ISSN 1110-0419

Annals Of Agric. Sc., Moshtohor,
Vol. 45(3): 1079-1090, (2007).

EFFECT OF SOME GROWTH PROMOTERS ON GROWTH PERFORMANCE OF WHITE AND BROWN BOVANS CHICKENS BY

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ABSTRACT

Six hundred sexed 7days-old Bovans chicks were used in this experiment. Two experimental corn- soybean meal diets were formulated with 20.5 and 18.0% crude protein (CP) and nearly isocaloric (2900 & 2800 kcal. ME/Kg diet) and fed during the growing period, respectively. Choong Ang Yeast Culture (CYC-100) which is a unique live yeast culture product (saccharomyces cerevisiae 1.510^{11} CFU/ kg) and More Yeast (MY)which is a unique dead yeast culture (saccharomyces cerevisiae) were used as growth promoters. The objective of the present work was to study the effect of the two growth promoters on growth performance and some blood parameters during different ages in White and Brown Bovans (WB and BB) birds.

It can be concluded that probiotics significantly affected BW_{12}, $BWG_{4-8}$and $_{8-12}$, FC_{4-8} and and$_{8-12}$. MY had higher BW_{12} and BWG_{8-12} than the other treatments, whereas CYC-100 had higher BWG_{4-8} and better FC_{4-8} and $_{8-12}$ than the other treatments. Brown Bovans had significantly heavier BW and BWG at all ages studied than White Bovans and showed better FC during different periods of growth. The CYC-100 had significantly higher Hb and lower cholesterol than the other treatments being 9.67g/100ml and 168.19mg/100ml. However, the control had significantly higher Ht of 26.04% than the other treatments. The White Bovans had higher Ht and Hb than the Brown Bovans strain (22.83 and 8.38 vs 20.41 and 7.98, respectively), whereas the BB strain had higher cholesterol content than the WB strain (150.49 vs 147.61mg/100ml).

Key words: Probiotics, growth performance, White and Brown Bovans chickens.

INTRODUCTION

The use of probiotics (direct- fed microbials) as a substitute for antibiotics in poultry production has become an area of great interest. Continued use of subtherapeutic levels of antibiotics in animal feeds may result in the presence of antibiotics residues in animal products and the development of drug-resistant micro- organisms in humans. To achieve high levels of economical efficiency, poultry are raised under intensive production systems in densely populated colonies or flocks. The chickens are stressed by various factors such as

transportation to the growing site, overcrowding, vaccination, chilling and/ or overheating. These factors tend to create an imbalance in the intestinal microflora and lowering of body defense mechanisms. Under such circumstances, antimicrobial feed additives such as antibiotics and synthetic antimicrobial agents are often used to suppress or eliminate harmful organisms in the intestine, and to improve growth and feed efficiency. The use of antibiotics as routine feed additives has been banned in some countries because of public concern over possible antibiotic residual effects and the development of drug-resistant bacteria. Probiotics have been introduced as an alternative to antibiotics, however their effects on poultry production are not consistent resulting in uncertainties and scepticism for development of the products.

The term "probiotic" was used to describe growth promoting factors produced by micro- organisms and for micro- organisms or substances which contribute to intestinal microbial balance. Furthermore, Crawford (1979) defined "probiotic" as a culture of specific living micro- organisms (primarily lactobacillus spp.) which implants in the animal to which it is fed and ensures the effective establishment of the intestinal populations of the beneficial organisms. However, Vanbelle *et al.* (1990) pointed out that most researchers considered probiotics to be selected and concentrated viable counts of lactic acid bacteria (i.e. Lactobacillus Streptococcus). Victor *et al.* (1993) reported that supplementing 0.1% of probiotics (saccharomyces cerevisiae) to the aflatoxin-free diet given to 4 weeks-broiler chicks, significantly increased body weight from 456 to 516g. A similar trend, that addition of 0.1% lactobacillus cultures to the diet of broiler chicks resulted in improving body weight from 0-6 weeks of age, was reported by Jin *et al.* (1997).

Ali (1999) indicated that the best live body weight and body weight gain at 7 weeks of age in commercial broiler chicks were obtained with Lactobacillus alone followed by those fed on a mixture of the Lactobacillus + fermacto. Similar improvements in these traits of broiler ducks chicks,and quails were obtained by Gippert and Bodrogi (1992) and Ali (1994), Tawfeek *et al.* (1993), Omar (1996), El- Nagmy and and Abd- Alsamea (2000) . On the other hand, no effect of probiotic supplementation at a level of 100 mg/kg diet was obtained on these traits in broilers at 6 weeks of age (Ghazalah and Ibrahim, 1998, Panda *et al.*, 1999 and 2001). Many authors reported an improvement in feed utilization when microbial growth promoters as yea-sacc were added to poultry feed or drinking water (Mc Daniel, 1990, Paik *et al.*, 1990, Hussein and El-Ashry (1991), El-Hindawy *et al.*, 1996) and Ali, (1999). Mudalgi *et al.* (1993) observed no effect on feed conversion in broilers fed Lactobacillus acidophilus at 8 weeks of age. Whereas, Couch (1978) reported that Lactobacillus supplemented broiler diets (454 g/ton) decreased mortality rate. Alder and Damassa (1980) indicated that a single dose of Lactobacillus to the fasted chicks prevented accumulation of excreta around the vents, which was seen in the control chicks.

Abdel- Azeem (2002) and Abdo (2004) used microbial phytase at levels of 0, 500 and 1000 FTU phytase/kg of broiler diets and observed no effect on haemoglobin and haematocrit concentrations. On the other hand, Tollba *et al.*

(2004b) supplemented the diet of broilers with Lactobacillus 10^5 CFU/g and reported that haemoglobin concentration and PCV increased. Several investigators (Zeweil,1997, Abdel- Azeem *et al.*, 2001 and Abdel-Azeem, 2002) reported that chicks fed yeast culture had the highest levels of haemoglobin concentration while the PCV was not significantly affected. Tollba *et al.* (2004 a) supplemented Lacto- sacc or yea- sacc at a level of 1 kg/ ton of broiler diets at 6 weeks of age and observed a decrease in plasma cholesterol level. Similar results were obtained by Abdel- Azeem *et al.* (2001) in Japanese quail. Meanwhile, Panda *et al.* (2001) detected a significant reduction in the total serum cholesterol. Ali (1999) added 0.25 up to 0.50 kg /ton Lactobacillus acidophilus plus Fermacto 4 kg/ton to broilers diet at 7 weeks of age and obtained slightly less values of cholesterol. The reduction in cholesterol concentration may be due to the inhibition of the culture within the intestine (Katz and Demain, 1977). This reduction in absorption and / or synthesis of cholesterol is happened in the gastrointestinal tract. Furthermore, Mohan *et al.* (1995) illustrated that Lactobacillus acidophilus reduces cholesterol in the blood by deconjugating bile salts in the intestine thereby preventing them from acting as precursors in cholesterol synthesis, thereby caused a reduction in the serum cholesterol.

The objective of the present work was to study the effect of two growth promoters, Choong Ang yeast culture (CYC-100) and More yeast (MY) on growth performance and some blood parameters during different ages in White and Brown Bovans (WB and BB) birds.

MATERIALS AND METHODS

The experimental work of the present study was carried out at the Farms of Co-operative El- Ekhlass Society for Development of Animal and Poultry Wealth, Giza, Governorate, Egypt. The chemical analysis of samples were performed in the Laboratories of the Poultry Production Department, Faculty of Agriculture, Fayoum University. The experiment started from December 2001 till Febraury, 2002.

Two growth promoters were used in this study: Choong Ang Yeast Culture (CYC-100) which is a unique live yeast culture product (saccharomyces cerevisiae 1.510^{11} CFU/ kg) and More Yeast (MY)which is a unique dead yeast culture (saccharomyces cerevisiae). Six hundred sexed 7days-old Bovans chicks were used in this experiment. Chicks were brooded in a suitable heated floor pen with wood straw. They were fed a corn soy bean meal diet. At the end of 7 days of age, chicks were fasted overnight, individually wing- banded and weighed to the nearest 1.0g. Chicks were randomly classified into two equal strains (White and Brown) of 300 chicks each and were divided into 3 treatments, each of 100 chicks (control, CYC-100, and MY).

Two experimental corn- soybean meal diets were formulated with 20.5 and 18.0% crude protein (CP) and nearly isocaloric (2900 & 2800 kcal. ME/Kg diet) were fed during the growing period, respectively (Table 1). These diets were supplemented with DL- methionine, L- lysine and choline chloride when

necessary, to maintain the dietary requirement levels. Also, the vitamin and mineral mixture was adequately supplied to cover the requirements according to NRC (1994). Three diets were used:1-un supplemented with growth promoters (control), 2- supplemented with CYC-100 (2 kg/ton) and 3- supplemented with MY (2kg/ton). The experimental diets were mixed each week to insure that a viable microbial culture would be present during the experimental period from 2 to 12 weeks of age. Experimental mash diets and fresh clean water were offered *ad libitum* over the experimental period. Chicks in all treatments were kept under similar management system. Light schedule was held artificially according to the system of brooding period. Electrical and gas heaters were used to provide the chicks with heat needed for brooding. The vaccination program of all birds during the experimental period was provided as recommended. The following criteria were measured and/or calculated:

Body weight (BW): Birds were individually weighed to the nearest gram, in the early morning before receiving any feed and water at 4- weekly periods up to 12 weeks of age.

Body weight gain (BWG): It was calculated by subtracting the initial body weight of the bird in a certain period for each treatment from the final one in the same period.

Feed intake (FI): Residual feed was weekly collected, weighed and subtracted from the offered one to obtain FI on a group basis for each treatment.

Feed conversion (FC): It was calculated using the following equation:Grams feed intake/grams weight gain (growing period)

Haematological Parameters:

Blood samples, about 5 ml were obtained in heparinized test tubes from the Brachial vein at 12weeks of age from 6 birds in each group . Plasma was separated by centrifugation for 15 minutes at a speed of 3000 rpm and kept frozen at -20°C until blood analysis. Blood was withdrawn by haematocrit capillary tube, haematocrit value (Ht %) was determined by the colorimetric methods according to Merck (1974). Haemoglobin value (g/dl) was determined by colorimeteric method using Hllige-Sahlis haemoglobim meter using the acid-hematin method (Binjamin, 1961). Plasma cholesterol was determined according to Richmond (1973).

Statistical Analysis:

Analysis of variance was computed using the General Linear Model (GLM) procedure of statistical analysis system (SAS, 1982) according to Steel and Torrie (1980) according to the following model for growth performance traits:

$$Y_{ijk} = \mu + T_i + S_j + TS_{ij} + e_{ijk}$$

μ = Overall mean, T_i = Effect of treatment, S_j = Effect of strain, TS_{ij}: Interaction of trait x strain and e_{ijk} = Random error term for growth performance traits.

Variable means for treatments indicating significant differences in the ANOVA were tested using Dumcan's Multiple Range Test (Duncan, 1955).

Table (1): Composition of the experimental basal diets.

Ingredients	1-9 wks	10-12 wks
Ground yellow corn	60.60	65.00
Soybean meal (44%)	34.00	26.00
Wheat bran	-	5.10
Ground lime stone	-	1.00
Vegetable oil	1.50	-
Bone meal	3.00	2.00
Sodium chloride	0.30	0.30
Vit. and Min. Mix. *	0.30	0.30
Sodium bicarbomate	0.10	0.10
DL- methioine	0.15	0.10
L- lysine	0.025	0.050
Choline chloride	0.025	0.050
Total	100	100
Crude protein %	20.62	18.18
Crude fiber %	3.81	3.89
Crude fat %	4.31	2.93
Ash %	5.62	5.88
ME, Kcal/ Kg	2940	2840
Ca. %	0.98	1.05
Total P %	0.77	0.64
Avail P %	0.53	0.4
Met %	0.44	0.41
Lys. %	1.16	0.99

* The vitamin and mineral mixture (Rovimix layer & broiler breeder Roche) was added as 3 kg per ton of diet and supplied the following (as mg or I.U. per kg of diet) Vit. A 12500, Vit .D_3 2500 I.U., Vit. E 40mg, Vit. K_3 4mg Vit. B_1 2mg, vit. B_2 10mg, Vit. B_6 5mg, Vit. B_{12}: 0.02mg, Niacin 40mg, Biotin 0.15mg pantothenic acid 12mg, folic acid 1.5mg, choline chloride:
700mg, Mn 100mg, Cu 10mg, Se 0.2mg, Fe 40mg, Zn 80 mg,I 0.5mg, and Co 0.25mg.

RESULTS AND DISCUSSION

Growth Performance:

At 4 weeks of age, treatments had no significant effect on BW, but the Brown Bovans(BB) strain had heavier body weights than White Bovans(WB, $P \leq 0.05$), the values were 238.86 vs 197.34g, respectively (Table 2). No significant effect due to treatment effect on BWG, but the strain effect was significant ($P \leq 0.05$), the BB had a higher BWG than WB being 176.18 vs 139.19g (Table 2). Similar trend was obtained for BW at 8 weeks of age (Table 2). The strain effect was significant for BWG ($P \leq 0.05$). CYC-100 treatment improved BWG significantly ($P \leq 0.05$) as compared with the control, but MY treatment insignificantly improved BWG as compared with the control (Table2). Many investigators demonstrated that growth promoter affected growth performance (BW, BWG) at more than 8 weeks of age in layer chicks but occurred with broiler chicks after 4 weeks of age (Victor *et al.*, 1993, Ali 1999,

Zhang *et al.*, 2005 and Ahmad, 2006). At 12 weeks of age, the treatment effect start to occur on BW. MY treatment had higher BW values than CYC-100 and the control ($P \leq 0.05$), the values were, 1073.61, 1056.00, and 1035.11g, respectively. At all previous studied ages, strain effect was significant ($P \leq 0.05$) in favor of BB. BWG at 12 weeks of age showed the same trend as observed at 8 weeks of age. These results are in agreement with those reported by Victor *et al.* (1993) on broiler chicks. Similar results were also reported by Gippert and Bodrogi (1992), El-Faham *et al.* (1994) and Ali (1999). On the contrary, these results disagreement with those reported by Maiolino *et al.* (1992), Mudalgi *et al.* (1993), Senani *et al.* (2000) and Panda *et al.* (2001), at 6 weeks of age. They reported no effect of growth promoters on BW, BWG.

At 4 weeks of age, results in Table 2 showed that the strain had significant ($P \leq 0.05$) effect on FC. The WB strain had a higher FI than BB whereas BB strain had better FC values than WB. During the first 4 weeks period, the chick of WB consumed 568g and 548g for the chick of BB. The corresponding values for FC were 4.08 and 3.11 for WB and BB, respectively. With regard to FI, chicks fed MY consumed more feed than those of both CYC-100 and the control. CYC-100 treatment chicks consumed the least amount of feed (572, 568 and 560 g for MY, control and CYC-100) respectively. At 8 weeks of age, the effect of strain on FI was in favor of BB (1506g and 1449g for BB and WB strains). But the MY and CYC treatment increased FI. The corresponding values for FI were 1532, 1464 and 1445g for MY, CYC and the control group, respectively. CYC treatment improved FC, being 3.88, 3.96 and 4.08 for CYC, control and MY treatments, respectively. BB strain chicks had a better ratio compared with WB chicks 3.86 vs 4.08, respectively . At 12 weeks of age, strain significantly affected FC ($P \leq 0.05$). The WB chicks consumed more feed than BB (2257 vs 2179g). But, for FC, the BB chicks had a better FC ratio than WB (4.28 vs 5.39 respectively). The treatment significantly decreased FI than the control being 2092, 2185 and 2435g for CYC, MY and the control, respectively. For FC, WB strain chicks had a higher FC ratio than BB strain chicks (5.39 vs 4.28, respectively). Treatment significantly improved ($P \leq 0.05$) the FC ratio as compared with the control, the best value was 4.53 for CYC than MY and control (4.56 and 5.40, respectively). The strain had a significant ($P \leq 0.05$) effect on FC ratio. The BB strain had better FC during the periods 1-4, 4-8 and 8-12 weeks of age (3.11, 3.86 and 4.28 vs 4.08, 4.08 and 5.39, respectively) than the WB strains, respectively). Many workers demonstrated that the probiotics or growth promoters improve the FC ratio. (Mudalgi *et al.*, 1993, Ali 1999, and El-Nagmy and Abd Asamea 2000). With advancing the age, the FI gradually increased and FC ratio decreased. This may be due to the increasing of growth with age and decreasing the maintaining diet for layer chicks with advancing the age. Also, Ali (1999) reported that the superiority of probiotics may be due to the favorable effects that provides live yeast culture and natural lactic acid producing bacteria to the chicks digestive tract. It takes part in the metabolism of dietary nutrients such as carbohydrates, protein, lipids and minerals and also in the synthesis of vitamins. The lactic acid bacteria help to maintain an optimum low PH to inhibit growth of undesirable bacteria (All tech. Bio-technology- Center Announcement 1989).

Table (2): Effects of treatment and strain on growth traits at different ages studied (Main effects).

Item	Treatment effect			Strain effect	
	Control	CYC-100	MY	White Bovans	Brown Bovans
Body weight (BW, g)					
BW_4	220.13±2.20	215.74±2.21	218.43±2.20	197.34±1.80^b	238.86±1.79^a
BW_8	585.06±5.23	593.36±5.26	594.71±5.27	552.78±4.30^b	629.30±4.28^a
BW_{12}	1035.11±7.32^b	1056.00±7.41^{ab}	1073.61±7.41^a	971.57±6.06^b	1138.24±5.99^a
Body weight gain (BWG, g)					
BWG_{1-4}	159.97±2.12	155.42±2.13	157.65±2.12	139.19±1.73^b	176.18±1.73^a
BWG_{4-8}	365.00±3.80^b	377.40±3.83^a	375.45±3.84^{ab}	355.18±3.13^b	390.04±3.12^a
BWG_{8-12}	450.88±4.40^b	461.86±4.47^b	479.05±4.47^a	418.68±3.65^b	509.17±3.62^a
Feed intake(FI, g)					
FI_{1-4}	568±3.32^b	560±3.18^b	572±3.60^a	568±4.02^a	548±3.98^b
FI_{4-8}	1445±5.12^b	1464±5.38^{ab}	1532±5.80^a	1449±6.01^b	1506±6.15^a
FI_{8-12}	2435±9.42^a	2092±8.97^b	2185±9.19^{ab}	2257±9.56^a	2179±9.11^b
Feed conversion (FC)					
FC_{1-4}	3.55±0.073	3.60±0.074	3.63±0.073	4.08±0.06^a	3.11±0.06^b
FC_{4-8}	3.96±0.047^{ab}	3.88±0.48^b	4.08±0.048^a	4.08±0.039^a	3.86±0.039^b
FC_{8-12}	5.40±0.08^a	4.53±0.08^b	4.56±0.08^b	5.39±0.06^a	4.28±0.06^b

a and b: Means having different superscripts within each row and each effect are significantly different ($P<0.05$).

Nahashon *et al.* (1992, 1993, 1994b, 1996a) found that supplementation of Lactobacillus culture in diet stimulated appetite and increased fat, nitrogen, calcium, phosphorus, copper, and manganese retention in layers (Jin *et al.*, 1997). As shown in Table 3, strain by treatment interaction significantly ($P<0.05$) influenced each of BW4, .BWG4-8, BW12, BWG8-12 and FC4-12. The control of the BB had higher BW4 and BWG1-4 than the other groups(246.02 and 183.12g). However, the CYC-100 had the highest BW8 and better FC during the periods 1-4 and 4-8 weeks of age (632.14g, 3.03 and 3.82gfeed/g gain). The MY had the highest BW12, BWG4-8,BWG8-12 and the best FC8-12(1157.71, 396.69, 529.18g and 3.97 gfeed/g gain, respectively).

Strain had a significant effect ($P\leq0.05$) either on packed cell volume (PCV) or haematocrit value (Ht) as shown in Table 4. The WB strain chicks has higher level of Ht than BB strain chicks (22.83% vs 20.41%, respectively). Concerning of treatment effect, the MY decreased significantly ($P\leq0.05$) Ht than control, being 26.04%, 24.87 and 24.19%, for control, CYC, and MY, respectively. These results are in agreement with several authors (Zewil 1997, Abdel-Azeem *et al.*, 2001, Abd El- Azeem 2002, Abdo, 2004 and Tollba *et al.*, 2004a).

Strain significantly infuenced haemoglobin concentration (Hb,$P\leq0.05$). The WB had a significantly higher level of Hb than the BB strain (8.38 vs 7.98) respectively. The CYC-100 treatment significantly affected ($P\leq0.05$) the Hb concentration, but the MY treatment significantly decreased ($P\leq0.05$) the Hb level than the CYC-100 but it was insignificantly differed than the control (Table 4). These results were in agreement with El-Hindawy *et al.*, 1997, Abd El- Azeem *et al.*, 2001 and Tollba *et al.*, 2004a.

The WB strain chicks had significantly ($P \leq 0.05$) lower level of plasma cholesterol than BB strain chicks (147.61 vs 150.49 mg/dl,respectively).Also, the treatment significantly decreased ($P \leq 0.05$) plasma cholesterol favoring CYC-100 than control. The values were 175.35, 168.19 and 172.92 for control, CYC-100 and MY, respectively (Table 4). These results were in agreement with Ali 1999, and Tollba *et al.*, 2004a. This reduction in plasma cholesterol could be attributed to reduction in absorption and/or synthesis of cholesterol in the gastrointestinal tract by probiotics supplementation (Nelson and Gilliand, 1984). Furthermore, Mohan *et al.*, (1995) stated that lactobacillus acidophilus reduces cholesterol in the blood by deconjugating bile salt in the intestine, thereby preventing them from acting as precursor in cholesterol synthesis and caused reducing in the plasma cholesterol. As shown in Table 5, strain by treatment interaction significantly ($P<0.05$) influenced both Ht and Hb. The YC-100 of the WB had the highest Ht and Hb (23.25 and 9.00g/100ml) whereas the control of the BB had the lowest estimates of Ht and Hb (19.80% and 7.92g/100ml) as shown in Table 5.

Table (3): Effects of growth promoters and strain interaction on body weight, body weight gain and feed traits at different ages of growth.

Trait	White Bovans			Brown Bovans		
	Control	CYC-100	MY	Control	CYC-100	MY
Body weight (BW, g)						
BW_4	194.07±3.10^{c}	195.14±3.09^{c}	202.69±3.07^{b}	246.02±3.05^{a}	236.34±3.10^{b}	234.11±3.09^{b}
BW_8	545.92±7.47^{b}	554.56±7.47^{b}	557.86±7.43^{b}	624.17±7.35	632.14±7.43	631.52±7.51
BW_{12}	935.43±10.4	989.97±10.4	989.50±10.4	1134.13±10.2	1122.22±10.4	1157.71±10.4^{a}
Body weight gain (BWG, g)						
BWG_{4-}	136.23±2.99^{c}	137.29±2.99^{c}	143.89±2.97^{b}	183.12±2.96^{a}	173.56±3.00^{b}	171.77±2.99^{b}
BWG_{4-8}	352.27±5.41^{c}	358.98±5.43^{c}	354.29±5.41^{c}	377.80±5.35^{b}	395.80±5.41^{a}	396.69±5.46^{a}
BWG_{8-12}	391.36±6.16^{c}	433.09±6.22^{a}	431.90±6.22^{a}	509.96±6.06^{a}	490.80±6.19^{b}	529.18±6.19^{a}
Feed conversion (FC)						
FC_{1-4}	4.03±0.10^{ab}	4.17±0.10^{a}	4.05±0.10^{ab}	3.08±0.10^{c}	3.03±0.10^{c}	3.21±0.10^{c}
FC_{4-8}	4.05±0.06^{a}	3.93±0.06^{a}	4.27±0.06^{a}	3.87±0.06^{b}	3.82±0.06^{b}	3.90±0.06^{b}
FC_{8-12}	6.43±0.11^{a}	4.58±0.12^{b}	5.16±0.12^{ab}	4.37±0.11^{b}	4.49±0.12^{b}	3.97±0.12^{c}

a,b and c: Means having different superscripts within each row and each effect are significantly different ($P<0.05$).

Table (4): Effects of treatment and strain on blood parameters at on blood parameters at 12 weeks of age (Main effects).

Item	Ht (%)	Hb (g/dl)	Cholesterol (mg/dl)
Treatment effect:			
Control	26.04±0.63^{a}	9.49±0.24^{ab}	175.35±3.63^{b}
CYC-100	24.87±0.56^{ab}	9.67±0.22^{a}	168.19±3.63^{a}
MY	24.19±0.56^{b}	8.87±0.22^{b}	172.92±3.62^{ab}
Strain effect:			
White Bovans	22.83±0.58^{a}	8.38±0.19^{a}	147.61±2.96^{b}
Brown Bovans	20.41±1.38^{b}	7.98±0.18^{b}	150.49±2.96^{a}

a and b: Means having different superscripts within each column and each effect are significantly different ($P<0.05$).

Table (5): Effects of growth promoters and strain interaction on blood parameters at 12 weeks of age.

Strain	Treatment	Blood parameters		
		Ht (%)	Hb (g/dl)	Cholesterol (mg/dl)
White Bovans	Control	23.00±1.26 ^{ab}	8.00±0.46 ^{a}	155.52±8.50 ^{a}
	YC-100	23.25±1.54 ^{a}	9.00±0.57 ^{a}	133.58±8.50 ^{a}
	MY	22.25±1.54 ^{ab}	8.13±0.57 ^{ab}	153.72±8.50 ^{a}
Brown Bovans	Control	19.80±1.38 ^{c}	7.92±0.46 ^{b}	140.02±8.50 ^{a}
	YC-100	20.83±1.26 ^{c}	7.92±0.46 ^{b}	153.88±8.50 ^{a}
	MY	20.60±1.38 ^{c}	8.10±0.51 ^{ab}	157.57±8.50 ^{a}

a and b: Means having different superscripts within each column and each effect are significantly different ($P<0.05$).

In conclusion, probiotics significantly affected BW12, BWG4-8, BWG8-12, FC4-8 and FC8-12. MY had higher BW12 and BWG8-12 than other treatments, whereas CYC-100 had higher BWG4-8 and better FC4-8 and FC8-12 than other treatments. Brown Bovans had significantly heavier BW and BWG at all ages studied than White Bovans and showed better FC during different periods of growth. The CYC-100 had significantly higher Hb and lower cholesterol values than the other treatments being 9.67g/100ml and 168.19mg/100ml. However, the control had significantly higher Ht of 26.04% than other treatments. The WB had higher Ht and Hb than the BB strain (22.83 and 8.38 vs 20.41 and 7.98, respectively), whereas the BB strain had a higher cholesterol value than the WB strain (150.49 vs 147.61mg/100ml).

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تأثير بعض منشطات النمو على الأداء الانتاجى للنمو فى كتاكيت البوفانز الأبيض والبنى

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تم استخدام عدد ٦٠٠كتكوت مجنس عمر ٧ أيام فى هذه التجربة. وقد استعملت عليقتان تجريبيتان من الذرة وفول الصويا احتوت على ٢٠,٥ و١٨% بروتين خام و كانت تقريبا متماثلة فى الطاقة (٢٩٠٠ و ٢٨٠٠كيلوكالورى طاقة ممثلة/كجم عليقة) خلال فترة النمو. وقد استخدمت فى هذه الدراسة نوعان من الخميرة أحدهما CYC-100 وهى منتج بيئة خميرة حية و أخرى ميتة (MY) كمحفزات للنمو. هدف هذه الدراسة هو دراسة اثنين من محفزات النمو(CYC-100) و(MY) على الأداء الانتاجى وبعض صفات الدم عند أعمار مختلفة فى طيور البوفانز الأبيض و البنى (WB and BB) . و قد خلصت الدراسة الى أن تلك المحفزات أثرت معنويا على كل من وزن الجسم عند ١٢أسبوع، الزيادة فى الوزن و معدل التحويل الغذائى خلال الفترة من ٤الى ٨أسابيع و الفترة من ٨ الى ١٢أسبوع عن المعاملات الأخرى، بينما CYC-100 أدت إلى زيادة فى النمو فى الفترة من ٤الى ٨أسابيع و معامل تحويل غذائى افضل فى الفترتين٤الى ٨أسابيع و الفترة من ٨ الى ١٢أسبوع عن المعاملات الأخرى. كان للبوفانز البنى وزن جسم ومعدل زيادة فى وزن الجسم أعلى عند كل الأعمار المدروسة عن البوفانز الأبيض كما كان له معدلات تحويل غذائية أفضل فى فترات النمو المختلفة. اعطت CYC-100 هيموجلوبين و كوليسترول أعلى عن باقى المعاملات (٩,٦٧جم/١٠٠مل و ١٦٨,١٩مجم/١٠٠مل) . بينما كان للمجموعة الضابطة هيماتوكريت أعلى عن باقى المعاملات (٢٦,٠٤%). و قد كان للبوفانز الأبيض هيماتوكريت و هيموجلوبين أعلى عن البوفانز البنى (٢٢,٨٣ %و ٨,٣٨ جم/١٠٠مل مقابل ٢٠,٤١ %و جم/١٠٠مل ٧,٩٨ على التوالى) بينماكان للبوفانز البنى كوليسترول أعلى عن البوفانز الأبيض (١٥٠,٤٩ مقابل ١٤٧,٦١ مجم/١٠٠مل).