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A Survey on Effect of some Common Growth-promoters on Growth Factors of Broiler Chickens

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ABSTRACT: The present research seeks to investigate the influence of some common growth promoters (Prebiotics, Probiotics, Antibiotics, Asidfires and Synbiotics) on growth factors of broiler chickens. 240 one-day Ross 308 chickens were divided into 6 groups: A, B, C, D, E, F. Group B received 150 gr/ton Virginamycin, group C received Protexin with average dose of 100 gr/ton, group D received 6 kg/ton Salkyn, group E received 3 Kg/ton A-Max and group F received 1 kg/ton Synbiotic while group A received no growth-promoter. Effective factors which were evaluated included: consumption of food, weight increase, feed conversion coefficient (FCR) and rate of death. During the study, there were not any meaningful differences regarding weight increase, consumption of food, and feed conversion coefficient (FCR) among treatments with growth promoters. However, all treatments had more beneficial effectives in compare with control group. According to the obtained results, prebiotics and synbiotics are better growth-promoters than others. However, asserting such findings and other aspects of growth-promoters in nutrition of broiler chickens requires more studies.

***Key Words**:* Prebiotics, Probiotics, Growth-promoting antibiotics, Asidfire, Synbiotics, FCR, Broiler chikens.

INTRODUCTION

In order to promote modern broiler chickens' growth and heath and to increase their genetic potential and layer hybrids, comestible additives are used as growth-promoters in poultries' nutrition (Zakeri et al, 2006). Antibiotics induce their influence through intestinal micoflora fixation therefore, prevent from development of certain intestinal pathogens (Zakeri et al, 2006). Probiotics are living microorganisms and affect positively on host while it is swallowed and entered to abdomen. It has shown in several studies that adding probiotics in nutrition of broiler chickens develops their yield (Mahdavi et al, 2010). Prebiotics stimulate endogenous microbial community such as bifidobacteria and specially lactobacillus which are useful for animals' health (Mahdavi et al, 2010 and Zakeri et al, 2006). Prebiotics are in category of oligosaccharides and they are one of the most important natural products to develop and increase body immunity level and productive factors. Bailey et al, 1991, studied about the influence of Fructo Oligosaccharides on replacement of salmonella in intestinal mucosa and immunity of intestine. Obtained results showed the efficiency of these compounds to prevent replacement of harmful bacteria such as salmonella. In addition, studies conducted by Lemieux et al, 2003, on new-born piglets showed positive effect of Manan Oligosaccharides (MOS) on their growth. Savage et al, 1996, studied on positive effect of Masnan Oligosaccharides on amount of Immunoglobulin of turkeys. Also, dietary supplements, Fructo Oligosaccharides (a dosage of 0.3%), or Oligochitosan (a dosage of 0.1%) as prebiotics, show that they could induce growth-promoting effects similar to antibiotics as food treatments which are produce based on flavomycin or aureomycin. Asidfire is , in fact, a compound of organic acids with antimicrobial effect and PH adjusting in intestine which includes Citric acid, Formic acid, Lactic acid, Fumaric acid, and salts of each acid (Zakeri et al, 2006 and Zakeri et al. 2009) reported that asdfires not only develop productive factors but increase humoral immunity level. As products derived from plants, Phytobiotics were studied and reviewed by Windisch and kroismayr, 2006, they were added to nutrition of livestock in order to have a better yield. As a simple description, we could say that Synbiotics are compounds of probiotic & prebiotic. This product could improve durability of probiotic organism due to a certain layer which is accessible for fermentation (Mahdavi et al. 2010). This study seeks to determine influences of different growth-promoters as comestible additives on yield of broiler chickens.

MATERIALS AND METHODS

This experiment conducted on summer 2011 in Agricultural Faculty of Islamic Azad University of Tabriz branch. In this study, 240 Ross 308 broiler chicken which were negative in Mycoplasma Septicom, Cynovieh and Salmonellaplorom and Galinarom (Negativity was certified by technical manager of the incubation factory) divided into 6 similar groups each containing 40 similar chickens. The experiment conducted with 4 replications per each 10 chicken in each group. Groups were named by Latin alphabets: A, B, C, D, E & F. Group B received 150 gr/ton Virginiamycin (as growth-promoting antibiotic), group C received an average dose of Protexin amounted 100 gr/ton (as probiotic), group D received 6 kg/ton Salkyn (as asidfire) and group E received 3 kg/ton A-Max (as prebiotic) while group A did not receive any growth-promoter and fed only by base diet. All condition for aviculture such as a salon with tube ventilation in complete similar pans and simple bed of chaff with 7 cm depth disinfected previously by Formaldehyde gas and bell-type drinkers and cylindrical with thermal system of heater, delight environmental condition (a temperature of 30 □C when entering chickens and 70% humidity) and vaccination plan (H120 bronchitis spray form vaccination on 1st day of birth, inactivated double oil Influenza vaccination- H9N2 and Newcastle B1 vaccination injecting in breast's muscle and Newcastle B1vaccination as eye-drop and D78 Gambro as drinking vaccination) were completely similar for all groups and diet given to all six groups in starter period had 2900 kcal/kg energy and 21.26% protein, in grower period had 2985 kcal/kg energy and 20.2% protein and in finisher period had 3095 kcal/kg and 19.2% protein. Basic diet with all its particulars is represented in table one. In order to study productive parameters, chickens of 6 groups were weighted at the end of each week. Grains consumption were measured per week and mortality rate was recorded daily. Obtained results per each 5 experimental weeks were evaluated by SAS software through Variance Analysis Test ANOVA, Multi Range DUNCAN Test and Tukey Test (Zakeri et al. 2006).

Table 1. First materials and chemical compounds of diets for each 6 groups

Type of Ration Type of Nutrient	Starter 0-14	Grower 15-30	Finisher 31-42	Type of Ration Type of Nutrient	Starter 0-14	Grower 15-30	Finisher 31-42
Corn	9.48	9.52	45.55	ME	2900	2985	3095
Wheat	4.9	2.10	4.9	CP	26.21	2.20	2.19
Soya	2.32	2.28	2.24	DP	9.16	1.16	3.15
Fish Powder	8.2	8.1	5.1	CF	6.3	9.4	4.5
Fat Powder	4.2	2.3	1.4	EE	5.4	4.5	2.6
Met	2.0	15.0	22.0	Met	5.0	42.0	59.0
Lys	07.0	06.0	07.0	Met+Sys	91.0	82.0	99.0
Salt	15.0	15.0	15.0	Lys	4.1	2.1	9.0
DCP	53.1	3.1	2.1	Available P	6.0	6.0	52.0
Shell Powder	28.1	4.1	32.1	Ca	1.1	9.0	75.0
Supplement	6.0	6.0	6.0				
Salynomysin	05.0	05.0	05.0				

RESULTS

Mean of food consumption, cumulative weight gain, feed conversion coefficient (FCR) and morality rate in different groups were compared during first weeks to fifth as weekly. In these comparisons, Multi Range DUNCAN Test and Tukey test were used to determine the meaningfulness of differences among different group. Similar alphabets written for groups signify lack of meaningful difference among them and dissimilar alphabets over related column to groups represent meaningful difference between groups ($P<0.05$). according to the obtained results in this research, groups' food consumption mean in 1st, 2nd, 3rd, 4th and 5th weeks had meaningful difference ($P<0.05$) while the most food consumption during the whole period, was related to the group E and the least food consumption was related to group A (Table 2).

Cumulative weight gain mean in different groups was weekly compared during first to fifth weeks. According to the obtained results in this research, weight gain of groups has meaningful differences in 2nd, 3rd and 4th weeks ($P<0.05$). Group E had the most weight gain at the end of 2nd and 4th weeks. The most weight gain was belong to group C at the end of 3rd week and it was belong to group D at the end of 5th week. Regarding to the obtained results, the most weight gain mean during the whole period (35 day) was related to group E and the least mean was related to group A (Table 3).

Table 2. Daily food consumption of broiler chickens in different groups in first to fifth week of breeding period.

Group	Week 1	Week 2	Week 3	Week 4	Week 5
A	13.6±0.078e	24.3±0.125^{d}	61.6±0.07f	150.8±0.07a	143.2±0.43d
B	15.2±0.078c	27.1±0.125a	62.2±0.07e	141.8±0.07c	135.5±0.43e
C	15.2±0.078c	24.9±0.125c	64.1±0.07c	144.9±0.07b	145.5±0.43c
D	15.1±0.078c	25.4±0.125b	64.1±0.07c	135.5±0.07f	136.2±0.43e
E	15.6±0.078b	23.7±0.125e	62.7±0.07d	136.5±0.07g	148.8±0.43b
F	16.6±0.078a	21.2±0.125e	66.1±0.07b	140.5±0.07d	131.3±0.43f
P-VALUE	0.000	0.000	0.000	0.000	0.000

Table 3. Daily weight gain mean of broiler chickens (g/d) in different groups in first to fifth week of breeding period.

Group	Week 1	Week 2	Week 3	Week 4	Week 5
A	7.11±0.15e	19.9±0.52^{b}	39.1±1.25^{b}	71.4±4.09^{dc}	73.4±4.23
B	7.3±0.15c	19.4±0.52^{b}	43.5±1.25^{a}	88.6±4.09^{ab}	66.5±4.23
C	7.1±0.15c	21.7±0.52^{ab}	47.4±1.25^{a}	77.8±4.09^{bc}	69.9±4.23
D	7.08±0.15c	19.5±0.52^{b}	45.1±1.25^{a}	82.7±4.09^{abc}	79±4.23
E	7.26±0.15b	22.7±0.52^{a}	43.9±1.25^{a}	91.4±4.09^{a}	75.9±4.23
F	7.26±0.15a	20.4±0.52^{e}	44.4±1.25^{a}	81.9±4.09^{abc}	74.8±4.23
P-VALUE	0.000	0.001	0.000	0.000	0.006

FCR mean in different groups was weekly compared during first to fifth weeks. According to the obtained results in this research, groups E and F have the least FCR and they had meaningful differences with control group (A). It means that group E and F were the best experimental group due to the lowest FCR (Table 4).

Table 4. FCR mean of different treatment in first to fifth week and the whole period.

Group	Week 1	Week 2	Week 3	Week 4	Week 5
A	1.9±0.04 ^{b}	1.2±0.03 ^{bc}	1.9±0.04ba	2.1±0.11ab	1.9±0.11a
B	2.1±0.04 ^{c}	1.4±0.03 ^{b}	1.5±0.04bc	1.6±0.11bc	2.1±0.11b
C	2.1±0.04 ^{c}	1.1±0.03 ^{c}	1.4±0.04c	1.7±0.11abc	1.9±0.11a
D	2.2±0.04 ^{c}	1.3±0.03 ^{b}	1.4±0.04bc	1.8±0.11abc	1.8±0.11a
E	2.1±0.04 ^{c}	1.04±0.03 ^{d}	1.4±0.04bc	1.15±0.11c	1.9±0.11a
F	2.3±0.04 ^{a}	1.04±0.03 ^{d}	1.5±0.04abc	1.7±0.11abc	1.7±0.11a
P-VALUE	0.000	0.001	0.000	0.000	0.006

Morality rate was recorded daily and it was found that the least morality rate was in group E and the most rate happened in control group (A) (Table 5).

Table 5. Percentage of cumulative morality of broiler chickens in different groups in first to fifth week.

Group	Week 1	Week 2	Week 3	Week 4	Week 5	Total Period
A	5.0^{a}	5.1^{b}	5.0	0.0	25.0	75.2
B	0.0^{a}	25.0^{a}	25.0	0.0	5.0	1
C	5.0^{a}	25.0^{a}	5.0	5.0	0.0	75.1
D	25.1^{b}	0.0^{a}	5.0	5.0	0.0	75.
E	5.0^{a}	5.0^{a}	25.0	5.0	25.0	2
F	0.0^{a}	25.0^{a}	0.0	5.0	5.0	25.1

DISCUSSION

Generally, positive effects of additives on weight gain, FCR and food consumption and morality in this study were in agreement with reports of Piray et al, 2007, Pelicano et al, 2004, Zakeri et al. 2006 and Mahdavi et al, 2010. Effects of growth-promoting additives on development of FCR have been reported by some researchers. Esteve-garcia et al 1997, found that adding flavomycin to basic diet of wheat could meaningfully improve CFR of chickens during starter and grower periods. Pelicano et al, 2004 and Zulkifli et al, 2000. Reported that CFR improved meaningfully during 0 to 21 days old in birds which were fed by prebiotic, probiotic and symbiotic in compare with control group. Non-significant influence of experimental treatments with growth-promoting additives on birds' consumption of food was according to the reports by Pelicano et al, 2004 and Gunal et al, 2006. These differences in results are probably due to difference in managing and breeding condition between different experiments. When digestive system of birds is infected with disease-causing bacteria and mucous layer becomes thicker, so absorption of nutrients decreases (Gunal et al. 2006). Therefore, by decreasing population of disease-causing bacteria, consumption of prebiotics and probiotics effects on growth development and FCR. In addition, it has reported that using prebiotics increases level of area where nutrients is absorbed through increasing length of intestine, therefore, it develops birds yield (Santin et al. 2001). In the present experiment, there was such an effect which improved food absorption in birds fed by growth-promoting additives. Prebiotics, probiotics, synbiotics and asidfires have a suitable price and more important that they are natural growth-promoters which remain no residues in birds' meat so no drug-resistance creates against antibiotics in human due to consumption of these meats. In addition, as using growth-promoting antibiotics is forbidden for poultries in Europe on January 1999 (because of remaining antibiotics in consuming meat and creating drug-resistance in poultries and human), therefore, compounds such as prebiotics, probiotics, synbiotics and asidfires which have high efficiency could be as the best replacement for growth-promoting antibiotics (Mahdavi et al, 2010).

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