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EFFECT OF FEEDING BIOLOGICALLY TREATED CORN STALKS ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF GROWING RABBITS

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ABSTRACT

The main aim of the present study was improving the nutritional values of corn stalks as an example of poor quality roughage and to improve its utilization by animals. Therefore, sixty-four New Zealand White rabbits of five weeks old were randomly distributed into four groups of sixteen rabbits each. The animals of the first three groups were fed on rations contained corn stalks treated biologically with *Trichoderma viride (T. viride)*, with 10%, 20% or 30% respectively, whilst those of the fourth group were given ration without *T. viride* (0%, e.g. the commercial diet).

At the end of the experimental period, which lasted for 12 weeks three rabbits from each treatment were selected and slaughtered to study the different carcass characters. All the results were subjected to analysis of variance.

The most important results obtained in the present study could be summarized as follows:

1- It was observed that replacement of berseem hay by biologically treated corn stalks at different levels did not affect statistically on daily body weight gain. On the other hand, daily feed consumption had been affected significantly by treatment differences.

2- It was noted that replacement of berseem hay by biologically treated corn stalks at different levels may improve feed conversion values.

3- The results of slaughter weight (SW), carcass weight (CW), empty body weight (EBW) and dressing percentage (DP) were not significantly affected by replacement of berseem hay by biologically treated corn stalks.

4- Marked differential effects due to different biological treatment had been observed on weights and percentages of testis relative to carcass weight and empty body weight. On the other hand, results of the other edible organs did not show any significant effects due to biological treatment.

5- Weights and percentages of different carcass cuts (fore legs, thoracic cage, loin and hind legs) were not influenced by dietary treatments.

6- Crude protein and ash percentages of *L. dorsi* muscle were not influenced statistically by the biological treatment differences. On the other hand, the dietary treatments affected significantly dry matter and ether extract contents.

Finally, based upon the present results, it could be suggested that *T. viride* can be used safely to enrich poor quality roughages such as corn stalks, and that fungus *(T. viride)* can be used successfully to improve the utilization of untraditional rabbit feed stuffs.

Likewise, upon the basis of the present investigation, it could be stated that the biological treatments of rabbit rations can be used safely without adverse effect on growth performance and health of animals. So, it can be recommended as it is easy to be applied by farmers.

Keywords: Corn stalks, biological treatments, Rabbits, growth performance, Carcass.

INTRODUCTION

Large quantities of agricultural wastes and residues with low nutritive values exist throughout the world.

At present time, most of these low quality roughages are not only wasting natural resources, but also an important sources of environmental pollution. Therefore, legal laws are already being taken in many countries in the world to ban and forbidden the burning of straws, stalks and stubbles from grasses, fruit, grains and other crops.

However, in Egypt as well as in many other developing countries, animals suffer from shortages of feeds that are continuously increasing in their costs. At the same time, many thousand tons of agricultural wastes and residues per year are produced from processing of vegetables and fruits.

In Egypt, however, there are about 21 million tons of plant by products produced annually. However although wheat straw and rice straw are already being fully utilized by many farmers, either for bedding poultry farms (wheat straw in particular) or for feeding livestock, yet corn stalks is not being utilized on large scale.

The problem of feeding stalks and other fibrous by-products to animal, which limits their use in animal ration can be stated and summarized as follows: low digestibility, low protein content, high crude fiber content and poor feed palatability. Thus, therefore physical, chemical and biological treatments can be used.

However, corn is considered as an important main summer field crop in Egypt and occupy a large area of available cultivated land. Therefore, corn stalks had been selected to be investigated as one of the most important low quality roughage used as an untraditional animal feeds to increase its protein content by the biological treatment. Likewise, the aim of the present investigation was to study the effect of feeding biologically treated corn stalks on growth performance and carcass traits of rabbits.

MATERIALS AND METHODS

The field work of the present study was conducted at the Rabbits Farm of Animal Production Department, Faculty of Agriculture, Moshtohor, Banha University.

The chemical analysis and the microbiological studies of the present investigation were carried out at the laboratories of National Research Centre (NRC), medical service unit of NRC and Agriculture Research Centre (ARC) of Ministry of Agriculture.

The main aim of the present investigation was improving the nutritional values of corn stalks as an example of poor quality roughages and to improve its utilization by animals. Likewise, the objective of the present experiment was to study effect of feeding replacing berseem hay with corn stalks treated biologically on growth performance, feed conversion and carcass traits of rabbits.

1. Biological Treatment.

(a) Trichoderma viride enrichment.

A heap of 10 kgs chopped corn stalks (CS) was treated with 400 ml. Standard inoculums of *Trichoderma viride* and following additives were added to the treated corn stalks:

250 g Molasses, 100 g Urea, 100 g Super Phosphate, 100 g Ammonium Sulfate, 250 g Sodium Chloride. 50 g Yeast Extract Powder and 20 liters water to keep the moisture content at about 60%. The composting heap was covered with air tight polyethylene sheets and left for 15 days. The protein was analyzed and it was 16% to 18%.

(b) The biological treatment.

(I) Inoculum preparation

Pure culture of *T. viride* F- 416 preserved on PDA solution was employed for laboratory inoculum preparation as follows:

The culture was renewed on PDA medium, then incubated for 72 hrs at 28 °C $\pm$ 2. Ten ml sterilized water was used to crush fungal growth to be used as inoculum at 10% (v / w). 500 ml of conical flasks each containing 25g sugar beet pulp (SBP) moistened at solid liquid ratio 1:2 with solution containing (g / l) urea, 2.0, Ammonium sulphate, 2.0, potassium hydrogen phosphate, 2.0, magnesium sulphate, 0.05 and 50g sugar cane molasses. The flasks were autoclaved at 121°C for 30 min. The cooled sterilized flasks was inoculated then incubated statically at room temperature 30 °C $\pm$ 2 for 72 hrs.

(II) Propagation of fungal inoculum

Five liters flasks capacity each containing 300g SBP moistened at solid: liquid ratio 1:2 with the some above nutrient solution. The sterilized flasks were inoculated with fungal growth obtained from previous step at 10% (w / w), then incubated at room temperature 30 $\pm$ 2 for 5 days.

(iii) Scaling up biological treatment.

The prepared corn stalks in all biological steps were moistened with nutrient solution at solid: liquid ratio 1:2 containing urea 1.5%, ammonium sulphate 1.0%, magnesium sulphate 0.05%, molasses 2.5% and active dry yeast *Saccharomyces Cevervisiae* F- 25 0.01%. The following steps were applied:

1-Ten kg of prepared corn stalks was inoculated with above prepared inoculum at 10% (w / w) and incubated in polyethylene bags 75 X 120 cm on room temperature for 7 days.

2-The fermented corn stalks from step I was mited with 90 kg moistened corn stalks, then left to ferment for 10 days at room temperature.

3-Fermented corn stalks from step II was wall mited with 400 kg prepared corn stalks and left to ferment for 10 days at room temperature. The corn stalks treated was down up day after days to end of biological period.

The obtained product was air dried, preserved to analysis and using in feeding trails.

(c) Manufacturing the pelleted feed.

The air dried compost have been transferred to the feed mill (the united company) for preparing the experimental pelleted feed by substitution of berseem hay with corn stalks treated biologically with *Trichoderma viride* at the rate of 33% , 66% from berseem hay, in addition to 100% (complete substitution of berseem hay with corn stalk).

2. Experimental Animals.

Sixty four New Zealand white weaned rabbits of five weeks old were allocated into four equal groups of 16 rabbits in each with nearly similar initial weight.

The animals were housed individually and were fed *ad. lib.* An excess of fresh water was provided. The rabbits were offered a commercial diet for about seven days before starting the experiment.

3. Feeding treatments.

Four experimental diets of iso - nutritive value but differ in their constituents according to the purpose of the present work were formulated. However, all the experimental diets were adjusted to cover the nutrient requirements of growing rabbits according to the (***NRC, 1977)*** recommendations.

The experimental animals were fed on complet diets contained different amounts of biologically treated corn stalks in combination with berseem hay. However, Table (1) shows the chemical analysis of untreated and treated corn stalks and the chemical constituents of the experimental rations, whilest the constituents of the experimental rations and their percentages are shown in Table (2).

Table (1) Chemical composition of untreated, treated corn stalks and complet rabbit diets

Item	Chemical composition on DM basis						
	DM	OM	CP	Ash	CF	EE	NFE
Corn stalks	93.54	89.39	4.66	10.61	44.43	3.03	37.27
Biologically treated corn stalks (B.T.C.S)	89.90	80.76	16.58	19.24	20.08	0.66	43.44
Complet rabbit diets							
T_1 (10% B.T.C.S)	92.00	89.98	15.27	10.02	16.66	1.70	56.35
T_2 (20% B.T.C.S)	92.66	89.52	15.97	10.48	16.56	1.83	55.16
T_3 (30% B.T.C.S)	92.37	88.20	15.60	11.80	16.68	1.74	54.18
T_4 (Control)	92.64	88.43	15.91	11.57	16.01	1.77	54.74

DM : dry matter OM : organic matter CP : crude protein
CF : crude fiber EE : ether extract NFE : nitrogen free extract

4. Managements.

The experimental animals were housed in galvanized wire hutches of rabbit batteries. The experimental rations were offered *ad. lib.* twice daily at 8.00 a.m. and 2.00 p.m. in addition to fresh water which was available all time. Residuals of feed were weighed daily and then subtracted from the offered amounts to obtain the actual accumulated feed consumed per week.

The rabbits were individually weighted to the nearest five grams every week before morning meal during experimental period.

Table (2) Composition of the experimental rations (%).

Treated corn stalks / Ingredients%	Experimental rations (%)			
	T_1 (10%)	T_2 (20%)	T_3 (30%)	Control
Yellow corn	18.00	18.00	18.00	18.00
Barley	7.40	7.40	7.40	7.40
Berseem hay	20.00	10.00	0.00	30.00
Treated corn stalks	10.00	20.00	30.00	0.00
Soybean meal (44%)	12.00	12.00	12.00	12.00
Sunflower meal (27%)	7.00	7.00	7.00	7.00
Wheat bran	20.00	20.00	20.00	20.00
Lime stone	2.00	2.00	2.00	2.00
Sodium Chloride	0.30	0.30	0.30	0.30
Vitamins and minerals premix*	0.20	0.20	0.20	0.20
Molasses	3.10	3.10	3.10	3.10

***** *Kg of Vitamins and minerals premix contained: Vit. A 2000000 IU; Vit. D_3 150000 IU; Vit. E 8.33 g; Vit. B_1 0.33g; Vit. B_2 1. 00g; Vit. B_6 0.33g; Vit. B_9 8.33g; Vit. B_{12} 1.70 mg; Pantothonic acid 3.33 g; Biotine 33 mg; Mg 66.70 g; Folic acid 0.83 g; Choline chloride 200 g; Zn 11.70 g; Fe 12.50 g; Cu 0.50 g; I 33.30 mg; Se 16.60 mg and Mn 5.00 g.*

5. The chemical analysis of the experimental diets.

Presumed analysis of experimental diets were determined. Moisture, nitrogen (N), ether extract (EE), crude fiber (CF) and ash were recorded as described by Association of Official Analytical Chemists ***(AOAC, 1990).***

The factor 6.25 was used for calculating crude protein (CP). The amount of nitrogen-free extract (NFE) was obtained as the following equation: NFE % = 100 – (moisture % + ash % + CP % + EE % + CF %).

6. The slaughter experiments and carcass characters.

6.a. Slaughter weight (SW), carcass weight (CW), empty body weight (EBW) and dressing percentages (DP).

At the end of the experimental period, three representative rabbits from each feeding group were randomly taken to study the different characteristics. Those rabbits were fasted for approximately 18 hours before slaughtering and then individually weighed and slaughtered by severing the neck with a sharp knife according to Islamic religion. Empty body weight (EBW) was obtained as stated in the following equation:

EBW = BW – (full digestive tract – empty digestive tract).

The dressing percentages were calculated based on carcass weight (CW) and on empty body weight (EBW).

6.b. The edible organs.

After skinning the carcass, the different edible organs (e.g. liver, kidneys, heart, spleen, lungs and testis) were separated and weighed. The weights and percentages of these edible organs relative to carcass weights and empty body weights (EBW) were calculated.

6.c. Carcass cuts.

Each carcass was weighed and subjected to the following cuts: fore legs, thoracic cage, loin and hind legs. Each of those cuts was weighed to the nearest gram and recorded. The percentages of each cut relative to carcass weight was calculated.

6.d. Chemical analysis of Longissimus dorsi muscle.

Samples of Longissimus dorsi muscle were taken for chemical analysis according to the methods of the *(AOAC, 1990).*

7. The statistical analysis.

The data were statistically analyzed by using the general linear model procedure of *SPSS (1998)*. The differences among means were examined by using Multiple Range Test to *Duncan (1955).*

RESULTS AND DISCUSSION

Effect of fungal treatment on chemical composition of corn stalks.

Chemical composition of both untreated and biologically treated corn stalks with *Trichoderma viride* are shown in (Table 1). The results showed improvement in both crude protein and nitrogen free extract percentages and decreasing in crude fiber content of biologically treated corn stalks.

Durand and Chereau (1988) found that, Trichoderma viride is characterized by high protein content wide spectrum amino acids composition, low nucleic acids contents, no toxicity, no antibiotic production and its ability to consume different substrates.

However, the increase in protein content in biologically treated corn stalks may be due to the release of water soluble sugar from polysaccharides might have led to faster growth of fungus which in turn resulted in higher CP content, or may be related to the addition of basal mineral media containing nitrogen salts as has been suggested by *Grajek (1988) and Garcia et al., (1993).*

On the other hand, the decreasing in crude fiber content of biologically treated corn stalks in comparison with untreated corn stalks may be due to the utilization of CF by the fungi for their growth since fungi among the microorganisms which have capability in decomposing different agricultural by- products as had been suggested by *Kim, et al., (1985).*

Effect of biologically treated corn stalks on growth performance, feed intake and feed conversion of the experimental rabbits.

(a) Effect on growth performance of New Zealand White rabbits.

Table (3) revealed the effect of using different percentages of the biologically treated corn stalks on the growth performance of the experimental rabbits. It is worthy, to note that the initial live body weights of the experimental rabbits ranged from 843.0 g to 865.0 g ($\pm$ 23.6), the differences were non-significant (P>0.05). It is interesting to state that the biological percentages of treatment did not affect significantly the live body weight gains. However, disappearance of the significant effect may be due to the existence of great individual variation within treatments inherent in the experiment. The demonstration of such variations, however, would require to use number of animals so large as to minimize the individual variations and experimental error.

The average final daily live body weight daily gains at the end of the experimental period were ranged between 16 g/d. to 18 g / day (Table 4). The present results, however, are somewhat, lower than those reported by *El-Sayaad et al., (1996)* and *Soliman et al., (2000)*. However, differences in feeding treatments and managements may be account for the lower values obtained in the present study.

(b) Effect on feed consumption.

Effect of feeding different percentage of biologically treated corn stalks in the diet on feed consumption are shown in Table (3). It has been clearly noted that feed consumption had been affected significantly by the percentageof biologically treated corn stalks. The results showed that rabbits reared under treatment one consumed the least amount of rations. However, the most probable explanation for this finding is that the partly replacement of 10% berseem hay bytreated corn stalks with *Trichoderma viride* may depress rabbits appetite.

On the other hand, the rabbits raised under the control treatment consumed the greatest amount of ration. However, upon basis of the present results one may suggest that the control diet, e.g. without biologically treated corn stalks, may be more palatable to the animals than the others and increase the appetite of the rabbits.

(c) Effect on feed conversion efficiency (FCE).

The mean values of feed conversion efficiency (FCE) of the rabbits as affected by the replacement of different % of berseem hay with biologically treated corn stalks are presented in Table (3).
It is interesting, however, to note that FCE of animals fed T_1 treatment was the best, whilst that of the rabbits raised on the control ones was the poorest, However, based upon the present results, it is conceivable to suggest that the biological treatment may improve feed conversion values.

Table (3):Effect of biologically treated corn stalks on growth performance, feed intake and conversion of the experimental rabbits over the entire experimental period, from the start of the experiment until the end of the 12 th week.

Treated corn stalks / Parameters	Experimental groups					Significance
	T_1 (10%)	T_2 (20%)	T_3 (30%)	T_4 (Control)	SEM	
Initial weight (g)	843	856	864	865	23.60	NS
Mean weight at 12 th week (g)	2362	2322	2234	2283	32.00	NS
Total body weight gain (g)	1519	1466	1370	1418	27.5	NS
Daily body weight gain (g)	18.00	17.00	16.00	17.00	0.64	NS
Daily feed consumption (g)	94^{b}	98^{b}	99^{ab}	111^{a}	2.10	*
Feed conversion (g feed / g gain)	5.22^{b}	5.76^{ab}	6.19^{ab}	6.53^{a}	0.11	*

*a and b: Means in the same row having different superscripts differ significantly at (P<0.05). NS : Non significant. * : Significant at (P< 0.05).*

Effect of replacing different levels of berseem hay by biologically treated corn stalks on:

(I) Slaughter weight (SW), carcass weight (CW), empty body weight (EBW) and dressing percentages (DP).

The mean values of slaughter weight (SW), carcass weight (CW), empty body weight (EBW) and dressing percentages (DP) as affected by the treatments are given in Table (4).

Table (4): Mean values of slaughter weight, carcass weight, empty body weight and dressing percentages as affected by different rates of biologically treated corn stalks.

Treated corn stalks / Items	Experimental groups					Significance
	T_1 (10%)	T_2 (20%)	T_3 (30%)	T_4 (Control)	SEM	
Slaughter Wt., g	2350	2357	2123	2080	73	NS
Carcass Wt., g	1280	1297	1152	1110	44	NS
EBW [(1)], g	2202	2193	1928	1948	64	NS
DP [(2)], g	54.58	54.96	54.28	53.20	0.60	NS
DP [(3)], g	58.20	59.01	59.73	56.71	0.70	NS

(1) EBW = BW – (full digestive tract – empty digestive tract).
(2) Dressing percentage based on carcass weight.
(3) Dressing percentage based on empty body weight. **NS : Non significant.**

It is worth noting that mean values of slaughter and carcass characteristics were not affected by different treatments.

Moreover, upon the basis of present results, one may suggest that differences in crude fiber content of the experimental rations did not show any significant effect on slaughter and carcass characters of rabbits. The present suggestion, however, is in accordance with those of *Anber (1986)* and *Khashaba (1988)* who showed that differences in crude fiber levels did not show any significant effects on slaughter and carcasses weights of rabbits.

It was observed generally that carcass weights were increased in the groups exhibiting heavier slaughter weights. However, due to elimination of gut "fill" variation, therefore, EBW is considered to be valuable character in comparing between animals of the different treatments.

It is worthy to note, that dressing percentage is of considerable importance, since it determines to much extent the output of edible tissues from an animal.

It is clear, that dressing percentage values, based on carcass weight, ranged from 53.20% to 54.96%, whilst dressing percentages based on empty body weight (EBW) ranged between 56.71% and 59.73% with no significant differences among different treatments.

However, the present data are compatible generally with those of *Ayyat et al., (2002), Radwan (2002)* and *Pournima et al., (2003).*

On the other hand, the present values of the dressing percentages are somewhat higher than those reported by *Ghazalah and El-Shahat (1994)*, who reported ranges between 40.6% to 47.7% for rabbits. However, worthy of mention is that their values were calculated relative to live body weight and this explains the depression of their data compared compared to the obtained results of the present investigation.

(ii) Effect on edible organs of rabbit carcasses.

Mean values of weights and percentages of edible organs relative to carcass weights and empty body weights (EBW) as affected by the feeding treatments are given in Table (5).

Table (5): Weights and percentages of edible organs relative to carcass weight and empty body weight (EBW) as influenced by feeding different levels of biologically treated corn stalks.

% of B.T.C.S / Items	Experimental groups					Significance
	T_1 (10%)	T_2 (20%)	T_3 (30%)	T_4 (Control)	SEM	
Carcass weight (g)	1280	1297	1152	1110	44	NS
Empty body weight *(EBW), (g)*	2202	2193	1928	1948	64	NS
Liver:						
Liver weight (g)	49.3	52.3	46.0	42.30	3.20	NS
Liver / carcass wt. (%)	3.83	4.01	3.99	3.81	0.18	NS
Liver / EBW (%)	2.22	2.37	2.37	2.16	0.11	NS
Kidneys:						
Kidneys weight (g)	11.77	14.33	19.00	12.33	1.23	NS
Kidneys/carcass wt. (%)	0.91	1.11	1.65	1.13	0.12	NS
Kidneys / EBW (%)	0.52	0.65	0.97	0.63	0.07	NS
Heart:						
Heart weight (g)	6.33	7.67	7.33	5.76	0.37	NS
Heart / carcass wt. (%)	0.49	0.61	0.63	0.51	0.03	NS
Heart / EBW (%)	0.28	0.35	0.37	0.29	0.02	NS
Spleen:						
Spleen weight (g)	4.67	6.7	6.23	5.43	0.62	NS
Spleen / carcass wt. (%)	0.37	0.51	0.54	0.51	0.06	NS
Spleen / EBW (%)	0.21	0.3	0.31	0.29	0.03	NS
Lungs:						
Lungs weight (g)	12.67	12.33	13.67	12.67	0.61	NS
Lungs / carcass wt. (%)	0.98	0.94	1.18	1.18	0.06	NS
Lungs / EBW (%)	0.57	0.55	0.70	0.66	0.03	NS
Testis:						
Testis weight (g)	9.33^{abc}	8.67^{abc}	7.00^{b}	11.00^{c}	0.54	*
Testis / carcass wt. (%)	0.72^{b}	0.68^{b}	0.60^{b}	1.00^{a}	0.06	*
Testis / EBW (%)	0.42^{b}	0.40^{b}	0.36^{b}	0.56^{a}	0.03	*

a, b and c: Means in the same row having different superscripts differ significantly at (P<0.05). ***NS = Non significant*** *** : significant at (P<0.05).**

With the exception of weights and percentages of testis; the statistical analysis revealed that the other organs were not affected significantly by the different feeding treatments. However, based upon the present results it is comprehensible to suggest that the different feeding treatments have an important role on the testis. However, further investigations are needed before any definite suggestions could be attained. Worthy of note is that the mean values of the present trial are generally compatible with those stated by *El-Sayaad et al., (1996), Abd El-Razik (1996), Soliman et al., (2000), Ayyat et al., (2002)* and *Radwan (2002).*

(iii) Effect on carcass cuts.

Table (6) represents the mean weights and percentages of the different carcass cuts as affected by the dietary treatments. Duncan's multiple range test is shown in the same Table. It is worth noting that the hind legs had the biggest proportion (33% - 39%) of the carcass, followed by the loin cuts (23% - 28%) then the thoracic cages (21.50% - 23%), whilst the fore legs cuts had the smallest proportion (16.10% -16.60%).

However, it should be noted that the parts of the carcass containing the thickest muscular cuts such as the hind legs and the loin should make up high proportion of the carcass, whilst the fore legs and thoracic cage should be relatively low.

It is of special interest, however, to state that the high priced carcass cuts; e.g. the hind legs and the loin are more desirable by the consumers, representing nearly 61% - 62% of the whole carcass weight. However, the present data are compatible with those reported by *Radwan (2002)* and *Pournima et al., (2003).*

(iv) Effect on the chemical analysis of Longissimus dorsi muscle.

Mean values of the chemical constituents of Longissimus dorsi muscle *(L.Dorsi)* are presented in (Table 7). The same Table shows the significance of the different percentages of biologically stalks in the diet on the chemical components on dry matter basis.

It is of special interest, however, to note that different percentage of biologically stalks in the diet had affected statistically ($P < 0.05$) dry matter and ether extract.

It is interesting, however, to note that Duncan's multiple range test revealed that there was statistical differences among diets containing different percentage of biologically treated corn stalks in dry matter, crude protein and ether extract. On the other hand different treatments had no significant effect on ash percentage.

Table (6): Mean weights and percentages of rabbit carcass cuts as affected by the different rates of biologically treated corn stalks.

Treated corn stalks / Items	Experimental groups					Significance
	T_1 (10%)	T_2 (20%)	T_3 (30%)	T_4 (Control)	SEM	
Carcass Wt., g	1280	1297	1152	1110	44	NS
Fore legs:						
Weight (g)	208^{a}	212^{a}	192^{ab}	177^{b}	6.00	NS
%	16.30	16.40	16.60	16.10	0.31	NS
Thoracic cage:						
Weight (g)	295	278	248	253	9.40	NS
%	23.00	21.50	22.20	22.90	0.27	NS
Loin:						
Weight (g)	358	300	267	307	17.0	NS
%	28.00^{a}	23.00^{bc}	23.10^{c}	27.30^{abc}	0.92	NS
Hind legs:						
Weight (g)	418^{ab}	507^{a}	4.38^{ab}	373^{b}	20.3	NS
%	33.00^{b}	39.00^{a}	38.00^{a}	34.00^{b}	0.96	NS

a,b and c: Means in the same row having different superscripts differ significantly at ($P < 0.05$)
NS = Non significant

Table (7): The chemical analysis of Longissimus dorsi muscle.

Treated corn stalks / Items	Experimental groups					
	T_1 (10%)	T_2 (20%)	T_3 (30%)	T_4 (Control)	SEM	Significance
DM	28.40^a	31.92^b	31.38^{ab}	33.45^b	0.68	*
Chemical composition % (on DM basis)						
CP	85.09^a	75.59^b	77.94^b	78.38^b	1.38	NS
EE	10.96^a	20.79^b	18.43^b	13.70^{ab}	1.39	*
Ash	3.95	3.62	3.63	4.32	0.14	NS

a and b: Means in the same row having different superscripts significantly differ at ($P < 0.05$)
SEM : Standard errors of means
NS : Non significant
*** : Significant at ($P<0.05$).**
DM : dry matter CP : crude protein EE : ether extract

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تأثير التغذية بحطب الذرة المعامل بيولوجياً على أداء النمو وخصائص ذبائح الأرانب النامية

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من أهم أهداف هذه الدراسة هو العمل على زيادة الإستفادة وتحسين القيمة الغذائية لأحد الأعلاف غير التقليدية وذلك بالمعاملة البيولوجية ؛ لذا فإنه تم إختيار مُخلف نبات الذرة (حطب الذرة) الذى يتميز بإنخفاض قيمته الغذائية وإنخفاض نسبة البروتين وإرتفاع نسبة الألياف والشائع وجوده بكثرة فى جميع قرى ونجوع مصر. كذلك من أهداف هذا البحث العمل على إيجاد حلول عملية لمشكلة توفير البروتين الحيوانى لغذاء الإنسان ؛ وحيث أن الأرانب تُعد حيوانات سريعة النمو ولها مقدرة كبيرة على تحويل المخلفات الزراعية ومواد العلف الخشنة المنخفضة فى قيمتها الغذائية إلى لحوم ذات قيمة غذائية مرتفعة وبها نسبة عالية من البروتين؛ لذا فإنه تم إختيار الأرانب كحيوانات تجريبية لهذه الدراسة.

هذا ولقد أجريت التجارب المزرعية لهذا البحث فى مزرعة كلية الزراعة بمشتهر ؛ جامعة بنها ؛ بينما أجريت التحاليل الكيميائية والميكروبيولوجية فى معامل أقسام الإنتاج الحيوانى ؛ والميكروبيولوجيا بالمركز القومى للبحوث ؛ وفى معامل وحدة الخدمات الطبية بالمركز القومى

للبحوث ؛ ومعامل مركز البحوث الزراعية التابعة لوزارة الزراعة.

تم إختيار أربعة وستون أرنباً من سلالة النيوزيلندى الأبيض وذلك فى سن خمسة أسابيع وتم توزيعها إلى أربعة مجموعات متماثلة بكل مجموعة ستة عشر أرنباً ، ولقد غذيت أرانب المجموعة الأولى على عليقة تم إحلال ثلث دريس برسيم العليقة بحطب الذرة المعامل بيولوجياً بفطر ترايكودرما فيردى "*Trichoderma viride* " بينما غذيت أرانب المجموعة الثانية على عليقة تم إحلال ثلثين دريس برسيم العليقة بحطب الذرة المعامل بيولوجيا بالفطر ؛ وفى عليقة المجموعة الثالثة تم إحلال تام لدريس برسيم العليقة بحطب الذرة المعامل بيولوجيا بالفطر ؛ أما أرانب المجموعة الربعة فقد غذيت على العليقة التجارية الموجودة بالسوق (العليقة المقارنة) أى العليقة غير المحتوية على حطب ذرة معامل بيولوجيا بالفطر.

فى نهاية تجربة النمو التى استمرت ١٢ أسبوعا تم ذبح ثلاثة حيوانات من كل مجموعة لدراسة تأثير إحلال حطب الأذرة المعامل بيولوجيا" بنسب مختلفة محل دريس البرسيم على صفات ذبائح الأرانب وخصائصها المختلفة وكانت أهم النتائج المتحصل عليها يلى:

١ – لم يؤثر إحلال حطب الأذرة المعامل بيولوجيا محل الدريس إحصائيا على معدل النمو اليومى فى حين كان هناك تأثيراً معنوياً للمعاملات البيولوجية على المعدل اليومى لإستهلاك الغذاء.

٢ – لوحظ أن إحلال حطب الأذرة المعامل بيولوجيا محل الدريس له تأثير على تحسين قيم معدلات تحويل الغذاء.

٣ – لم يتأثر كلاً من وزن الذبح ، ووزن الذبيحة ، ووزن الجسم الفارغ ، ونسب التصافى وأوزان ونسب قطعيات الذبيحة تأثراً معنوياً بإحلال حطب الأذرة المعامل بيولوجيا محل الدريس

٤ – لم تتأثر نسب البروتين الخام والرماد فى العضلة العينية (*Longissimus dorsi muscle)* تأثرا معنويا بإحلال حطب الأذرة المعامل بيولوجيا محل الدريس ؛ بينما تأثر كلا من المادة الجافة ومستخلص الأثير معنويا.

وتبعاً للنتائج التحصل عليها من هذه الدراسة يمكن إستنتاج ما يلى:

أ – يمكن إستعمال فطر "*Trichoderma viride*" لتحسين القيمة الغذائية لحطب الذرة والأعلاف الخشنة الأخرى منخفضة القيمة الغذائية.

ب – يمكن إستخدام فطر "*Trichoderma viride*" لمعاملة المواد الخشنة الداخلة فى علائق الأرانب لتحسين كفاءة معدلات تحويل الغذاء وبعض صفات ذبائح هذه الحيوانات.

ج – يمكن تطبيق نتائج هذه الدراسة للمساهمة فى سد جزء من الفجوة الغذائية ، وتقليل التلوث البيئى الناتج عن حرق حطب الذرة والمخلفات الزراعية الأخرى.