and composition as affected by addition DRC in rations of lactating goats.

Item	Control ± SE	T_1 ± SE	T_2 ± SE	T_3 ± SE
DMI (g/h/d)	1019^a	934^b	880^c	870^d
Milk yield (g/d)	510.39^a±20.60	473.76^b±16.67	416.79^c±27.93	413.07^c±20.79
4% FCM (g/d)	442.55^a±13.52	411.61^b±11.94	362.34^c±15.99	360.53^c±16.53
Milk composition %				
Fat (%)	3.19$_b$±0.11	3.21^b±0.15	3.50^a±0.27	3.24^b±0.15
Total solids (%)	11.57±0.15	11.67±0.20	11.85±0.31	11.87±0.19
SNF (%)	8.38±0.11	8.46±0.122	8.36±0.12	8.63±0.19.
Protein (%)	3.06^a±0.06	3.13^a±0.05	2.97^b±0.11	2.67^c±0.05
Lactose (%)	4.53^a±0.11	4.24^{ab}±0.17	4.01^b±0.09	4.10^b±0.15
Ash (%)	0.88^a±0.01	0.87^a±0.02	0.77^b±0.015	0.85^a±0.015
Acidity (%)	0.146^a±0.003	0.145^a±0.002	0.144^a±0.004	0.125^b±0.001
Feed efficiency:				
Milk yield / DMI	0.501^a	0.507^a	0.473^b	0.475^b
FCM yield / DMI	0.434^a	0.441^a	0.412^b	0.414^b

a, b ,c and *d* with different superscripts are significant (P<0.05).

CONCLUSION

From the results it could be concluded of the present study that DRC can be used as component of rations of Baladi goats and BH may replace at a level of 12.5% without any adverse effects on the production. These results strongly exhibit the high potential of DRC as waste material efficiently replaces high quality roughage like berseem hay.

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تأثير ادخال محتويات الكرش الجافة في العليقة علي الاداء الانتاجي للماعز البلدي الحلاب

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تم استخدام اربعة أناث من الماعز البلدي الحلابة متوسط أعمارها ٢ -٣ سنوات و متوسط اوزانها ٣٣.٧٤ كجم بعد الأسبوع الأول من الولادة. وقد قسمت الحيوانات عشوائيا الي اربع معاملات بنظام المربع اللاتيني ٤× ٤ التجربة الي اربعة مراحل كل مرحلة استمرت لمدة ٢٨ يوم ، وكانت العلائق فى المعاملات المختلفة تتكون من الآتى: -

١ - المجموعة المقارنة : تتكون من ٥٠ ٪ علف مركز + ٥٠٪ دريس البرسيم.

٢ - المعاملة الأولى : تتكون من ٥٠ ٪ علف مركز +٣٧.٥٪ دريس برسيم + ١٢.٥٪ محتويات كرش مجففة شمسيا.

٣ - المعاملة الثانية : تتكون من ٥٠ ٪ علف مركز + ٢٥٪ دريس برسيم + ٢٥٪ محتويات كرش مجففة شمسيا.

٤ - المعاملة الثالثة : تتكون من ٥٠ ٪ علف مركز + ١٢.٥٪ دريس برسيم + ٣٧.٥٪ محتويات كرش مجففة شمسيا.

وكانت النتائج كما يلي:

- اوضحت النتائج وجود تحسن في هضم المادة الجافة و المادة العضوية و الالياف الخام و الدهن الخام في المعاملة الاولي مقارنة بباقي المجموعات، بينما سجلت المجموعة الثانية اعلي قيمة معنوية لمعامل هضم البروتين الخام عن باقي المعاملات. كما اظهرت النتائج حدوث انخفاض تدريجي في معامل هضم المستخلص الخالى من النيتروجين بزيادة محتويات الكرش الجافة في العليقة.
- بالنسبة لمقاييس الكرش فقد زاد كل من الامونيا والاحماض الدهنية الطيارة ووالنيتروجين الكلي والنيتروجين غير البروتيني والبروتين الحقيقي في المجموعة المقارنة عن باقي المجموعات علي عكس انخفاض pH فيها.
- لوحظ عدم وجود فروق معنوية في تركيزالكوليستيرول واليوريا والكرياتينين فى سيرم الدم بين كل المجموعات، بينما سجلت المجموعة المقارنة اعلي قيمة معنوية للجلوكوز، اما تركيز

البروتين الكلي و الجلوبيولين فقد زاد في المعاملة الثالثة عن باقي المعاملات، ولكن الالبيومين فقد زاد تركيزه في المجموعة المقارنة عن باقي المعاملات.

- تم الحصول علي اعلي قيم لانتاج اللبن واللبن المعدل لنسبة الدهن (٤٪) ونسب مكونات اللبن الداخلية (NCN و الرماد والاكتوز والحموضة) في المجموعة المقارنة مقارنة بباقي المجموعات، اما نسبة الدهن والجوامد الكلية فقد حدث انخفاض معنوي المجموعة المقارنة عن باقي المجموعات ، بينما نسبة البروتين والكازين فقد حدث انخفاض معنوي للمجموعة الثالثة عن باقي المجموعات.
- يتضح من نتائج الدراسة أن هناك إمكانية لاستبدال ٢٥٪ من دريس البرسيم المقدم في علائق الماعز البلدي الحلابة بما يكافئه مادة جافة محتويات الكرش المجففة دون وجود أي تأثيرات سلبية على الإنتاجية أو الحالة الصحية للحيوان ويحسن من الكفاءة الغذائية.