NUTRITIONAL EVALUATION OF DRIED TOMATO (LYCOPRISON ESCULINTUM) HAULMS INSTEAD OF ALFALFA HAY IN FEEDING GROWING RABBITS UNDER NORTH SINAI CONDITIONS.

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SUMMARY

The study was conducted to evaluate the utilization of dried tomato (Lycopraison esculintum) haulms as instead of alfalfa hay in feeding growing rabbits. Thirty weaned New Zealand white rabbits of both sexes aged 7 wk and weighted 970.80 were randomly divided into three groups (10 each). The first group (C) was fed the basal diet as control (0% DTH), while the other two treatment groups (L and H). Were fed diets containing 10 and 20% DTH, respectively replacing alfalfa hay in the basal diet. All the experimental diets contained nearly the same level of crude protein (CP) and digestible energy (DE). All the experimental diets formulated to cover the nutrients requirements of rabbits. The diets and fresh water were supplied ad-libitum during the experimental period (8 wk). At the end of experimental period, digestibility trials were carried out to determine the digestibility of feed nutrients and the feeding values of experimental diets. Three rabbits from each group were slaughtered to evaluate carcass traits and some blood parameters. Results indicated that the experimental diets with different levels of DTH (L and H) showed no significant differences (P> 0.05) among the dietary treatments in respect of live body weight, total weight gain and daily weight gain at different ages. Total feed intake and daily feed intake of DTH-diets were significant decreased compared to that of control diet during the first four weeks, while, were slightly decreased during the whole experimental period. Feed conversion did not affected significantly. All nutrients digestibility coefficients (DM, OM, CP, CF, EE and NFE) and Nutritive values as TDN did not effect by dietary treatment did not affected, while DCP was lower with H-diet than that of other diets (control diet and L-diet). Empty carcass as weight or percentage and total edible parts as weight were decreased significantly with H-diet comported with that of control diet, while the other traits of carcass were not affected by dietary treatments. There were no significant differences among dietary treatments in most blood constituents (Albumin, Glucose, Cholesterol, Urea-N, Creatinine, ALT and AST). Total protein (TP) and Globulin of rabbits fed on H-diet were lower (P< 0.05) than those fed C-diet. Economic efficiency (E.E) and Relative of DTH-diets were higher than C-diet.

Keywords: Rabbits, dried Tomato (Lycop很多玩家 esculintum) haulms, productive performance, digestibility, carcass traits, blood parameters and economic efficiency.

INTRODUCTION

In Egypt, there is a wide nutritional gap between the available and that demand for meet to nutritional requirements of livestock. This gap is continuously increasing because of limited land and irrigation water and increasing human population. So, several searches have made to decrease this gap by using crop residues and agro-industrial by-products in animal feeding. There are annually about 38.28 million tons of field crop residues and using of them is estimated about 39% as animal feeds (Agricultural statistics, Economic affairs sectors, Ministry of Agriculture, 2011).

Vegetable crop residues are the plant parts that remained after harvesting of vegetable crops. Most of them used as organic fertilizers or burned causing environmental pollution and subsequent health hazard, but a little are dried and stored as forage sources for ruminants or left in the field as grazing for animals (Renard, 2001). Crop tomato (lycoperison esculintum) is considered main vegetable crop in Egypt. Crop area of them is estimated about 537582 fedan produce about 1881537 tons of tomato haulms (Agricultural statistics, Economic affairs sectors, Ministry of Agriculture, 2011). Tomato (lycoperison esculintum) haulms can be used in ruminant feeding as forage where it having 14.88% CP, 1.85% EE, 43.59% CF and 30.71% NFE (EL-sayed et al., 2012).

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Therefore, the present study aimed to study the effective inclusion of dried tomato (*lycopriscon esculintum*) haulms instead of alfalfa hay as untraditional feed ingredient in rabbit diets on growth performance, digestibility of nutrients, carcass traits and some blood constituents.

**MATERIALS AND METHODS**

This experiment was conducted in the rabbitry farm of the Department of Animal and Poultry Production, Faculty of Environmental Agriculture Sciences, Arish University, North Sinai, Egypt for 8 weeks starting 19-5 to 13-7-2021.

**Preparation of dried tomato (*lycopriscon esculintum*) haulms (DTH)**

Tomato (*lycopriscon esculintum*) haulms (TH) were collected from EL-Saleheya city, Sharqia governorate, Egypt. TH were air dried under shade until their moisture content reached almost 10%, then completely ground and stored in a well tight polyethylene bags at room temperature until they were used. Samples of dry Tomato haulms (DTH) were taken for chemical analysis. DTH was analyzed for crude protein (CP), crude fiber (CF), ether extract (EE) and ash according to A. O. A. C (2012).

**Experimental design and management**

Thirty newly weaned New Zealand White (NZW) rabbits of both sexes at 7 weeks ages were assigned to three similar groups, each of 10 animals according to their initial live body weight (970.80 ± 24.51 g). Rabbits of each group were sub-divided into three replicates of 3, 3 and 4 animals. The experimental period lasted 56 days (from 7 to 15 wks of age). The 1st treatment group (control, C%) was fed a pelleted control diet; the 2nd and 3rd treatment groups (L and H) were fed diets containing 10 and 20% DTH substituting 33.3% and 66.6% alfalfa hay respectively (Table 1). DTH was handily mixed with feed ingredients and the experimental diets were pelleted under a temperature of 70 °C and 0.3 cm diameter and 2 cm length. The experimental diets were formulated to be iso-nitrogenous (≈17% CP), iso-caloric (2500 kcal DE / Kg diet) and cover the recommended nutrients requirements of growing rabbits according to NRC (1996). Ingredient and calculated chemical composition of the experimental diets are showed in Table (1). Rabbits were housed in galvanized wire cages (3/cage) measured (40*40*30 cm) in a well ventilated building (natural air and light throw the window). Cages were provided with feeders and automatic nipple drinkers. The experimental diets and fresh water were offered *ad-libitum* twice daily at 8.00 AM and 6.00 PM. All rabbits were observed daily, kept under the same managerial, hygienic and environmental conditions. All rabbits were individually weighed at the beginning of the experiment, then weekly before offering the morning meal until end of experiment. Feed intake was recorded weekly during the experimental period. Live body weight, weight gain, feed intake, feed conversion ratio (g feed/ g gain) and economic efficiency were estimated.

**Digestibility trials**

At the end of the growth experimental period (15 wk of age), digestibility trials were conducted to evaluate the nutrient’s digestibility and feeding values of the experimental diets. Three male rabbits were chosen randomly from each group and housed individually in metabolism cages facilitate the collection of feces. The same feeding regime used during the feeding trial was also used during the digestibility trial. A preliminary period of 10 days was followed by 5 days as a collection period for feces. The experimental diets were offered once a day at 8.00 AM *ad-libitum*. Feed intake was recorded daily and quantitative collection of feces was started 24 hours after offering the daily feed. The feces of each rabbit were collected daily in the morning for a collection period of 5 days. Any shaded hair or foreign materials were discarded. The feces were sprayed with 2% boric acid for trapping any ammonia released, then was dried at 60 °C for 36 hours. At the end of the collection period, all dried feces for each rabbit was mixed, grounded and stored until chemical analysis. Diets and feces were analyzed according to A. O. A. C (2012). The nutritive values of the experimental diets were estimated as digestible crude protein (DCP %), and total digestible nutrients (TDN) Values of total digestible nutrients (TDN) were calculated according to the equation described by Cheeke *et al.* (1982) as follows:

\[
\text{TDN} = \%\text{DCP} + \%\text{DCF} + \%\text{DNFE} + 2.25(\%\text{DEE})
\]

**Carcass traits**

At the end of experimental period (15 wk of age), three rabbits representing each dietary treatment were randomly chosen to estimate carcass traits. Rabbits were fasted for approximately 12 hours and
individually weighted to record the pre-slaughter weight. After complete bleeding and skinning, the empty carcass with head, liver, kidneys and heart were weighted separately according to Cheeke (1987).

Table (1): Ingredients and calculated chemical composition of the experimental diets (as fed).

| Item                              | The experimental diets¹ |       |
|-----------------------------------|--------------------------|-------|
|                                   | C            | L            | H            |
| Alfalfa hay (15%)                 | 30.00        | 20.00        | 10.00        |
| Dried tomato haulm (DTH)          | -            | 10.00        | 20.00        |
| Yellow corn                       | 21.00        | 21.14        | 23.69        |
| Soybean meal (44%)                | 18.00        | 17.60        | 18.00        |
| Wheat bran                        | 24.19        | 24.40        | 21.00        |
| Molasses                          | 4.00         | 4.00         | 4.00         |
| Di-Methionine                     | 0.11         | 0.11         | 0.11         |
| Vitamins and mineral mixture²     | 0.30         | 0.30         | 0.30         |
| Salt                              | 0.50         | 0.50         | 0.50         |
| Limestone                         | 1.35         | 1.40         | 1.65         |
| Di-Calcium phosphate              | 0.35         | 0.35         | 0.55         |
| Anti-fungi                        | 0.10         | 0.10         | 0.10         |
| Anti-coccidian                    | 0.10         | 0.10         | 0.10         |
| Total                             | 100          | 100          | 100          |

Calculated analysis³:
- Dry matter (DM)%
- Organic matter (OM)%
- Crude protein (CP)%
- Ether extract (EE)%
- Nitrogen free extract (NFE)%
- Ash%
- Digestible energy (DE)⁴, kcal/Kg
- Crude fiber (CF)%
- NDF%
- ADF%
- Hemicellulose%
- Calcium%
- Total phosphorus%
- Methionine%
- Lysine
- DE : CP

| Calculated analysis³ |       |
|----------------------|-------|
| DM                   | 87.04 |
| OM                   | 81.09 |
| CP                   | 17.00 |
| EE                   | 2.67  |
| NFE                  | 47.96 |
| Ash                  | 5.95  |
| DE                   | 2500  |
| Crude fiber          | 13.46 |
| NDF                  | 37.77 |
| ADF                  | 21.71 |
| Hemicellulose        | 16.06 |
| Calcium              | 1.13  |
| Total phosphorus     | 0.535 |
| Methionine           | 0.38  |
| Lysine               | 0.82  |
| DE : CP              | 147.06|

¹Experimental diets: C = control diet, containing no DTH; L = diet containing 10 % DTH; H = diet containing 20 % DTH.
²Each 3 kg of premix contains: Vit. A 6000000 iu, Vit. D3 900000 iu, Vit. E 4000 mg, Vit k3 2000 mg, Vit. B1 2000 mg, Vit. B2 4000 mg, Vit. B6 2000 mg, Vit.B12 10mg, Biotin 50 mg, Pantothenic acid 10000 mg, Nicotinic acid 50000 mg, Follic acid 3000 mg, Choline chloride 250000 mg, Mg 8500 mg, Zn 50000 mg, Iron 50000 mg, Copper 5000 mg, Iodine 200 mg, Selenium 100 mg and Cobalt 100 mg.
³According to (MOA 2001).
⁴Calculated according to Cheeke (1987): DE (kcal/g) = 4.36 - 0.0491 (%NDF).
%NDF=28.924+0.657(%CF). %ADF= 9.432 + 0.912(%CF). Hemicellulose= %NDF %ADF

RESULTS AND DISCUSSION

Temperature-humidity index (THI)

In this study, overall averages of temperature and relative humidity were 29.76 °C and 63.24%, respectively. The calculated mean THI was 28.01 indicated that the rabbits were reared under moderate heat stress (Marai et al., 2001).
**Productive performance:**

As shown in table (2), No significant differences were observed among the three dietary treatments in respect of live body weight, total weight gain and daily weight gain at different ages (from 7 to 15 weeks). Slightly decreasing was observed due to inclusion of DTH in the mentioned traits. Decreasing daily weight gain of all rabbits in the present study than that obtained by (Bakr et al 2019 and Bakr, 2019) for the same rabbit strain may be due to heat stress. Viability percentage of rabbits were 90, 100 and 90% for the three dietary treatments (control diet, C; L and H), respectively.

**Table (2):** Live body weight and daily gain of growing rabbits as influenced by dietary treatments.

| Item                          | Treatments | Control, C | L          | H          | P-Value |
|-------------------------------|------------|------------|------------|------------|---------|
| Live body weight (g):         |            |            |            |            |         |
| Initial (7 wk).               |            | 968.80±26.65| 970.80±24.51| 970.10±24.96| 0.998   |
| 11 wks.                       |            | 1578.22±53.16| 1561.80±28.56| 1518.22±29.61| 0.536   |
| 15 wks.                       |            | 1969.56±55.16| 1970.40±38.41| 1897.22±49.00| 0.475   |
| Total weight gain (g):        |            |            |            |            |         |
| 7-11 wks.                     |            | 613.44±37.46| 591.00±24.87| 534.44±33.14| 0.224   |
| 11-15 wks.                    |            | 391.33±28.70| 408.60±23.04| 379.00±32.17| 0.751   |
| 7-15 wks.                     |            | 1004.78±50.15| 999.60±32.79| 913.44±54.14| 0.310   |
| Daily weight gain (g):        |            |            |            |            |         |
| 7-11 wks.                     |            | 21.91±1.34 | 21.11±0.89 | 19.09±1.18 | 0.224   |
| 11-15 wks.                    |            | 13.98±1.02 | 14.59±0.82 | 13.53±1.15 | 0.751   |
| 7-15 wks.                     |            | 17.85±0.59 | 16.31±0.97 | 16.31±0.97 | 0.308   |
| No. of animals:               |            | 10         | 10         | 10         | -       |
| No. of dead animals.          |            | 1          | -          | 1          | -       |
| Viability %.                  |            | 90         | 100        | 90         | -       |

1Treatments. C = Control, containing no DTH; L = Containing 10% DTH; H = Containing 20% DTH. 2Values are least-squares means.

**Table (3):** Feed intake and feed conversion ratio as influenced by dietary treatments.

| Item                          | Treatments | Control (C) | L          | H          | P-Value |
|-------------------------------|------------|------------|------------|------------|---------|
| Total feed intake (kg/head)   |            |            |            |            |         |
| 7-11 wks.                     |            | 2.20±0.03  | 2.11±0.02  | 2.08±0.00  | 0.008   |
| 11-15 wks.                    |            | 2.49±0.08  | 2.36±0.03  | 2.48±0.02  | 0.199   |
| 7-15 wks.                     |            | 4.69±0.10  | 4.47±0.01  | 4.56±0.02  | 0.118   |
| Daily feed intake g/h/d       |            |            |            |            |         |
| 7-11 wks.                     |            | 78.67±0.67 | 75.33±0.67 | 74.00±0.00 | 0.002   |
| 11-15 wks.                    |            | 89.00±2.89 | 84.33±0.88 | 88.67±0.67 | 0.200   |
| 7-15 wks.                     |            | 83.67±1.76 | 79.67±0.33 | 81.33±0.33 | 0.093   |
| Feed conversion ratio         |            |            |            |            |         |
| 7-11 wks.                     |            | 3.60±0.17  | 3.59±0.17  | 3.93±0.30  | 0.514   |
| 11-15 wks.                    |            | 6.47±0.57  | 5.94±0.41  | 6.6±0.31   | 0.566   |
| 7-15 wks.                     |            | 4.71±0.28  | 4.52±0.22  | 5.02±0.26  | 0.419   |

1Treatments. C = Control, containing no DTH; L = Containing 10% DTH; H = Containing 20% DTH. 2Values are least-squares means. a, b Means in the same row with different superscripts differ (P<0.05).

Total feed intake and daily feed intake of diets contained DTH (Land H) were significant (P<0.01) decreased compared to that of control diet during the period (7 – 11 wks) while they were nearly comparable during the periods (11 – 15 wks and 7 – 15 wks) for the dietary treatments (Table 3). Decreasing total feed intake and daily feed intake of DTH diets during (7 – 11 wk of age) may be due to the oxalate effect which is considerably working as major factor contributing to the anti-palatability (Ravindran et al., 1996, Agwunobi et al., 2002 and Amany et al, 2017). Regarding feed conversion ratio, results cleared that no significant effect due to inclusion of DTH into the rabbit diets during the different ages (from 7 – 15 wk). The 2nd group (L) had the
best values (3.59, 5.94 and 4.52) and the 3rd group (H) had the lowest values (3.93, 6.6 and 5.02). From previous results, it means that DTH could be incorporated in the rabbit diets up to H level (20%) without causing adverse effects on the productive performance.

**Nutrients digestibility and nutritive values of experimental diets**

Table (4) showed that all nutrients digestibility coefficients were not significant (P>0.05) among treatments. Digestion coefficients of CP and CF tended to be lower in rabbits fed diets containing DTH. In the same way, total digestible nutrients (TDN) did not differ significantly among treatments. Meanwhile, digestible crude protein (DCP) of rabbits fed H-diet (20%) was lower (P<0.05) than that fed DTH-free diet (control diet).

Decreasing digestibility coefficients (CP and CF) and digestible crude protein (DCP) of rabbits fed DTH diet might be due to the oxalate effect which is considered working as a major factor contributing to the anti-palatability effect (Agwunobi et al, 2002 an Salem, 2020).

### Table (4): Effect of dietary containing of different levels of dary tomato haulms (DTH) on apparent nutrients digestion coefficients and nutritive values of the experimental diets.

| Parameter                  | Treatment 1 | Treatment 2 | Treatment 3 | P-Value2 |
|----------------------------|-------------|-------------|-------------|----------|
| Digestibility coefficient  |             |             |             |          |
| (%DM)                      | 65.49±2.34  | 65.58±1.51  | 64.07±1.60  | 0.82     |
| (OM)                       | 67.52±2.05  | 67.53±1.54  | 65.86±1.57  | 0.75     |
| CP                         | 78.04±2.89  | 76.11±3.25  | 68.19±3.05  | 0.13     |
| EE                         | 80.03±1.44  | 77.26±3.14  | 76.32±2.24  | 0.55     |
| CF                         | 28.15±4.98  | 24.83±2.89  | 19.25±0.60  | 0.24     |
| NFE                        | 74.45±1.90  | 74.83±1.85  | 75.97±1.01  | 0.80     |
| Nutritive values           |             |             |             |          |
| TDN                        | 65.22±2.38  | 63.96±1.48  | 62.17±1.14  | 0.50     |
| DCP                        | 15.13±0.56  | 14.20±0.61  | 12.31±0.55  | 0.03     |

Treatments. C = Control, containing no DTH; L = Containing 10% DTH; H= Containing 20% DTH. Values are least-squares means.

a, b Means in the same row with different superscripts differ (P<0.05).

**Carcass traits**

All carcass traits either weight or percentage of pre-slaughter were unaffected significantly (p>0.05) by dietary treatments. In respect of dressing percentage, the highest value being occurred with control group (C, 66.84%) versus (63.39 and 63.64%) for groups L and H, respectively (table 5). These results indicated that using DTH up to 20% had not adverse effects on carcass traits and the internal organs (liver, kidneys and heart) were appeared normal in size and did not show any signs of toxicity.

**Blood constituents**

Data presented in Table (6) showed that inclusion of dried tomato haulms (DTH) in rabbit diets up to 20% had no significant effect on most of selected serum constituents (except total protein, Globulin and Alb / Glo ratio) which were significantly lower in the group (H) than control group (C). The significant decrease in serum total protein in group (H) than that of control group (C) could be attributed to lower degradability of protein in tomato haulm. However, it contains anti-nutritional factors such as tomatine, solanine, chaconine, lactins and oxalats (Khogali et al, 2010 cited by Novak and Haslberger, 2000). All serum constituents were within the normal range of healthy rabbits (Manning et al., 1994). The non-significant effects of the dietary treatments on most serum constituents may be due to the adequacy of nutrients. (Eggum, 1989; Onifade and Abu, 1998; Amany et al 2017 and Bakr et al, 2019).
Table (5): Effect of the different levels of tomato haulm in growing New Zealand White rabbit diets on carcass characteristics

| Item                        | Treatments | P-Value |
|-----------------------------|------------|---------|
|                             | Control (C) | L       | H       |
| Live-body weight (LBW)      | 1949.33±16.80 | 1933.00±29.51 | 1884.00±49.79 | 0.460 |
| Empty carcass weight (g)    | 1247.33±26.52 | 1169.00±29.51 | 1140.67±28.42 | 0.084 |
| % of LBW                    | 63.98±0.82   | 60.48±1.25   | 60.57±1.05   | 0.094 |
| Total edible parts (g)      | 1303.33±28.26 | 1225.00±27.84 | 1198.67±30.77 | 0.097 |
| % of LBW(dressing)          | 66.84±0.88   | 63.39±1.33   | 63.64±1.01   | 0.118 |
| Edible giblets (g)          | 56.00±2.52   | 62.00±2.00   | 58.00±3.06   | 0.312 |
| % of LBW                    | 2.87±0.11    | 3.20±0.05    | 3.08±0.08    | 0.086 |
| Head (g)                    | 118.33±2.33  | 117.33±3.38  | 111.67±1.76  | 0.224 |
| % of LBW                    | 6.07±0.13    | 6.07±0.07    | 5.93±0.19    | 0.723 |
| Liver (g)                   | 40.67±2.33   | 47.00±2.08   | 43.33±1.76   | 0.176 |
| % of LBW                    | 2.09±0.11    | 2.43±0.07    | 2.30±0.03    | 0.053 |
| Kidney (g)                  | 9.67±0.33    | 9.67±0.33    | 9.67±0.33    | 1.000 |
| % of LBW                    | 0.50±0.01    | 0.50±0.02    | 0.51±0.01    | 0.763 |
| Heart (g)                   | 5.67±0.33    | 5.33±0.88    | 5.00±1.00    | 0.842 |
| % of LBW                    | 0.29±0.02    | 0.28±0.05    | 0.26±0.05    | 0.895 |

a,b Means in the same row with different superscripts differ (P<0.05).
1 Treatments: C= Control, containing no DTH; L= containing 10% DTH; H= containing 20% DTH. 2 Values are least-squares means.
3 Total edible parts wt. = empty carcass wt. (with head) + edible giblets wt.
Total edible parts % = total edible parts wt. /fasted wt. * 100
4 Edible giblets wt. = Liver + Kidneys wt. + Heart wt.

Table (6). Effect of the different levels of dried tomato haulm in growing New Zealand White rabbits’ diets on some blood constituents.

| Item                  | Treatments | P-Value |
|-----------------------|------------|---------|
|                      | Control (C) | L       | H       |
| Total protein (g/dl)  | 6.50±0.14   | 6.15±0.09 | 5.92±0.17 | 0.058 |
| Albumin (g/dl)        | 4.67±0.13   | 4.67±0.09 | 4.70±0.15 | 0.978 |
| Globulin (g/dl)       | 1.83±0.04   | 1.49±0.17 | 1.22±0.10 | 0.018 |
| Alb/Glo               | 2.58±0.10   | 3.24±0.43 | 3.88±0.19 | 0.042 |
| Glucose (mg/dl)       | 91.67±8.25  | 93.67±1.45 | 81.33±6.33 | 0.367 |
| Cholesterol (mg/dl)   | 45.33±0.67  | 55.67±0.88 | 51.00±5.29 | 0.142 |
| Urea (mg/dl)          | 42.33±0.88  | 43.67±5.21 | 45.33±1.45 | 0.804 |
| Creatinine (mg/dl)    | 1.66±0.16   | 1.51±0.08 | 1.60±0.02 | 0.604 |
| AST (U/L)             | 68.33±6.23  | 59.00±6.81 | 64.00±5.69 | 0.600 |
| ALT (U/L)             | 55.33±4.67  | 50.00±7.00 | 50.33±11.86 | 0.883 |

Economic efficiency

It is evident that the lower price of tomato haulms was reflected on the price of the experimental diets. Feed cost / kg gain of the diets contains DTH (L and H) was decreased by 13.33 and 13.29 % compared with that of control diet (C), respectively. Net revenue / rabbit (L.E), Economic efficiency (E. E) % and Relative E.E (%) of L-DTH diet (10%) were higher than C-diet and H-DTH diet (20%). These results were in agreement with those obtained by Amany et al (2017) and Salem (2020).

CONCLUSION

It could be concluded that the use of vegetable crop residues is necessary to reduce the price of feed, because feed cost is one of the main obstacles to the development of rabbit production. Therefore, dried tomato haulm (DTH) could be used in feeding growing rabbits up to 20% of the diet replacing from...
Alfalfa hay with no harmful effects compared with feeding the commercial diet. In addition, due to the lower prices of dried tomato haulm compared to traditional feeds, the economic efficiency could be increased when using it as a substitute.

**Table (7):** Economic efficiency as affected by dried tomato haulms (DTH) in rabbits’ diet.

| Item                                      | Control (C) | L   | H   |
|-------------------------------------------|-------------|-----|-----|
| Price/kg diet (L.E)                       | 5.07        | 4.76| 4.51|
| Total feed intake/rabbit (g)              | 4.69        | 4.47| 4.56|
| Total feed cost/rabbit (L.E)              | 23.78       | 21.28| 20.56|
| Total weight gain/rabbit (g)              | 1004.78     | 999.60| 913.44|
| Feed cost/kg gain (L.E)                   | 23.68       | 21.27| 22.52|
| Price/kg weight gain (L.E)                | 37          | 37  | 37  |
| Total revenue/weight gain (L.E)           | 37.18       | 37  | 33.78|
| Net revenue/rabbit (L.E)                  | 13.50       | 15.73| 11.26|
| Economic efficiency (E.E) %               | 57.01       | 73.95| 0.50|
| Relative E. E (%)                         | 100         | 129.71| 87.72|

*Treatments: C = Control, containing no DTH; L = Containing 10% DTH; H = Containing 20% DTH.

Based on price of ingredients of the diets and market price of live body weight as kg during the experimental period (2021). The price of one ton of alfalfa hay, yellow corn, soybean meal (44%), wheat bran and tomato haulm were 3400, 5200, 7800, 3750 and 500 LE, respectively and the price of kg of salt, lime stone, Di-calcium phosphate, premix, molasses, DL-methionine, Anti-fungi and Anti-coccidian were 1, 0.5, 12, 50, 3, 80, 42 and 150 LE. Price of live body weight as kg was 37 LE.

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التمييز الغذائي لعش الطمطام الجاف كديل لدرس البرسيم الحجازي في تغذية الأرابين النامية تحت ظروف
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هذه الدراسة أجريت لتسهيل استخدام عرض الطمطام الجاف كديل لدرس البرسيم الحجازي في تغذية الأرابين النامية. تتألف أربعة
نيوزيلاندي أعظم مطور عمر سبيع entail بكميس وزن 870±10 وزن قطعته ثلاثة مجموعات بكل منها 10 أرابين. المجموعة الأولى
(الكترول) أُذُن على علبة مقارنة (% عرض الطمطام الجاف) بينما المجموعة الثانية والثالثة أُذُن على علبة تحتوي على 10%
وي 20% عرض الطمطام الجاف. استيمداً من دريس البرسيم الحجازي على التوالي. كانت العيوب الثلاثة متساوية في محتواها من الطاقة
(2500 كيلوجرام/اليومن) والبروتين (17%)- بحيث تحتوي الزيادات الغذائية لداراب النامية. وفي نهاية التجربة أجريت تجربة
أقصى امتصاص العضلات الغذائية والقيمة الغذائية للعلاق الثلاثة بالإضافة إلى ثلاث أرباب من كل مجموعة لتقدير صفات
التيحوية، ببعض مكونات الدم.

أوضح التحال النمطي على ما يلي:

- عدم وجود فرق ملحوظ في الوزن الحي، والوزن الكلي، والزيادة اليومية بين المجموعات الثلاثة.
- الماكول الكلي والمكمل الوسي، للعلاق تحتوي على عرض الطمطام قم معيوناً مقارنة بالكترول خلال الأربعة أسابيع الأولى من
التجربة بينما لم يختلف معيوناً أثناء فترة التجربة (8 أسابيع).
- معدل التحويل الغذائي لمختلف معيوناً بين المجموعات الثلاثة أثناء التجربة.
- لم توجد اختلافات ملحوظة في معدلات الدهم المكونات الغذائية والقيمة الغذائية في صورة مجموع المركبات الكلي المهمومة
بين TDN.
- البترفيان المحموم الكلي ق معيوناً في المجموعة الثالثة (20% عرض الطمطام) مقارنة بالكترول.
- لم توجد اختلافات ملحوظة لمعدل صفحات الدم (كما عا وزن النسيج الفضاء والأجزاء الماكول) بين المجموعات الثلاثة.
- وزن النسيج الفضاء والأجزاء الماكول للمجموعة الثالثة قم معيوناً مقارنة بالمجموعة الكترول.
- لم توجد اختلافات ملحوظة لمعدل مكونات الدم (الأسباع، الجلوكلوز، المزمن، الغدد، الكراتين، وزن النسيج الفضاء والأجزاء الماكول).
- البروتين الكلي والبروتين الجاف قم معيوناً بالمجموعة الثالثة مقارنة بالمجموعة الكترول بينما الألياف، البروتين / الجلوكلوز للمجموعة الثالثة زاد
- معيوناً مقارنة بالكترول.
- ومعناً كل مكونات الدانيا، металлبلني لداراب النامية للمجموعات الثلاثة.
- حقيقة المجموعتان الثلاثة والثالثة التي تجد علاقات ملحوظة على عرض الطمطام الجاف أعلى عند استخدامها مقارنة بالمجموعة
الكترول.

الخلاصة: يمكن تغذية الأرابين النامية على علاق محدودة على عرض الطمطام الجاف حتى 20% من الطاقة استبدالاً من دريس البرسيم
الحجازي دون أن يؤثر ذلك على الصحة الإنتاجية والشيخوخة للأرابين النامية.