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PERFORMANCE OF GROWING CROSSBRED FRIESIAN CALVES FED BIOLOGICAL TREATED ROUGHAGES AND CONCENTRATE
2 – Blood constituents and carcasses characteristics.

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SUMMARY

The aim of this study was to investigate the effect of feeding biological treated roughages and concentrate feed mixture in the rations of growing crossbred Friesian calves some blood constituents and carcasses characteristics. The experiments extended for 183 days and were carried out on forty eight crossbred Friesian calves of 6 -7 months old and 189.17 $\pm$ 3.58 Kg live body weight (LBW). Animals were divided into 3 groups of 16 calves; each group was subdivided into two subgroups (8 calves each). The experimental groups allotted randomly into six rations: control (R1, R3 and R5): 2% of LBW. CFM and *ad-libitum* straws of wheat, bean and clover, respectively, while R2, R4 and R6 included 2% CFM of LBW. and biological treated (*Trichoderma harzinaum F-418* fungi) previous straws *ad-libitum*, respectively. Blood constituents, dressing percentage and carcasses characteristic were determined. Results indicated that, the activity of serum transaminase enzymes, serum total protein, albumin glucose and cholesterol concentrations were increased significantly ($P<0.05$) with biological treated straws containing rations compared with other treatments. No significant differences were found among the experimental treatments in serum globulin and creatinine urea-N. Dressing percentage was significantly ($P<0.05$) higher for biological treated roughages than other control groups. Eye muscle (*Longissimus dorsi*) area, water holding capacity (WHC), and tenderness, of biological treated groups were higher than those received the control groups. pH values and coluor intensity of the eye muscle of calves fed biological treated roughages were significantly ($P<0.05$) less than those fed control. The chemical composition of 9 to 11th ribs of eye muscles showed significant ($P<0.05$) effect of biological treatments, protein percentage was relatively higher in biological treated groups than those fed the control groups, while no significant differences were found in the fat and ash percentage among all the treatments. It could be concluded that, feeding biological treated (*Trichoderma harzinaum F-418* fungi), wheat, bean and clover straws *ad-libitum* with 2% of LBW concentrate feed mixture (2% of LBW of growing crossbred Friesian calves), resulted in superior dressing percentage and better carcasses characteristics, as compared with control groups could be recommended.

INTRODUCTION

Ruminant meat is an important source of nutrients and is also of high sensory value for human. However, the importance and nature of these characteristics depend on ruminant nutrition. The first part of this study is focused on the effect of biological treated different types of straws and dietetic value on the blood constituents and the second part is meat quality. It offers a panel of quantitative and qualitative contributions, especially through its physical and chemical characteristics. **Census (2006)** showed that the Egyptian people consumed approximately 30 kg of meat/year (12,7 kg of these quantity is lean meat). In Egypt, there is a gap between the available and required animal feeds and animal requirements especially in summer. Wheat, bean and rice straw and also, corn stalks are the main roughages used in animal feeding by farmers in summer season. The concentrate ingredients containing elevating prices, so attempts to use new methods such biological treatments for elevating the roughages feeding values and marked increases in their nitrogen (CP) content and digestibility to partially replace high prices concentrate rations **(Al-Ashry *et al.*, 2003, Kholif (2005) and Sabbah *et al.*, (2006).** Also, increased carcass weight and dressing% **(Henics, 1987; Sabbah *et al.*, 2006).**Biological treatments is consider a promising method for utilizing lignocelluloses agricultural wastes to increase their protein content, then use it as feed for ruminants.

The aim of this study was to investigate the effect of feeding biological treated roughages and concentrate feed mixture in the rations of growing crossbred Friesian calves some blood constituents and carcasses characteristics

MATERIALS AND METHODS

This study was carried out at Arabic Agriculture Company at El-Behera governorate and Animal Production Research Institute. A feeding trial lasted 183 days was carried out on forty eight crossbred Friesian calves of 6 -7 months old and weighing 189.17 $\pm$ 3.58 Kg LBW. Animals were divided into 6 subgroups (8 calves each).

Materials of study: Eight tons of wheat straw, bean straw and clover straw were obtained from the same company fields, while the fungal strain of (*Trichoderma harzinaum F-418* fungi) was obtained from the Microbial Chemistry Laboratory, National Research Center.

Preparation of fungal inoculums: Three days old slants cultures of *Trichoderma harzinaum F-418* was crushed into flask containing 205 ml of sterilized water. The inoculums was used to inoculate 500 ml capacity flaks containing 20g of cooled sterilized residue by autoclaving on 121 °C for 30 minutes, while moistened by basal medium containing 4% molasses, 0.4% urea, 0.2% KH_2PO_4 and 0.03 $MgSO_4.7H_2O$ in solid liquid ratio 1:2 by 10% (v/w). The incubated flasks were incubated in adjusted temperature incubator at 30 $\pm$ 1 °C for 5 days.

Preparation of fungal treatments: The treated roughages were moisture at 65 – 70% and put specific fungal spawn and left for three weeks.

The experimental groups allotted randomly into six rations as shown in (Table 1): control (R1, R3 and R5): 2% of LBW. CFM and *ad-libitum* straws of wheat, bean and clover, respectively, while R2, R4 and R6 included 2% CFM of LBW. And biological treated (*Trichoderma harzinaum F-418* fungi) previous straws *ad-libitum*, respectively.

Concentrate feed mixture (CFM) consisted in percentages of; 35% yellow corn grain, 25% wheat bran, 20% undecortecated cottonseed meal, , 10% line meal, 5 soybean meal, 2% limestone, 1.5% common salt, 0.5% ammonium chloride, 0.3% premix, 0.3% dicalssium phosphate, 0.3% sodium bicarbonate, and 0.1% yeast

Feeds were offered in group feeding in two equal portions at 8.00 am and 4.00 pm. Refused feeds (if any) were daily collected and recorded. The offered amounts of feed mixtures were biweekly adjusted according to body weight changes. Drinking water was freely available all times.

Table (1): Calculated nutrients composition and gross energy (GE*) of the main ingredients and the experimental rations.

Item	DM%	Nutrients% (DM basis)											GE, MJ /kg DM
		OM	CP	CF	EE	NFE	Ash	NDF	ADF	ADL	Cell.	Hem.	
CFM	100	91.18	16.84	9.42	4.11	60.81	8.82	33.52	17.88	7.82	10.06	15.64	1.737
Untreated WS	91.36	89.15	1.81	40.11	0.42	46.81	10.85	77.09	45.28	9.89	35.39	31.81	1.657
Treated WS	90.51	83.41	5.08	38.01	0.68	39.64	16.59	69.18	46.13	6.29	39.8	23.05	1.574
Untreated BS	92.68	84.29	5.96	37.79	0.72	44.82	10.71	68.17	49.32	9.60	39.72	18.85	1.683
Treated BS	91.78	84.58	10.71	35.53	1.05	37.29	15.42	63.15	45.12	7.50	37.62	18.03	1.627
Untreated CS	91.60	88.75	6.45	38.15	0.86	43.29	11.25	65.10	51.23	13.35	37.88	13.87	1.679
Treated CS	90.72	85.80	11.20	34.18	1.75	38.67	14.20	60.08	48.11	9.17	38.94	11.97	1.665
Ration 1	100	89.55	12.40	21.62	3.17	52.36	10.45	52.87	29.72	9.36	20.36	23.15	1.751
Ration 2	100	87.30	13.76	21.09	3.31	49.14	12.70	50.54	30.39	8.13	22.26	20.15	1.720
Ration 3	100	89.56	13.98	20.84	3.29	51.45	10.44	49.77	31.32	9.29	22.03	18.45	1.760
Ration 4	100	87.79	15.78	20.07	3.42	48.52	12.21	46.98	29.87	8.54	21.33	17.11	1.739
Ration 5	100	89.32	14.21	21.05	3.36	50.70	10.68	48.84	32.14	10.71	21.43	16.70	1.759
Ration 6	100	88.01	16.02	19.65	3.69	48.65	11.99	47.14	31.10	8.62	22.48	16.04	1.750

*CFM = Concentrate feed mixture, WS=wheat straw, BS=bean straw and CS=clover straw.

**GE, MJ/kg DM = 0.0226 CP + 0.0407 EE + 0.0192 CF + 0.0177 NFE (MAFF, 1975).

Blood samples: Four animals of each group were sampled monthly; samples were collected from jugular vein at about 3 hrs after morning feeding of roughage diets. Blood samples were directly collected into a clean dried tube and centrifuged at 4000 rpm for 20 minutes. Serum was separated and stored at –18 C° till the biochemical analysis.

***Blood Serum Metabolites*:** Serum total protein (**Armestrong and carr, 1964), albumin (Dumas et al., 1971)**, transaminase enzymes (AST and ALT) **(Reitman and Frankel, 1959),** urea **(Patton and Crouch, 1977)**, Creatinine **(Husdan, 1968)**, Glucose **(Siest et al., 1981**), Cholesterol

(Raltiff and Hall 1973). Globulin and albumin/globulin ratio were calculated.

Slaughter trials: At the end of feeding period, four calves of each experimental group were randomly chosen and slaughtered after deprived from feeding and water for 16 hours before slaughter time. After slaughter, the carcass was splited carefully into two sides, each half was divided into fore and hind quarters between 11 12^{th} ribs. Each quarter was weighted, de-boned and the boneless meat in each quarter was estimated and the weight of the hot carcass was recorded. Samples of eye muscle at the 9^{th} to 11^{th} rib were taken for chemical analysis and physical characteristics. The area of eye muscle (*Longissimus dorsi*) was measured by a planimeter from a tracing taken on the cut surface over the 9^{th} rib.

Weights of the internal organs (heart, spleen, kidneys, liver, lungs, testes, head, 4 legs, hide, compartments of the stomach (full and empty) and intestine (full and empty) were recorded. The hot carcasses weights were recorded and dressing percentage with or without edible offal's (heart, kidneys, liver and testes) also were calculated.

Meat analysis: Proximate chemical analysis of meat was done according to **A.O.A.C. (1990).** The pH value of meat tissues was measured by pH meter with glass electrode as described by **Aitken *et al.*, (1962).** Tenderness and water holding capacity were determined using the method described by **Grau and Hamm (1957).**

Statistical Analysis: The data for all traits were statistically analyzed according to Snedecor and Cochran, 1980 in two ways analysis of variance procedure by computer program of **SAS (1995)** using the model:

$Y_{ijk} = \mu + A_i + B_i + B_i * B_i + e_{ijK}$ Where: Y_{ijk} = represents observation, μ = overall mean, A_i = effect of roughage, B_i = effect of rations, $B_i * B_i$= Effect of interaction between roughages and rations.and e_{ijk}=experimental error(common error).**Duncen multiple range test, (1955)** was applied whenever possible.

RESULTS AND DISCUSSION

Clinical Biochemistry*:* As shown in (Table 2), the activity of serum transaminase enzymes (AST and ALT) were significantly (P<0.05) increased with biological treated groups. Our results of fungal treatments are in accordance with those obtained by **El-Ashry *et al.*, (1997**), **Khorshed (2000)** and **Sabbah *et al.*, (2006)** who observed that AST concentration increased significantly with fungal treatments. The present values of AST and ALT showed normal activity of the animal hepatic tissues and consequently, different biological treated straws applied in the present investigation could be used without any adverse effect on the liver functions. Serum total protein and albumin were increased significantly (P<0.05) with biological treated straws containing rations compared with other treatments. However, serum globulin and A/G ratio were not affected by treatments (Table 2). Serum total protein reflects the nutritional status of the animal and it has a positive correlation with dietary protein **(Kumar *et al.*, 1980).** These results were parallel with values of CP content in the experimental rations and of organic matter. The results of total protein and albumin are in accordance with finding of **El-Ashry *et al.*, (1997**), **Khorshed (2000), Kholif *et al.*, (2005)** and Sabbah *et al.,* (2006) who reported that biological treatments increased serum total protein. Values of serum globulin were not affected by biological treatment. The results of globulin are in the line of those obtained by **El-Ashry *et al.*, (1997), Khorshed (2000), Kholif *et al.*, (2005**) with fungal culture treatments. Serum urea concentrations affected by treatments significantly (P0<.05). The results of fungal treatments were higher than those of control groups and in agreement with those obtained by **El-Ashry *et al.*, (1997), Khorshed (2000), Kholif *et al.*, (2005)** who reported a significant increase in serum nitrogen concentration with fungal treatments.

Values of serum creatinine were not affected by biological treatment (Table 2). Generally, serum creatinine level is a useful indicator of glomerular filtration in the kidney. From the previous data, it was found that the levels of serum creatinine for calves were within the normal levels. Concerning to the results of serum urea nitrogen and serum creatinine concentrations, it is clear that tested animals were not in a catabolism situation and kidney function was not affected by biological treatments. Consequently, the animals were in a good nutritional condition.

Also, serum glucose showed slightly increase (P<0.05) with biological treated straw containing rations by 16.02, 5.56 and 5.47% for R2, R4, and R6,

respectively, compared with their control rations (Table 2). The slightly increase of serum glucose with biological treatments may be due to higher OM, CF, fiber fractions digestibilities and higher DE and ME content of animals given treated rations. These results are closed with the finding of **Ali (1999) and Kholif *et al.*, (2005)** who obtained similar results on dairy goats fed biological treated diets, and **Sharma *et al.*, (1998)** on buffalo calves.

Serum cholesterol recorded a significant increase (P<0.05) with biological treated straws containing rations compared with control treatments. The mean values of serum cholesterol ranged from 158.30 in R6 (treated clover straw) to 152.85 mg/dl in R3 (untreated bean straw). The results are in a good agreement with those obtained by **Ali (1999**) who found significant increase (P<0.05) of serum cholesterol with biological treatment compared with control. In the contrary **Piva *et al.*, (1993)** reported that plasma cholesterol was not affected by added dietary yeast culture to cows ration.

Table 2: Some blood serum constituents of growing crossbred Friesian calves fed rations containing biological treated roughages.

Items	Experimental Rations						± SE
	Wheat straw		Bean straw		Clover straw		
	Untreat. R1	Treated R2	Untreat. R3	Ureated. R4	Untreat. R5	Ureated R6	
AST (U/L)	33.60^{c}	33.85^{c}	32.81^{d}	34.76^{b}	33.47^{c}	35.65^{a}	1.52*
ALT (U/L)	21.40^{b}	23.09^{a}	21.35^{b}	22.95^{a}	21.82^{b}	23.40^{a}	1.10*
Total protein (g/dl)	6.63^{b}	7.29^{a}	6.70^{b}	7.55^{a}	6.54^{c}	7.30^{a}	0.30*
Albumin (g/dl)	3.10^{d}	3.75^{b}	3.15^{d}	3.98^{a}	2.95	3.66^{c}	0.06*
Globulin (g/dl)	3.53^{a}	3.54^{a}	3.55^{a}	3.57^{a}	3.59^{a}	3.64^{a}	0.12 NS
A/G ratio	0.99^{b}	0.90^{c}	0.89^{d}	0.87^{d}	0.98^{b}	1.01^{a}	0.03
Urea-N (mg/dl)	40.60^{d}	42.17^{ab}	41.85^{c}	42.84^{b}	41.76^{c}	43.76^{a}	1.35*
Creatinine (mg/dl)	1.37^{a}	1.41^{a}	1.35^{a}	1.40^{a}	1.31^{a}	1.42^{a}	0.96 NS
Glucose (mg/dl)	55.36^{d}	64.23^{b}	62.24^{c}	65.70^{a}	62.50^{c}	65.92^{a}	5.17*
Cholesterol (mg/l)	153.41^{b}	157.10^{a}	152.82^{c}	157.16^{a}	153.16^{b}	158.30^{a}	1.25*

+a, b, c, d and e Means with different superscripts on the same row are different at (P<0.05).

*Each value is the mean of 4 values (4 animals).

Carcass and organs weights: The effect of dietary biological treated roughages on the carcass traits of crossbred Friesian calves are shown in Table (3). Hot carcass weight followed the same pattern of the fasting body weight

being heavier for legume biological treated straw (bean and clover) followed by germinant biological treated wheat straw, while the control group recorded the lowest values. Dressing percentage was significantly (P<0.05) higher for biological treated roughages than other control groups. Also, differences were found to be significant (P<0.05) for head, hide, heart and liver. Weight of these organs were higher for animals received biological treated roughages than those fed control groups. No significant differences were found regarding the other carcass traits (Table 3).

Table 3: Dressing % and carcass offal's of slaughtered growing crossbred Friesian calves fed rations containing biological treated roughages.

Items	Experimental Rations						± SE
	Wheat straw		Bean straw		Clover straw		
	Untreat. R1	Treated R2	Untreat. R3	Treated. R4	Untreat. R5	Treated R6	
Fasting body wt, kg	403.00^{c}	410.00^{c}	432.00^{d}	453.00^{b}	440.00^{c}	470.50^{a}	4.15*
Empty body wt, kg	362.00^{b}	383.50^{a}	391.50^{b}	412.50^{a}	398.50^{b}	433.00^{a}	3.18*
Dressing% 1	54.96^{b}	56.86^{a}	55.65^{b}	57.68^{a}	55.68^{c}	59.08^{a}	2.10*
Dressing% 2	61.19^{c}	63.02^{b}	61.48^{c}	63.57^{b}	61.48^{c}	64.19^{a}	2.06*
Non-Visceral offal's							
Head, kg	23.50^{a}	23.80^{a}	23.75^{d}	23.88^{d}	24.80^{b}	24.85^{a}	1.53 NS
Hide, kg	31.50^{c}	31.65^{c}	31.95^{c}	32.75^{b}	32.17^{b}	33.50^{a}	1.35*
Legs, kg	9.20^{a}	9.25^{a}	9.32^{a}	9.45^{a}	9.30^{a}	9.50^{a}	0.16 NS
Tail, kg	1.46^{a}	1.47^{a}	1.45^{a}	1.55^{a}	1.50^{a}	1.60^{a}	0.17 NS
Visceral offal's							
Lungs, kg	6.12^{b}	6.12^{a}	6.15^{c}	6.20^{a}	6.14^{b}	6. 30^{a}	1.25 NS
Spleen, kg	1.16^{a}	1.17^{a}	1.16^{a}	1.18^{a}	1.17^{a}	1.19^{a}	0.12 NS
Tests, kg	0.60^{a}	0.61^{a}	0.60^{a}	0.62^{a}	0.61^{a}	0.63^{a}	0.12 NS
Heart, kg	1.80^{a}	1.85^{a}	1.85^{a}	1.90^{a}	1.86^{a}	1.88^{a}	0.08 NS
Liver, kg	6.12^{a}	6.18^{a}	6.13^{a}	6.20^{a}	6.15^{a}	6.25^{a}	0.12 NS
Kidney, kg	1.10^{a}	1.13^{a}	1.10^{a}	1.12^{a}	1.10^{a}	1.20^{a}	0.12 NS
GIT full, kg	72.50^{b}	73.15^{a}	73.45^{a}	73.25^{a}	73.67^{a}	71.00^{c}	1.20*
GIT empty, kg	31.50^{c}	31.65^{c}	31.95^{c}	32.75^{b}	32.17^{a}	33.50^{a}	0.82*
Hot carcass wt, kg*	221.50^{e}	241.70^{d}	240.70^{d}	262.21^{b}	244.00^{c}	277.95^{a}	3.37*
Hot carcass wt, kg**	231.12^{e}	251.47^{d}	250.38^{d}	272.05^{b}	253.72^{c}	287.91^{a}	3.45*

+a, b, c, d and e Means with different superscripts on the same row are different at (P<0.05).

Components of cut ribs:

Data presented in Table (4) showed that the percentage of meat was 68.75, 69.92 and 70.82 % for the biological treated groups R2, R4 and R6, respectively, while it was 62.40, 67.16 and 67.40% for the control groups R1, R3 and R5, respectively. The differences however were statistically significant (P<0.05). Meanwhile, such values were indicates that animals fed biological treated roughages deposited more lean and less fat, which may be explained on the basis that these animals were still active in depositing protein and needed more energy to do so. Results of Table (4) revealed also that meat: bone ratios were 3.39, 3.43, and 3.50, respectively for the previous biological treated groups, while the control groups recorded 2.46, 2.96 and 2.88, respectively. It is clear that the results of meat: bone ratios were directly related to the boneless meat percentage, while they were inversely to the bone weight.

Some physical properties and chemical of fresh meat: The chemical and physical properties of fresh Friesian calves meat are presented in Table (4).

Physical properties: Some significant (P<0.05) differences could be noticed in the physical properties of Frisian meat obtained from different groups. Eye muscle (*Longissimus dorsi*) area, water holding capacity (WHC), and tenderness, of biological treated groups were higher than those received the control groups. These results are closed with the finding of **Sabbah *et al.*, (2006) and Kattab *et al.*, (2003)** of who mentioned that, eye muscle of fresh meat of lambs fed biological treated ration was better than those fed the other tested rations (except **Sabbah *et al.*, 2006** in tenderness values were significantly (P<0.05) lower than that in control).In this respect, **Sully and Morgan (1982)** found that steers fed a high rate of grains (source of energy), had a higher eye muscle area. **Hamm (1960)** noticed a proportional relationship between the WHC and tenderness of meat cuts from one side and between the two parameters and pH from the other side.

Many factors cause toughness of meat such as feeding **(Alsmyer *et al.*, 1965) marbling (Parrish, 1961)** and pH muscle **(Harrel *et al.*, 1978). Soloviev (1966)** pointed that the proteolysis of peptides bonds by the aid of tissue proteolytic enzymes may cause an increase in the tenderness. **Udin (1967)** reported that the higher tenderness of the fresh meat may be explained by higher fat content and the conversion of part of tough connective tissues into fatty tissues. **El-Sharkawy (1984)** reported that the tenderness of Friesian meat was 2.80 cm^2.

Hamm (1972) mentioned that WHC increased when the pH value was raised from 5 to 7. **El-Sharkawy (1984)** observed that WHC was 6.2 cm^2 for the fresh Friesian meat.

pH values of the eye muscle of calves fed biological treated roughages were significantly (P<0.05) less than those fed control. These results were accordance with the finding of **Khattab *et al.* (2003)** and **Sabbah et al., (2006**) with fresh meat of lambs. In this respect, acidity has an important role in meat because of its development in muscles after slaughtering as well as its effect on quality of meat **(Harrel *et al.*, 1978)** reported that pH value ranged between 4.9 to 6.5, but the meat under these conditions were not edible. It is worthy to mention that this correlation was noticed during this study, in which the higher PH was found in meat of control groups.

Colour intensity: of calves fed biological treated roughages were significantly (P<0.05) less than those fed the control rations. Many investigators studied the factors which effect on the color intensity such as pH value **(Hall *et al.*, 1944**), meat cuts **(Ragab *et al.*, 1966),** degree of fattening **(Scheper,1977),** marbling and fat content **(Yamazaki, 1981),** increase of muscle tissue myoglobin and/ or oxymyoglobin on the surface of meat **(Lawrie, 1974 and Mir and Mir, 1993). El-Sharkawy (1984)** pointed that the color intensity of fresh Friesian meat was 0.195.

Chemical composition*:* The chemical composition of 9 to 11^{th} ribs of eye muscles showed insignificant effect of biological treatments on moisture and ash content of meat component studied.

Protein percentage was relatively significantly (P<0.05) higher in biological treated groups than those fed the control groups, while no significant differences were found in the fat and ash percentage among all the treatments. **Sokolov (1965)** noticed that meat cuts of high fat content were mostly of less moisture. Energy value was relatively low for biological treated groups compared with control groups Table (1). **Baranaman *et al.*, (1962)** reported that the ether extract content of the 9^{th} to 11^{th} ribs cuts was highly correlated (r = 0.87) with carcass separable lean. **Barabieri *et al.*,1970)** studied the chemical composition of muscle *(Longissimus dorsi*) of veal fed different sources of roughages ranged

between 75.10–75.90% moisture, 20.10–20.50% protein, 0.60–1.10% ether extract and 1.10–1.41% ash content.

Sabbah *et al.*, (2006) mentioned that no significant differences among treatments groups in moisture and CP contents of fresh meat of lambs, while, the meat animals fed control ration had the lowest EE content. Also, ash content of lambs meats were significantly (P0.05) lower with lambs fed biological treated ration than those fed the control ration.

Table 4: Components of cut ribs, physical characteristics and chemical composition of eye muscle of slaughtered growing crossbred Friesian calves fed rations containing biological treated roughages.

Items	Experimental Rations						± SE
	Wheat straw		Bean straw		Clover straw		
	Untreat. R1	Treated R2	Untreat. R3	Treated. R4	Untreat. R5	Treated R6	
Samples of ribs, kg	5.30^{c}	5.85^{b}	5.81^{b}	6.59^{a}	6.18^{ab}	6.75^{a}	0.42*
% of ribs cut wt.							
Lean, %t	62.40^{d}	68.75^{b}	67.16^{c}	69.92^{b}	67.40^{b}	70.82^{a}	1.06*
Bone, %	25.40^{a}	20.29^{d}	22.68^{c}	20.40^{d}	23.40^{b}	20.21^{d}	042 *
Fat, %	13.20^{a}	10.96^{b}	10.14^{b}	9.68^{c}	9.208^{c}	8.971^{d}	0.13*
Lean, bone ratio 1:	2.46^{c}	3.39^{d}	2.96^{b}	3.43^{d}	2.88^{b}	3.50^{d}	0.05
Physical charact.							
Eye muscle area,cm^{2}	95.50^{d}	101.20^{b}	99.50^{c}	103.40^{a}	101.21^{b}	105.50^{a}	0.96 *
Tenderness, cm^{2}	2.60^{d}	3.10^{c}	3.15^{c}	3.40^{a}	3.30^{b}	3.42^{a}	5.17*
WHC, cm^{2}	8.50^{b}	9.30^{a}	9.50^{c}	9.70^{a}	9.55^{b}	9.95^{a}	1.25*
PH value	6.14^{b}	6.12^{b}	6.17^{a}	6.11^{b}	6.18^{a}	6.10^{b}	1.13 *
Color intensity	0.30^{c}	0.33^{b}	0.31^{c}	0.34^{b}	0.35^{a}	0.37^{a}	0.02 *
Chemical composition (DM basis)							
Moisture	76.95^{a}	75.72^{a}	76.67^{a}	75.66^{a}	75.38^{a}	75.17^{a}	1.65 NS
CP	19.07^{b}	20.20^{a}	19.32^{b}	20.21^{a}	20.44^{a}	20.70^{a}	0.65 *
EE	2.68^{a}	2.74^{a}	2.70^{a}	2.77^{a}	2.83^{a}	2.72^{a}	0.03 NS
Ash	1.30^{a}	1.34^{a}	1.30^{a}	1.36^{a}	1.45^{a}	1.41^{a}	0.01 NS

+a, b, c, d and e Means with different superscripts on the same row are different at (P<0.05).

It could be concluded that, feeding rations containing biological treated straws (wheat, bean and clover) with (*Trichoderma harzinaum F-418* fungi) *ad-libitum* with 2% of LBW concentrate feed mixture (2% of LBW of growing crossbred Friesian calves), affected the blood parameters, chemical and physical characteristics, resulted in that the best physical properties (eye muscle area, water holding capacity and tenderness) were noticed in biological treated groups and better protein content, as compared with control groups could be recommended.

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الأداء العجول الفريزيان الخليطة المغذاة على أعلاف خشنة معاملة بيولوجيا مع العلف المركز

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تهدف هذه الدراسة إلى اختبار تأثير التغذية على الأعلاف الخشنة المعاملة بيولوجيا مع مخلوط العلف المركز فى علائق العجول الفريزيان الخليطة النامية على القيمة الغذائية و أداء الحيوانات . استخدم فى هذه الدراسة 48 عجل فريزيان خليط بعمر 6-7 شهور و متوسط وزن حى 189.17± 3.58 كجم. قسمت الحيوانات إلى ثلاثة مجموعات تجريبية كل منها 16 عجل و قسمت كل مجموعة إلى تحت مجموعتين (8 حيوانات فى المجموعة). وزعت المجموعات التجريبية على ستة علائق تجريبية: (الأولى و الثالثة و الخامسة) عليقه مقارنة (كنترول):غذيت على 2% من وزن الجسم مخلوط علف مركز + تبن قمح و فول و برسيم حتى الشبع على التوالى. بينما غذيت المجموعات الثانية و الرابعة و السادسة على العلف المركز بنسب 2% من وزن الجسم الحى + الأتبان السابقة معاملة بيولوجيا بفطر (*Trichoderma harzinaum F-418* fungi)على التوالى حتى الشبع. امتدت تجربة التغذية إلى 183 يوم حيث تضمنت تقدير قياسات الدم و نسبة التصافى و خواص الذبيحة للحيوانات و قد أشارت النتائج المتحصل عليها من هذه الدراسة الى:

- زيادة نشاط تركيز إنزيمات الترانس أمينيز و البروتين الكلى و الألبومين و الجلكوز و الكولسترول بدرجة معنوية (5%)فى سيرم دم الحيوانات التى غذيت على علائق تحتوى على أعلاف خشنة معاملة بيولوجيا مقارنة بمعاملات المقارنة الأخرى . لا توجد اختلافات معنوية بين المعاملات التجريبية فى تركيز إنزيمات الجلوبيولين و الكرياتنين و اليوريا نيتروجين فى

سيرم الدم . كانت نسبة التصافى فى ذبائح المجموعات التى غذيت على علائق تحتوى على أعلاف خشنة معاملة بيولوجيا عن مجموعات المقارنة . مساحة العضلة العينية و قدرة اللحم على إمساك الماء و الطراوة للحوم المجموعات التى غذيت على علائق تحتوي على أتبان معاملة بيولوجيا أكبر بدرجة معنوية (5%) عن مجموعات المقارنة .كانت قيم رقم الحموضة و كثافة اللون للعضلة العينية فى لحوم العجول التى غذيت على علائق تحتوي على أتبان معاملة بيولوجيا قل بدرجة معنوية (5%) عن مجموعات المقارنة .

أظهر التركيب الكيماوى تأثيرا معنويا (5%) للمعاملة البيولوجية فقد كانت نسبة البروتين الخام أعلى نسبيا فى حيوانات المعاملات البيولوجية عن مثيلاتها فى مجموعات المقارنة بينما لم يكن هناك فروق معنوية فى كل من نسب الدهن و الرماد . من هذه الدراسة يمكن أن يوصى بالتغذية على الأتبان المعاملة بيولوجيا حتى الشبع و مخلوط العلف المركز (2% من وزن الجسم الحى) فى علائق عجول الفريزيان الخليطة النامية حيث يؤدى ذلك إلى زيادة نسبة التصافى و تحسين خواص الذبيحة مقارنة بمجموعات المقارنة .