

RESPONSE OF GROWING SHEEP TO DIETS CONTAINING ONION PRROSSING BY - PRODUCT

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ABSTRACT

Twelve crossbred Suffolk male lambs with average live body weight (17kg) were randomly assigned to 3 treatments (4 lambs each) to study the effect of addition of powder onion and husk onion on lamb performance. The lamb groups were fed T1-concentrate feed mixture and Rice straw (control ration) T2-ration of T1 plus 6% powder onion and T3-ration of T1 plus 6% husk onion. The experimental period lasted for 120 days. At the end of the experimental period three animals from each group were used in digestibility trail.

The main results were as follow:-

The OM, CP, EE and NFE digestibility and total digestible nutrients of T3 was higher no significantly. DM and CF digestibility was highest significantly ($P<0.05$) for T3 than T2. Lambs in T1 was higher no significantly live body gain. Additives were not effect on values of serum total protein, albumin, Globulin creatinine. While were significantly ($P<0.05$) on values of GOT and GPT. Additives were effect decrease on cholesterol values. Significant differences of TVFS's at all times.

Keywords: Lambs, onion Powder, onion husk, rumen, parameters.

INTRODCTION

Onion (*Allium cepa*) is alliaceous plant which have been grown widely in Egypt, since ancient times. It is used as flavouring agents and folk medicine, as well as some Egyptian farmers used to provides their birds with chopped onion, since it is a cheap source of feed especially up on harvest.

The organosulfur compounds are believed to possess anti-inflammatory, anti-microbial, and anti-thrombotic activity by inhibition of cyclooxygenase and lipoxygenase enzymes (Block *et al.*, 1999). Most likely the compounds work through sulfur-sulfur or sulfur-oxygen likages (Augusti, 1996). These compounds are formed when an onion is cut and the cell walls are disrupted. Allinase enzymes produce sulfenic acids via S-alk(en)yl cysteine sulphoxides (ACSOs) which rearrange to various compounds such as thiosulfates, cepaenes, and onion lachrymatory factor (Block *et al.*, 1996; Lancaster *et al.*, 1998).

In this century the medicinal properties of onion have received some consideration Onion is considered as antiatheroscleratic because cholesteroleamic properties (Augusti and Mathew 1974, Chi *et al.*, 1982) as well as antimicrobial (Cavallito and Baily, 1944) and antifungal (Prasaa and Sharma 1981) activities.

The present study is to evaluate the use of onion in lambs as antimicrobial, antifungal immune enhancing and as well as a natural growth promoters.

MATERIALS AND METHODS

This study was carried out at El-Gemmaiza Experimental station, Animal Production Research Institute, Ministry of Agriculture, Egypt.

In this regards, 12 twelve crossbred Suffolk male lambs average weight 17 kg. Animals were randomly assigned to 3 treatments (4 lambs each) to evaluate the following rations:

The three experimental treatments were as follows:

- 1) Basal diet (control)
- 2) Basal diet +6% powder onions
- 3) Basal diet +6% husk onion

Powder and husk onion were obtained from the exmport company in ElKalubea

Powder onions : This product is considered as the thing that is dropped on the ground from the machines during the process of mamufacturing and dry of the main product (the dried onions).

Husk onions: This product is considered as two outer layers away from the outer yellow layer. Then it is dried and sold to horses keepers.

T1, T2, T3 diet groups, respectively Table (1, 2, 3). The nutrient requirements were given according to N.R.C (1989). All lambs were provided with concentrate feed mixture (CFM) 60% and rice straw 40% Drinking water was available to animals twice daily.

The animals were fasted before weighted every month at the end of the experimental period three animals from each group were used in digestibility trial. At the end of the collection period samples of CFM, rice straw, feed refused and feces were collected for chemical analysis.

Proximate analysis for feed, feces, refused feed was done according to A.O.A.C (1995). Rumen liquor samples were taken at zero, 2 and 4 hours post feeding by stomach tube to determine pH, ammonia nitrogen and total volatile fatty acids (TVFA's) taken at zero hours. Ammonia nitrogen (NH₃-N) concentration was determined according to con way (1958) while TVFA's concentration was determined according to Warner (1964). Blood samples were taken before feeding serum was separated and stored at (-20°C) until assayed. Total protein, albumin, urea-N, GOT, GPT, Creatinine and Cholesterol were determined calorimetrically using Biomeriex Lab. Kits. Globulin was calculated as the difference between total protein and albumin, albumin/globulin ratio was calculated as well.

Table (1): Chemical analysis of onion prosing by product

| Item | DM | Chemical composition (on DM basis) % | | | | | |
|--------------|-------|--------------------------------------|-------|------|------|-------|------|
| | | OM | CP | CF | EE | NFE | Ash |
| Powder onion | 90.96 | 95.91 | 6.1 | 4.79 | 2.42 | 82.6 | 4.1 |
| Husk onion | 90.89 | 94.73 | 7.03 | 7.2 | 2.39 | 78.13 | 5.3 |
| CFM* | 89.0 | 95.7 | 14.24 | 10.8 | 4.1 | 65.7 | 4.3 |
| Rice straw | 88.8 | 89.9 | 3.0 | 30.0 | 1.3 | 53.9 | 10.1 |

*The concentrate feed mixture contained 38% wheat bran, 31% yellow corn, 24% cotton seed cake (undecorticated), 3.50% molasses, 2.5% limestone and 1% salt

Table (2): The chemical composition of the different experimental rations (on DM basis)

| Diet | DM% | Chemical composition on DM basis (%) | | | | | |
|------|------|--------------------------------------|------|------|-----|------|-----|
| | | OM | CP | CF | EE | NFE | Ash |
| T1 | 88.9 | 93.4 | 10.0 | 18.5 | 3.0 | 61.0 | 6.6 |
| T2 | 94.4 | 98.6 | 10.4 | 18.8 | 3.2 | 66.0 | 6.9 |
| T3 | 94.4 | 99.4 | 10.4 | 18.9 | 3.1 | 65.7 | 6.9 |

T1: control diet

T2: T1 + 6% powder onion

T3:T1+6%

Husk onion

Statistical Analysis:

Statistical analysis was conducted by analysis of variance using SAS Package (1998). The means and standard error of all parameters were estimated by Duncan. Multiple range test (Duncan, 1955) to detect significant differences among means of the experimental groups.

RESULTS AND DISCUSSION

Performance of growing lambs:

Performance data for lamb groups of different treatment are presented in table (3) the first and second interval are not different between treatment, while third and fourth interval were decreased gradually with T2 and T3 were no significant. The average daily body gain was higher for T1 (150 gm) while T2 and T3 were (133.3 and 127 gm). The animal reached (34.25, 32 and 31.25) live body weight at 16 week.

The data of daily body gain (gm) and daily feed intake (gm) were reflected on the feed conversion (gm feed/gm gain) which was the best for T1 followed by T3 than T2.

The results were higher than those values reported by Marghany *et al.* (2004) found the live body weight (34.0, 33.0, 33.5 and 36.0 kg) at 22 week

Table (3): Effect of feeding the experimental rations on the growth performance of growing lambs

| Experimental period | T1±SE | T2±SE | T3±SE |
|--------------------------------|--------------|-------------|-------------|
| Initial body weight (kg) | 16.25±0.935 | 18.00±0.935 | 17.25±0.935 |
| The first interval | 20.00±0.954 | 20.25±0.954 | 20.00±0.954 |
| The second interval | 26.00±1.341 | 25.25±1.341 | 25.00±1.341 |
| The third interval | 31.50±1.856 | 30.00±1.856 | 27.50±1.856 |
| Final body weight | 34.250±2.118 | 32.00±2.118 | 31.25±2.118 |
| Mean gain (kg) | 18±707.11 | 16±1527.5 | 15±1666.7 |
| Daily body gain (gm) | 150±5.89 | 117±12.73 | 117±13.89 |
| Total Feed Intake (gm) | 147000 | 148000 | 133000 |
| Daily feed intake (g/head/day) | 1225 | 1235 | 1110 |
| Feed conversion (feed/gain) | 8.2 | 9.3 | 8.7 |

Nutrients digestibility and nutritive values: Results in table (4) showed that nutrients digestibility OM, EE, CP and NFE% were no significantly higher (T3) which fed 6% husk onion also T3 was highest of digestibility DM and CF following by T2 (P<0.05).

The nutritive values of the experimental diets showed that 6% husk onion in the sheep diets increased TDN and DCP.

The additives (Powder and husk onion) were improved of nutrients digestibility and nutritive values because contain active compounds such as allicin quercetin, aflavonoid (one category of antioxidant compounds), nigellone and thymoquinon the compounds are effective against several gram positive and negative bacteria of different species and so may affect positively the performance.

Table (4): Digestion coefficients and nutritive values of the experimental rations.

| Item | T1 | T2 | T3 | ±SE |
|--------------------------------|--------------------|-------------------|-------------------|-------|
| Apparent digestibility: | | | | |
| DM | 79.03 ^b | 82.1 ^a | 83.7 ^a | ±0.86 |
| OM | 80.7 | 83.5 | 84.9 | ±1.41 |
| CP | 68.0 | 70.2 | 71.3 | ±1.91 |
| EE | 60.0 | 62.1 | 62.2 | ±1.11 |
| CF | 55.0 ^b | 63.1 ^a | 63.5 ^a | ±1.28 |
| NFE | 72.4 | 76.2 | 76.6 | ±2.03 |
| Nutritive value:- | | | | |
| DCP | 10.2 | 10.9 | 11.1 | ±0.30 |
| TDN | 65.7 | 69.1 | 69.4 | ±1.00 |

a, b means in the same column with different superscripts are significantly different (P<0.05)

Blood Parameters:

Results in Table (5) showed that Additive powder and hulls onions are not effect in most blood parameters TP, ALB, GLB, urea and creatinine. While GOT was the highest with treatment 1 while treatment 3 was highest in GPT parameter.

Table (5): Effect of feeding rations tested rations on some blood constituents of growing lambs.

| Parameters | T1 | T2 | T3 | ±SE |
|--------------------------|--------------------|---------------------|---------------------|--------|
| Protein fraction: | | | | |
| Total protein (g/dl) | 6.053 | 6.40 | 6.298 | ±0.461 |
| Albumin (g/dl) | 3.233 | 3.953 | 3.900 | ±0.528 |
| Globulin (g/dl) | 2.81 | 2.540 | 2.398 | ±0.271 |
| A/G ratio | 1.250 | 1.61 | 1.758 | ±0.354 |
| Liver function: | | | | |
| GOT (µ/ml) | 22.50 ^a | 17.375 ^b | 13.125 ^b | ±1.558 |
| GPT (µ/ml) | 12.75 ^b | 12.00 ^b | 19.00 ^a | ±1.86 |
| Kidney function: | | | | |
| Urea (mg/dl) | 42.15 | 46.04 | 43.32 | ±4.1 |
| Creatinine (mg/dl) | 2.060 | 1.963 | 2.07 | ±0.66 |
| Cholesterol (mg/dl) | 48.22 | 36.37 | 27.28 | ±9.12 |

a, b means in the same raw with different superscripts are significantly different (P<0.05)

Several factors affect GOT and GPT enzymes, as activities as feeding practices, environment, genetic control, response to stress, age, liver function and body weight (Boots *et al.*, 1969).

Values of serum protein fraction (total protein, albumin) for treatments T2 and T3 were higher than value of their control. These results were parallel with values of CP content in experimental ration and the results of OM and CP digestibility which indicated better utilization of dietary protein through digestive tract. Total protein in the present estimates lie within the normal range of sheep (6-8g/dl) reported by Recce (1991).

Values of serum urea-nitrogen concentration of T2 higher insignificantly than value of T1 and T3. Lewis *et al.* (1957) reported that overall patterns of rumen ammonia-nitrogen concentration are roughly parallel, and the measurement of blood urea was proposed as supplementary test for efficiency of nitrogen utilization in ruminants. While all values of creatinine were same. The values of serum creatinine obtained in present study were comparatively higher than normal range for lambs which may be due to several factors as e.g feeding practices, genetics control response to stress age, kidney function and body weight. John *et al.* (1979) reported the mean serum urea nitrogen values were significantly lower for the test ewes fed on the onion as compared with those of the control ewes on days 21, 64 and 98.

Values of cholesterol for T1 was higher followed by T2 while the lowest was by the group fed diet contained husk onions 27.28 mg/dl.

Cholesterol concentrations were dramatically reduced by adding powder and hulls onion.

The results are in agreement with Abou El-Wafa (2002) and El-Afufi (1997) who reported that adding onion into diets broiler chicks, reduced concentration of blood cholesterol and total lipid.

The under laid mechanisms of hypolipemic effect of onion may be attributed to their contents of organic disulphide which react with and inhibit, thiol (-SH) group of enzymes COA, also reduce NADPH, where both of them are necessary for biosynthesis of cholesterol and fatty acid. Therefore onion could depress cholesterolgenesis and lipogenesis in liver and consequently decreased their levels in blood (Sklan *et al.*, 1992).

Rumen activity:

Results in Table (6) showed that natural feed additive in growing lambs diets did not significantly affected on rumen pH values. The pH values were within the normal range for optimum cellulytic bacterial activity (Mertens, 1977). The recorded pH values (6-7) were within the normally functioning rumen (Abou Akkada and Blackburn, 1963).

Ammonia nitrogen concentration was lower at 0 and 4 hours post feeding with T1, T2 and T3 groups.

Ammonia-N concentration was increased at 2 hours post feeding of all treatments, this agree with Willms and Newbold (1992) who reported that the reduction of ammonia in the rumen liquor appear to be result of increased incorporation of ammonia into microbial protein and it was considered a direct results of stimulated microbial activity.

Ruminal TVFA's values was lower significant in T2 compared with T1 and T3 groups. While T3 was higher followed by T1 18.8 and 15.66 (meq/100 ml). Ruminal TVFA's values increased at Zero, 2 and 4 hours with decrease pH values. These results may indicate a stimulated rumen microflora activity through decreasing number, activity of antagonistic.

Organisms and/or 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 (Djouvinov *et al.*, 1997 and Mir *et al.*, 1998).

Table (6): Effect of experimental treatments and sampling time on some rumen liquor parameters

| Item | Time of sampling (hrs) | Experimental rations | | |
|--------------------------------|------------------------|--------------------------|--------------------------|--------------------------|
| | | T1±SE | T2±SE | T3±SE |
| Rumen pH | 0 | 5.97±0.287 | 6.08±0.287 | 6.14±0.287 |
| | 2 | 5.61±0.287 | 5.67±0.287 | 5.73±0.287 |
| | 4 | 5.54±0.287 | 5.63±0.287 | 5.41±0.287 |
| NH ₃ -N (mg/100 ml) | 0 | 15.40±4.25 | 21.00±4.25 | 19.39±4.25 |
| | 2 | 29.95±4.25 | 21.70±4.25 | 22.40±4.25 |
| | 4 | 24.50±4.25 | 22.00±4.25 | 19.55±4.25 |
| TVFS's(meq/100ml) | 0 | 11.90 ^b ±0.06 | 9.67 ^c ±0.89 | 16.37 ^a ±0.12 |
| | 2 | 12.50 ^b ±0.56 | 10.47 ^c ±0.32 | 17.80 ^a ±0.06 |
| | 4 | 15.70 ^b ±0.06 | 11.50 ^c ±0.06 | 18.80 ^a ±0.06 |

a, b, c means in the same raw with different superscripts are significantly different (P<0.05)

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إستجابة الحملان لعلائق محتوية على مخلفات البصل

هنا هاشم العمارى

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أستخدم فى هذه الدراسة 12 من ذكور حملان خليط السافولك متوسط وزن 17 كجم قسمت الحيوانات الى ثلاث مجموعات لدراسة تأثير اضافة مخلف تصنيع البصل وقشر البصل على الاداء الانتاجى للاغنام، غذيت المجموعة الاولى على عليقة مقارنة وقش أرز بينما غذيت المجموعة الثانية على عليقة المقارنة مضاف اليها 6% مخلف التصنيع والمجموعة الثالثة غذيت على العليقة المقارنة مضاف اليها 6% قشر البصل واستمرت التجربة 120 يوم اجرى فى نهايتها تجربة الهضم.

وأظهرت النتائج ما يلى:

- 1- أظهرت النتائج عدم وجود فروق معنوية بين المعاملات فى معدل النمو اليومى للحملان ولكن كان هناك زيادة تدريجية من T1 الى T3.
 - 2- لا توجد فروق معنوية بين المعاملات لكن كانت هناك زيادة فى معاملات هضم كل من المادة العضوية والبروتين الخام والدهن الخام والكربوهيدرات الذائبة ومجموع المركبات المهضومة للمعاملة الثالثة وهناك زيادة معنوية فى معامل هضم المادة الجافة والالياف الخام للمعاملة الثالثة ثم تليها المعاملة الثانية.
 - 3- لم تظهر هذه الاضافات اى تأثير معنوى على كل من البروتين الكلى والاليومين والجلوبيولين والكرياتنين بينما اثرت معنويا على كل من انزيمات الكبد.
 - 4- خفضت الاضافات الكوليسترول فى الدم بالمقارنة بالكنترول
 - 5- توجد فروق معنوية فى الاحماض الدهنية الطيارة فى كل الاوقات
- من النتائج السابق يتضح ان استخدام مخلفات تصنيع البصل وقشر البصل ادت الى تحسن فى معاملات الهضم وقياسات الكرش وخفضت الكوليسترول ولكن تحتاج فترة تجريبية اطول من 120 يوم حتى تظهر نتائج أفضل.