EFFECTS OF DIFFERENT LEVEL OF GROWTH PROMOTER (PANAMIN) ON THE PERFORMANCE OF BROILERS

A THESIS

BY

MD. SAIFUL ISLAM

REGISTRATION NO. 1205108

SEMESTER: JULY-DECEMBER, 2014

SESSION: 2012-2013

MASTER OF SCIENCE (M.S.)

IN

POULTRY SCIENCE

DEPARTMENT OF DAIRY AND POULTRY SCIENCE
HAJEE MOHAMMED DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR

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Approved as to style and content by-

Dr. Tahera Yeasmin	**Dr. Mst. Afroza Khatun**
Associate Professor	Professor
Research Supervisor	Research Co-Supervisor

Prof. Dr. Mst. Afroza Khatun
Chairman
Examination Committee
and
Chairman, Department of Dairy and Poultry Science

HAJEE MOHAMMED DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR

DECEMBER 2014

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ABSTRACT

The feeding trial was carried out by using 120, straight-run 7 day-old Ross broiler (308)chicks into four groups (3 replicates x 10 chicks), without Growth promoter (panamin) on Treatment-0, or with Growth Promoter (Panamin). Treatment-1 (1ml), Treatment-2 (2ml) and Treatment-3 (3ml) per litre of water respectively between 8-28 days of age at one day interval, to evaluate the performance of broilers in different treatments. The final body weights of birds improved significantly ($P<0.01$) in Treatment-3 (3 ml panamin/litre of water) compared to other treatment groups. Feed consumption and feed conversion ratio's differed significantly ($P<0.01$) at the age of 28^{th} days. Feed conversion ratios were 1.70, l.68, 1.64 and 1.59 in T_0, T_1, T_2 and T_3 respectively. Finally it may be concluded from the study that addition of growth promoter (panamin) may be beneficial. The most economic and efficient level of growth promoter was found to be 3.0 ml of Panamin/litre of water.

Key words: Broilers, Panamin, Growth Promoter, Production Performance

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LIST OF ABBREVIATIONS AND SYMBOIS

%	=	Per cent
*	=	Significant at 5% level of probability
**	=	Significant at 1% level of probability
/	=	Per
@	=	at the rate of
<	=	Less than
>	=	Greater than
^{O}C	=	Degree Celsius
BAU	=	Bangladesh Agricultural University
Ca	=	Calcium
CF	=	Crude fibre
cm	=	Centimeter
cm^2	=	Square centimeter
Contd.	=	Continuation
CP	=	Crude protein
Cyst.	=	Cystine
Dr.	=	Doctor
EE	=	Ether extract
et al.	=	Associates
Fig.	=	Figure
g	=	Gram
IU	=	International Unit
kcal	=	Kilo calorie
kg	=	Kilogram
Ltd	=	Limited
Lys.	=	Lysine
m^2	=	Square meter
ME	=	Metabolizable Energy

LIST OF ABBREVIATIONS AND SYMBOIS (Contd.)

Met.	=	Methionine
mg	=	Milligram
NFE	=	Nitrogen free extract
No.	=	Number
NS	=	Non- significant
P	=	Phosphorus
ppm	=	Parts per million
Prof.	=	Professor
RH	=	Relative humidity
SD	=	Standard deviation

CHAPTER I

INTRODUCTION

Broiler meat is an important source of high quality proteins, minerals and vitamins to balance the human diet and superior to other meat available for human consumption for its tenderness, palatability and better digestibility. Specially developed breeds of chicken meat (broiler) are now available with the ability of quick growth and high feed conversion efficiency. Depending on the farm size, broiler farming can be an important source of family income or can provide subsidiary income and gainful employment to farmers throughout the year. Bangladesh is an agro-based, densely populated developing country. In GDP, agricultural contribution is close to 19.61% and livestock sub-sector 3.1% (BBS, 2006). Poultry sector, especially commercial poultry farming has been developing intensively every part and corner in our country in recent years. The development of the industry is associated with several areas such as, nutrition, genetics, management to maximize the efficiency of growth performance and meat yield. Poultry meat contributes approximately 37% of the total animal protein supplied

in our country (Ahmed and Islam, 1990). There is a greater possibility of growth and expansion of this sector. This is justified by the fact that farmers are becoming more interested in broiler farming for the last two decades. The success of broiler farming depends upon optimum growth of broiler. There reorganization of antibiotics in the 1950s as one of the most readily available therapeutic agents and growth stimulants for farm animals has dictated their continued, widespread and indiscriminate use. However, there is growing concern in recent years on the use of antibiotics as growth promoters because of development of resistant bacteria that makes antibiotics therapy difficult.

Growth promoters are the substances that are added to a nutritionally balanced diet which provoke response towards the exploitation of maximum genetic potential of the host, in terms of growth as well as improvement in feed conversion efficiency. There are different types of growth promoters which are used to exploit the broiler industry like antibiotics, probiotics (bio-growth promoters), prebiotics, exogenous enzymes, antioxidants, coccidiostats etc. Growth promoters are now recognized in broiler industry as feed additives for faster growth and economic meat production. Growth promoters can play a vital role to shorten the time period required for attaining the market weight by stimulating growth (Bunyan *et al.*, 1977). They also improve the efficiency of feeding utilization. The growth promoters have given positive responses in respect to growth improve feed efficiency and survivability of broilers (Dash *et al.* 2001). Growth promoters are being used extensively in animal feed and water all over the world, especially in poultry industries to improve performance for therapeutic and prophylactic purpose by stabilizing intestinal microbial flora and to prevent some specific intestinal pathogens. Recently modern poultry scientists have been suggesting several feed supplements and feed additives, such as growth promoter, probiotics, prebiotics, and various organic acids and so on to minimize the growth performance related constraints. There are several antibiotics which are allowed to be used in poultry production as growth promoters. Beneficial effects of antibiotic growth promoter on broiler performance were reported by several researchers. In poultry, growth promoters, such as avilamycin, flavophospholipol, virginiamycin and avoparcin

control *Clostridium perfringens* infection in addition to improve feed conversion efficiency (JETACAR, 1999).

Now a day's various types of growth promoters are available in the market. Those growth promoters are imported in our country for improving feed conversion of broilers, some of them are concentrated or powder form and some are liquid form. The poultry farmers are occasionally get confused by the advertisement of the different pharmaceutical companies claiming their products are the best and there is indiscriminate use without experimental support and sometime doses of these defined within range. In assessing the value of growth promoter following characteristics should be taken into consideration. Basically, it should be naturally occurring microorganisms with a short reservation time. It is proved that a multi role species product is better than single species product. The stability of micro-flora can easily be disturbed by many factors like change in feed, vaccination, intestinal pH, bile salt concentration in the gut. It must have rapid colonizing ability and strong foot hold in gut so that it can exclude by stable and have long self-life to withstand in our environmental conditions. One such product available in the market is panamin (growth promoter). This growth promoter is the combination of liquid amino acid, trace elements, yeast extract and antioxidant. Which is the non-antibiotic form and it optimizes the nutritional value of other feed proteins, maximizes the production yields and minimizes the quality variation of the flock. So, its through study is essential before commercial use. The present study was therefore, undertaken to study the effects of Panamin on broiler performance. With this idea in mind, the present study was undertaken to fulfill the following objects:

i) To investigate effect of Growth promoter (Panamin) on the production performance of commercial broiler.
ii) To determine optimum doses and economic level of growth promoter (Panamin) in broiler diet.
iii) To observe carcass traits of the broiler after admission of growth promoter (Panamin).

CHAPTER II

REVIEW OF LITERATURE

The review of literatures is the vital sources information about the analogous research study conducted by other workers and helps to identify the basic concepts of different components blended in researches. The contributions made by numerous research workers are complied and publications are documented in the bibliography.

Huyghebaert *et al.* (2011) stated that, as per the current global scenario, the demand for cheap and quality food is continuously increasing due to the growing world population and this highlights the importance of maximizing the efficiency of poultry production in a cost effective manner, through the application of growth promoters, which are non-nutrients aimed to maximize utilization of the nutrients present in feed. Pedroso *et al.* (2013) reported that withdrawal of antibiotics or using alternatives to antibiotic growth promoter could alter the microbial flora of body. *Giannenas et al.* (2012) stated that Dietary probiotics have been found beneficial in increasing the performance of broiler chickens experimentally challenged with E. tenella. Fallah and Rezaei, (2013) the non-digestible oligosaccharides have been found to stimulate absorption of several minerals like calcium, magnesium, zinc and iron.

Tavarez *et al.* (2011) Antioxidants increase body weight gain and feed intake as it protects dietary lipids from further oxidizing and hence improved broiler performance and shelf life of their products. Studies suggested that using blends of antioxidants improved broiler performance better than the use of individuals alone. Elwinger *et al*. (1998) studied the effect of the growth promoters' avoparcin and avilamycin and the ionophore anticoccidials maduramicin, naracin and monensin on the growth of the clostridium perfrigens in the caeca and on the performance of broiler chickens. They concluded that no additives affected by combining growth promoter and ionophore anticoccidials. They also concluded that broiler may be raised without growth promoters without any detrimental effect. Samanta and Biswas (1995) stated that feeding probiotics (lactic acid) at a level of 0.3% with drinking water for the first 2 weeks of broilers did not promote weight gain.

Giriprasad *et al*. (1990) observed the efficiency different growth promoters singly or in combination in the cockerels. They concluded that the use of growth promoter in the diet invariably resulted in less feed cost per unit body weight or cockerels whether used individually or in combination. Singh *et al*. (1999) reared 480 one-day-old broiler upto 8 weeks of age on diets, containing 2600, 2900 or 3200 kcal ME/kg with 0.02gm, 0'03gm or 0.04gm, probiotic. The weight gain, feed intake and feed efficiency were recorded. They reported highest weight gain and feed efficiency on diet containing 0.02% probiotic. Cavazzoni *et al*. (1998) stated that the 75 male Ross chicken were divided into 3 groups of 25 and fed a standard diet supplemented with 3 coagulants 1.6×10^{10} cfu/kg from 1 to 7 days and 4×10^{4} cfu kg from 8 to 49 days. The found that mean body weight and daily live weight gain were higher in the probiotic fed chickens than the control groups. Hasan *et al*. (1998) used Jajoba oil in feed which showed significant increase in body weight gain, final body weight, weight of edible parts and- internal organs and the, levels of vitamin A and E in the liver compared with control birds given corn oil as supplement. It was concluded that Jajoba oil had antimicrobial activity

Shocib *et al.* (1997) stated that probiotic pronefer enhanced growth and immune response in chicken. Jayaprasad and Prabakaran (1994) studied with four different grown promoters containing cyproheptadine, amino acids, certain enzymes or antibiotic colistin to improve broiler performance. They found to improve body weight at seven weeks by 5.51, 2.33, 1.61 and 4.92 respectively and feed efficiency by 3.39, 2.48-0.84 and 5.08% over respective control. Net profit margins improve by Rs. 1.15, 1.18, 0.23 and 2.3 per bird respectively. Baidya *et al.* (1993) observed that Vencob broiler chickens in 5 groups when fed to improve appetite for 6 week on a basal diet without a growth promoter plus Aurofac-100, Biospur-50, G-probiotic 50 or Bioboost forte 10 g/100kg. The average body weight was 1261.5, 1280.1, 1288.5, 1274.4 and 1282.29 and FCR was 2.03, 1.89, 1.90, 1.92 and 1.96 respectively. Cost benefit analysis showed that Biospur was the most effective growth promoter.

Pellaz (1996) stated that use of a probiotics (Aviguard Bayer) did not reduce the *salmonella* carriage in broilers. Jinmo *et al*. (1997) reported that feeding 0.l% *Lactobacillus casei* (probiotics) in the diet of broiler chicken increased average daily gain

during the first 3 weeks period compared to control. They further stated that the probiotic decreased bacterial activity in the small intestine of young chickens and may be beneficial for improving animal health and growth especially during early period of life. Hataba *et al.* (1997) carried out an experiment to compare the effectiveness of virginiamycin; zinc bacitracin, lincomycin and flavomycin supplementation (as efficiency of chickens fed on diet containing animal protein or plant protein). It was concluded that protein source has pronounced effects on growth performance and the response of antibiotics was influenced by protein source. In general, protein diets with zinc bacitracin had beneficial effects on chicken performance. Pradhan *et al.* (1998) used three of probiotics, *G. probiotic*, Bioboost-Yc and Biopur at 75,100 & 150% of level as recommended by manufacturers to study the effect on body weight gain, feed conversion, and livability and feed cost of broilers. They concluded that the use of probiotics in broiler diet increased weight gain and cost effective.

Erdogan (1999) studied the effects of zinc bacitracin and two different probiotics on body weight gain, feed conversion and dressing percentage of broilers. A total of 250 one-day-old Ross broilers were divided into control and experimental groups. The control group was fed on unsupplemented basal diet, while experimental birds were given different amounts of probiotics, He stated that the probiotics treated groups were higher in live weight gains; feed consumption and feed efficiency. Sharma *et al*. (1986) studied without additive (control) or 3-Nitro, zinc bacitrain, calcarea phosphoricum or five phosphricum. All feed additives except Zn bacitracin significantly improved rate of gain up to 7 weeks old but none of the additives significantly affected feed intake, feed conversion efficiency or mortality. Economic returns were highest with calcarea-phosphoricum and least with zinc bacitracin. Vladijmirova *et al.* (1997) studied the effect of avilamycin 5 or 25 mg/kg on live weight gain, feed utilization and health compared with the control. They concluded that chicken receiving avilamycin 5 mg/kg showed an increase of 10-15% in body weight for the whole finishing period and a 9% increase in feed utilization with 100% survival.

Palic *et al.* (1998) reported that broiler diet treated with sacox and flavomycin showed superior performance on final body weight, feed conversion and mortality. Omprakash

et al. (1996) used 0,5, 10,15or 20 ml *Eremothecium ashbyii* broth (EAB) daily, incorporated with drinking water for 8 weeks. They observed an increase ($P<0.05$) in live weight gain with E4B supplementation compared with the control. The highest body weight and best feed efficiency at 4 and 6 weeks of age were noticed in the groups supplemented with 20 and 15 ml E. *ashbyii*. Morphological deficiency syndromes or abnormalities were not displayed by the chicken. Dash *et al.* (1992) conducted an experiment with or without growth promoter's flavomycin-40, stafac-20 and zinc bacitracin at the rate of 10, 100 and 10 g/quintal, respectively. They concluded that growth promoters gave positive responses in respect to growth and flavomycin-40 appeared to improve feed efficiency and survival in the broilers. Wolke *et al.* (1996) reported that probiotic (*Bacillus natto*) enhanced feed intake, weight gain and feed utilization in male broiler chickens but not in females. Gutierrez *et al.* (1993) used fluoride at different doses in broiler diet. They concluded that there was no intoxication with fluoride and low levels of fluoride (80mg/kg) could be included as a growth factor in broiler rations.

Fabris *et al.* (1997) fed day old 2400 male Cobb 500 broilers to appetite on starter and grower diets with 23.3 and 21.2% CP without additives (group A) or with *Bacillus toyoi* (group B) or *B. subtilis* and *B. licheniformis* (group C), 100 x 10^9 colony forming units/kg or virginiamycin (group D) 20, avoparcin (group E) 15 or avilamycin (group F) 10 mg/kg. From 0 to 25 days old feed intake was lower ($p<0.05$) in group D and F than in controls. From 26 to 53 days old, feed conversion index (FCI) was lower ($P<0.05$) in group D than in controls and group B. The FCI was lower ($P<0.05$) in groups C and E than in controls. From 0 to 53 days old, feed intake was lower ($P<0.05$) in group E than in controls. He showed that weight gain was greater ($P<0.05$) in groups E and D ($P<0.05$) than in group B. Mondal *et al.* (1994) evaluated the efficacy of aurofac-l00, neftin-50, vetrodox, flavqmycin-40 stafac-20 roxarsone, bioboost-40 and TM-50 on the performance of broilers reared for 8 weeks, Results showed the highest body weight gain in group stafac-20 followed by group's flavomicin-40, TM-50 and roxarsone. Feed efficiency and eviscerated carcass yield did not differ significantly among various treatments. From the cost benefit analysis, the most economic and efficient growth promoter was found to be stacac-20 followed by flavomycin-40 and TM-50. Dobretsberger *et al.* (1996)

reported that herbal products showed additional benefits by lowering morbidity and mortality and improving feed conversion and quality of meat as observed in fatty acid analysis. They also reported that herbal feed, supplement can be used as alternatives to antibiotics feed additives.

Tarakanov *et al.* (1999) stated that the efficiency of lactoamylovorin, a new probiotic containing Lactobacillus amylovovous was evaluated two groups of' broilers; control and experimental. Experimental birds received lactoamylovorin with diet for the duration of experiment (49 days). At 29 days of age, the experimental broilers were compared with the control. Body weight of the experimental broilers at 49-days of age was higher (1660g) than that of control (1540g). Hoda and Maha (1995) conducted an experiment on Cob broiler copper 0, 75 and 150 mg/kg from copper carbonate, copper oxide or copper sulfate for 6 weeks. Both levels of $CuCo_3$ supplementation achieved significant increase in live weight gain and improve feed conversion efficiency. Manickam *et al.* (1994) stated that the weight gain, feed conversion of broiler chicks, given Lactobacillus sporogenes (probiotics) was significantly better than that on untreated control.

Jamroz *et al.* (l992) studied with avoparcin 7.5, lincomycin 2, flavomycin 5 or virginoamycin 5 mg/kg. Compared with control the weight gains of chicks given lincomycin and flavomycin were higher by 4.3 and 6.4% ($P \leq 0.05$) given while feed conversion efficiency (kg) was better by 2.3 and 3.6% with avoparcin and lincomycin respectively. Gippert and Halmagyi (1992) reported that broiler diets containing avotan 150 or flavomycin 20 mg/kg increased live weight and feed conversion efficiency by 4-5% and 2-3% respectively. Combined use of avotan and flavomycin did not have any detrimental effects and improved body weight gain and feed; conversion by 6-7% and 4-5% respectively, compared with control. Alvarez *et al.* (1994) used growth promoters (probiotics) or with *Bacillus subtilisi* 100, zinc becitracin 100 or a product in 100 Indian River broiler chickens on a sorghum and soybean meal diet with or without live cultures of *Lactobacillus acidophilus, Streptococcus faccium* and *Saccharmyces cerevisiae* and enzymes (amylases, proteases and cellulases) at a level of 10 mg/kg. Mean weight gain was 1904, 1933, 1977 and 1984g in the 4 groups respectively.

Hamid *et al.* (1994) fed broilers different level of *Lactobacillus acietophilus* cultured (probiotics) up to 5 weeks of age and found improved grow rate and feed conversion and no mortality in any treatment. Novelli (1991) conducted an experiment without growth promoters or with avoparcin 10, virgiriamycin 20, ot flavomicyn 4 mg/kg or the

probiotics, Tepaxdry or Reface. Mean final live weights were 2438, 2504, 2479, 2460, 2489, and 2441g in females and 3122, 3191, 3136, 3111, 3075 and 3134g in males respectively. Feed conversion indices were 2.028, 2.040, 2.089, 2.132, 2.140 and 2.139 in female and 1.978, 1.938, 1.971, 1.973, 2.039 and 2.003 in males respectively. Morch (1982) reported that the growth promoting effect of avoparcin and virginiamycin was better than that of nitrovin and there was little difference between the first two drugs. Raj (1984) used Amprol, Stenorol and 3-Niro Hoechst on weight gain and feed efficiency in broiler. He concluded that Stenorol with 3-Nitro Hoechst was the most profitable among the feed additives used for broilers.

Alwan *et al.* (1998) observed that Vedetta, Petra and Starbro broilers fed on a standard diet or a standard diet supplemented with the antibiotic flavomycin 50g/t or the probiotic cerbiogalli 3kg/t until 7 weeks of age. Performance (body weight, feed intake, feed conversion and mortality) was assessed at ages 4 and 7 Weeks. Flavomycin significantly increased feed intake in all strains at 4 weeks and in Vedetta at 7 weeks. Cerbiogalli significantly increased body weight in all strains at 4 and 7 weeks. Mohan *et al.* (1996) stated that probiotics (containing *Lactobacillus acidophilus*, *L. casei, Bifidobacterium bifidum, Aspergillus oryzae and Torulopsis*) at a level of 75, 100, 125mg/kg attained 1204, 1268.3 and 1210 g weight gain, respectively. Chickens given probiotic at 75 mg retained more nitrogen ($P<0.01$) than control. Probiotic plus antibiotic supplementation supported maximum weight gain. Pisarski *et al.* (1995) reported lack of effect of probiotics on broiler growth in starting and finishing periods. However, the interactions of probiotics x cereals and probiotics x feed fat have significantly influenced weight gin. They further reported that probiotics had no effect on meat yield.

Jamroz *et al.* (1995) reported that roxazyme improved live weight of broiler by 3% and feed conversion efficiency by 2%. Avilamycin had similar effects while a combination of these preparations improved live weight by 7.7 and feed conversion efficiency by 2.8%. Al1 additives were most effective during the first 3 weeks of life. Lee *et al.* (1993) stated that broiler chicks supplemented with antibiotic and probiotics had higher viability than that of the control groups. Ali *et al.* (1994) used livol as a herbal growth promoter. They

reported that livol at a level of 0.5% of the diet in broiler improved survival rate, dressing percentage and eviscerate meat yield percentage, but had no effect on abdominal fat. Holoubek (1993) stated that the probiotics, *lactigerm, proma* and *biostrong* 500 increased growth rate and feed conversion in broilers in comparison with un-supplemented control diets.

CHAPTER III

MATERIALS AND METHODS

3.1 Statement of the experiment

The experiment was conducted at the Poultry Shed of Hajee Mohammad Danesh Science & Technology University, Dinajpur with commercial day-old Ross-308 broiler used for the experiment during the period from June to July, 2013 to find out the effects of growth promoter (Panamin). To complete the research work were followed in the following steps.

3.2 Experimental birds

Total numbers of 120 Ross Broiler (308) day old chicks were collected from the hatchery of CP Bangladesh Limited, Birampur, Dinajpur, Bangladesh for the experiment.

3.3 Preparation of the experimental house and equipment

The experimental birds were reared in an open sided house. The experimental house was properly washed and thoroughly cleaned with forced water by using a hosepipe. After washing with clean water, the rooms were disinfected by quick lime and the rooms were left vacant for 15 days. All feeders, plastic buckets, waterers and other necessary equipments were also properly cleaned, washed and disinfected with Virocid®, subsequently dried and left them empty for at least one week before the arrival of chicks. Ceiling, walls, and wire nets were also thoroughly disinfected by spraying Virocid® (4ml/lit). After 7 days, the house was divided into 12 pens of equal size

using wood ship and wire net. Each of pens was 10 sq. feet floor spaces for 10 chicks. Fresh dried rice husk were used as a litter materials on the floor at a depth of 8.0 cm.

3.4 Layout of the experiment

The day-old chicks were reared in brooder house up to 7 days. At the 8th day chicks were randomly distributed to four dietary treatment groups (T_0, T_1, T_2 and T_3) having three replications in each treatment. The chicks were reared in separated pens according to treatments and replications. Each dietary treatment group consists of 30 chicks and the numbers of chicks in each replication were 10.The layout of the experiment is shown in Table 3.1.

Table 3.1 Layout showing the distribution of experimental broilers

Dietary treatment	No. of chicks in each replication			Total number of chick in each treatment
	R_1	R_2	R_3	
T_0	10	10	10	30
T_1	10	10	10	30
T_2	10	10	10	30
T_3	10	10	10	30

Where,

T_0= Control

T_1= 1.0 ml of Panamin/litre of drinking water

T_2= 2.0 ml of Panamin /litre of drinking water

T_3= 3.0 ml of Panamin /litre of drinking water

3.5 Procurement of feed ingredients

Feed ingredients for making the experimental diets were procured from the local market of Dinajpur town. During procurement, ingredients were evaluated carefully for their freshness by observing its color with naked eye and smell with nose.

3.6 Experimental diet

Loose feed was used throughout the experimental study. The experimental period were divided into two phases (broiler-starter and broiler-finisher). The broiler chicks were fed broiler starter for 0 to 14 days, broiler grower for 15 to 28 days of age. Growth promoter was provided through water at morning and afternoon. The chemical composition of this feed is shown in Table 3.2.

Table 3.2 Composition of the experimental starter and finisher diets fed to broilers

Feed ingredients	Amount (kg/100kg feed)	
	Starter (1-14 days)	Finisher (15-28days)
Maize	53.5	57.00
Rice polish (Auto)	10.0	10.0
Soybean meal (44)	23.0	18.0
Protein Concentrate(Jasoport)	10.0	10.0
Oyester shell	1.0	0.75
DCP(Di-calcium phosphate)	0.5	0.75
Soybean oil	1.5	3.0
Common salt	0.25	0.25
*** Vitamin- mineral-aminoacid Premix	0.25	0.25
Chemical Composition of experimental ration		
Nutrients	**Starter diet**	**Finisher diet**
ME (kCal/kg)	2977	3074
CP (%)	21.21	19.40
CF(%)	5	5
Ca(%)	1.00	0.95
Available P (%)	0.74	0.75
Ash (%)	6	6
Lysine (%)	1.02	0.89
Methionine (%)	0.35	0.35

*** Composition of Vitamin-Mineral premix provided following per kg diet: Vit. A 5000 IU, D_3 1000 IU, K 1.6 mg, B1 1mg, B2 2mg, B3 16mb, B6 1.6mg, B9 320µg, B12 4.8 µg, H40mg, Cu 4mg, Mn 40 mg, Zn 20mg, Fe 2.4mg, I 160 µg.

3.7 Preparation of Experimental Diet

At first required amount of feed ingredients were weighed by digital weighing balance. Then micronutrients (vitamin-mineral-premix, lysine and methionine) and common salt were mixed thoroughly with small amount of weighing rice polish in a separate place. After that the remaining rice polish were mixed with the previously mixed ingredients. After proper mixing, it was then thoroughly mixed with maize and soyabean meal properly. Required amount of soyabean oil was sprayed on the mixed feed ingredients. During the time of mixing cross mixing was applied. Mixing was done manually. Composition of the experimental diet is shown in table 3.3

3.8 Collection of growth promoters (Panamin)

Growth promoter was collected from the local market, Dinajpur. The growth promoter Panamin of Square pharmaceuticals Company, Bangladesh was used for the experiment.

Table 3.3 Composition of Growth promoter (Panamin)

Amino acid		Elements	
Composition	**Per 1000 ml.**	**Composition**	**Per 1000 ml.**
DL- Methionine	1350 mg	Glycine	3150 mg
L-Lysine Hcl	4500 mg	Calcium	170 mg
Histidine	2000 mg	Chloride	2900 mg
Phenylalanine	3400 mg	Iodine	2090 mg
Serine	3800 mg	Manganese	16 mg
Threonine	2900 mg	Magnesium	1820 mg
Valine	3500 mg	Iron	20 mg
Arginine	5200 mg	Carbohydrate	3200 mg
Cystine	1050 mg	Potassium	680 mg
Isoleucine	3275 mg	Sodium	2100 mg

Leucine	5700 mg	Zinc	68 mg
Tryptophane	1200 mg	Copper	40 mg
Tyrosin	3200 mg	Yeast extract	2060 mg
Papain	1020 mg	Antioxidant	120 mg

3.9 Management of the experimental birds

Similar care and management in all treatment groups throughout the experimental period was practiced. At the initiation of the experiment, chicks were individually weighed recorded as initial body weight. The following management procedures followed during the experimental period.

3.9.1 Litter management

During the experiment period for the first 5 days litter was covered by clean newspaper and newspaper was removed when it become dirty. After that period the birds were reared on rice husk littered floor having a depth of 8 cm. Before use of litter calcium carbonate was spread on the floor. At the end of each week, litter was stirred to break its compactness and maintain proper moisture. At the end of 2^{nd} and 3^{rd} weeks of age, dropping were cleaned from the surface of litter.

3.9.2 Brooding

The experiment was conducted in summer (June to July/2013). Additional heat was provided to brood the chicks when it was necessary. Brooding temperature was kept at 35^0C in the first 1 week of age. It was decreased gradually at the rate of 3^0C in each week until they were adjusted to normal environmental temperature of the house. Additional heat was managed by fitting 100-walt electric bulb at the center of the pen about 6 inches above the floor from the 7-day old. The height of the bulbs was increased by raising the bulb gradually as per need of temperature. Daily room temperature (^{o}C) was recorded every six hours with a thermometer.

3.9.3 Lighting

All birds were exposed to Continuous lighting of 23 hours and one hour dark period per day throughout the experimental period. The dark period was practiced to make the broilers familiar with the possible darkness due to electricity failure. Supplementary light at night was provided by electric bulb by hanging at a height of 2.8 miters to provide necessary lighting.

3.9.4 Floor, feeder and water space

An area of 10 sq. feet was allotted for 10 birds in each pen; Therefore floor space for each bird was 1 sq. feet. One round feeder and one round waterer were provided in each pen for 10 birds; required feeding and drinking space was provided according to the number of birds in each replication.

3.9.5 Feed and water management

At the 1st week Feeds was supplied to the chicks on clean newspapers at three hours interval for the first 3 days. Linear feeder and round plastic drinker were used during brooding period. After that linear feeder were replaced by round plastic drinker. After 2 weeks, water was supplied trice daily (morning, noon and night) and water was supplied thrice daily at morning (40%), noon (20%) and night (40%). Feed and fresh water were offered to the bird manually according to experimental schedule. All broilers in different treatments had fresh feed and drinking water *ad libitum* throughout the experimental period.

3.9.6. Growth promoter (Panamin)

The birds were reared in separate pens. Growth promoter (Panamin) was added to drinking water for 8-28 days of age twice a day total 3 days each week at 1 day interval. Fresh cool clean water with or without Panamin were supplied to the experimental birds once in the morning, noon and in the night.

3.9.7 Immunization

All birds were vaccinated against Baby Chick Ranikhet Disease and Infectious Bronchitis at day one by the company and Gumboro Disease vaccine was given as per following schedule at the evening..

3.9.8 Medication

Immediately after unloading from the chick boxes the chicks were given Vitamin-C (1gm/1litre water) and glucose (50gm/litre) to prevent the stress occurring during

transport To prevent birds from bacterial infection, they are treated with amoxicillin @ 1gm/litter of drinking water and colistin sulphate @ 1gm/litter of drinking water at the age of 2-4th days to control bacterial infection and anticoccidial drug cocci-cure @ 1gm/litter of drinking water at the age of 15-17 days to control the coccidial infection. Water soluble multivitamin (0.2g/litre drinking water), electrolyte (1.5g/1 litre of drinking water) and vitamin-C (l g/ 3 litres of drinking water) were added with drinking water to Prevent stress.

3.9.9 Sanitation

Proper hygienic measures and strict sanitation programs were followed during the experimental period. The entrance of the farm and surrounding were kept clean and disinfectant (Virocid®) was sprayed regularly. In addition, the service area of the experimental rooms, outside wall and feed storage room were kept clean.

3.9.10 Bio-security

To prevent the outbreak of diseases, the following measures were taken to maintain bio-security.

i. Entrance of visitors was not allowed except worker, researcher, supervisor and co-supervisor who visited farm by following special care.
ii. Before entrance, hands were washed with soap and shoes were changed, feet were dipped in a footbath containing disinfectant solution (potassium permanganate) and the footbath was at the entrance point.
iii. All equipment of the experimental house was kept clean.
iv. Sick broilers were promptly isolated to a separate place from the experimental pens.
v. Dead broilers were removed promptly and buried far away the experimental house.
vi. The experimental areas were kept free of rats, cats, dogs, and wild flying birds.

3.9.11 Postmortem examinations of broilers

Dead birds (if any) were examined post-mortem exanimation. After postmortem examination, the results were collected and necessary measures were taken to remove the problem without

3.10 Method of broiler processing

After termination of the experiment, two birds weighing average of pen weight from each replication was selected. Feed was withdrawn from the pens 12 hours prior to slaughter but water was available to facilitate proper bleeding. After slaughter they were allowed to bleed from about 2 minutes, and then the birds were scalded in hot water (55-65^{o}C) for about 2 minutes in order to loosen the feathers of the carcasses. Final processing was performed by removal of the head, shank, viscera oil glands, kidney and lungs of the carcass. Heart and liver were removed from the remaining viscera by cutting them loose and then, the gall bladder was removed from the liver. The gizzard was removed by cutting it loose in front of the proventriculus and then cutting both, incoming and outgoing tracts. Then, it was split open with knife, emptied and washed and the lining removed by hand. The other organs or parts of the dissected birds were weighted out separately and recorded.

3.11 Data collection and record keeping

The following records were kept during the 4 weeks of rearing period:

a. Body weight: Initial and subsequently at the end of each week
b. Feed consumption: At the end of each week
c. Feed conversion ratio: At the end of each week
d. Survivability: Recorded from mortality
e. Temperature: Daily at 3 times.
f. Dressing yield: At the end of experiment two broilers were slaughtered from each replication to estimate dressing yield.

3.11.1 Live weight gain

The average body weight gain of each replication was calculated by deducting initial body weight from the final body weight of the birds.

Body weight gain = Final weight – Initial weight.

3.11.2 Feed intake

Feed intake was calculated as the total feed consumption in a replication divided by number of birds in each replication.

$$\text{Feed Intake (g/bird)} = \frac{\text{Feed intake in a replicatio n}}{\text{No. of birds in a replicatio n}}$$

3.11.3 Feed conversion ratio

Feed conversion ratio (FCR) was calculated as the total feed consumption divided by weight gain in each replication.

$$\text{FCR} = \frac{\text{Feed intake (kg)}}{\text{Weight gain (kg)}}$$

3.11.4 Survivability

Survivability percentage was calculated as the total broilers survived divided by the number of starting birds multiplied by 100.

3.11.5 Dressing yield

Dressing yield is based on the relationship between the dressed carcass weight and live bird weight after things like the skin and internal organs have been removed. Dressing yield can be calculated by taking weight of the carcass divided by weight of live bird.

$$\text{Dressing yield} = \frac{\text{Weight of the carcass}}{\text{Weight of live bird}} \times 100$$

3.12 Records of dressing Yield

During dressing the following parameters were recorded-

i. Live weight
ii. Shank weight
iii. Humerous weight

iv. Thigh weight
v. Drumstic weight
vi. Wing weight
vii. Breast weight
viii. Abdominal fat weight
ix. Skin weight
x. Liver weight
xi. Heart weight
xii. Skin weight
xiii. Gizzard weight
xiv. Head weight
xv. Dressed weight

3.13 Statistical analysis

Data on different variables were subjected to analysis of variance (ANOVA) in a Completely Randomized Design (CRD) (Steel and Torrie, 1980). The significant differences between the treatment means were calculated by the Duncan's Multiple Range Test (DMRT). All analyses were performed by using MSTATC and SPSS Program.

CHAPTER IV

RESULTS AND DISCUSSION

This experiment was conducted to study the efficacy of growth promoter (panamin) had effect on body weight, Feed intake, Feed conversion, Survivability, Meat yield characteristics as a growth promoter in Ross-308 broiler. This experiment was held under the Department of Dairy and Poultry Science, Faculty of Veterinary and Animal Science, Hajee Mohammad Danesh Science and Technology University, Dinajpur.

4.1 Body weight

The initial (1st week) body weights in all treatments were similar (P>0.05). The data (Table 4.1) shows that growth promoter (panamin) had effect on body weight at 8-14 days of age (P<0.05). Highly significant differences (P<0.01) were found at 15-21 days, 22-28 days and 8-28 days of age on body weight of birds in different treatment groups. Table 4.1 Birds on T_1, T_2, and T_3 improved body weight by 0.28%, 1.85% and 7.03% than that of control groups (T_0) at 28 days of age. The data on body weight (Table 4.1) indicate that the growth promoter (panamin) in treatments (T_1, T_2, and T_3) improved body weight of broiler than that of control (T_0). The birds in Treatment-3 (3.0 ml panamin/litre water) improved 7.03% better live weight compared to control. The increased body weight of broilers on different growth promoter was reported by many workers *Dash et al.* (1992), *Leeson et al.* (1992) who observed significantly higher body weight by using growth promoter on broiler ration. But the results disagree with Eliwinger *et al.* (1998) who stated that broiler may be raised without growth promoters. The highest body weight gain in T_3 ($1157.00^a \pm 7.00$) and the lowest body weight gain in T_0 ($1081.67^c \pm 2.08$) at the age of 8-28 days.

4.2 Feed intake

The differences in feed intake were not significant (P>0.05) at 8-14 days of age. However significant differences(P<0.01), in feed intake were found at 15-21 days and 22-28 days of age in different treatment groups (Table 4.1). Highly significant differences(P<0.01) was found at 28th days of age among the different treatment. The

result demonstrates that during 08-28 days of age the birds feed intake is almost similar, where T_0 consumed more feed than T_2, T_1, and T_3. But this result disagreed with *Ahsan et al.* (2008) who stated that addition of antibiotic as feed additives improved feed intake in chickens. The highest feed consumption in T_0 ($1835.67^{a}\pm7.51$) and the lowest feed consumption in T_0 ($1806.33^{b}\pm2.31$) at the age of 8-28 days.

4.3 Feed conversion ratio

Effect of growth promoter (Panamin) on feed conversion is presented in Table 4.1. Feed conversion ratios did not differ significantly ($P>0.05$) at 22-28 days of age, but there were significant differences ($P<0.05$) in feed conversion among different levels of growth promoter (Panamin) at 8-14 days of age (Table 4.1).Highly significant differences($P<0.01$) in feed conversion found at 15-21 days and also 8-28 days of age. The results (Table 4.1) indicate that the most efficient utilization of feed was done by the birds in T_2 and T_3. Feed conversion ratio was increased at 4^{th} weeks of rearing period than 2^{nd} and 3^{rd} week. Improved feed conversion of broiler fed on diets with growth promoter coincide with the findings of Ahmad (2005) could not detect any difference in feed conversion ratio of broilers as compared to control and M.H Tabidi *et al.,* (2013 a) feed conversion ratio did not improved in different period in growth promoter supplemented group compared to control bird. The highest Feed conversion ratio in T_0 ($1.70^{a} \pm 0.02$) and the lowest Feed conversion ratio in T_0 ($1.59^{b} \pm 0.05$) at the age of 8-28 days.

4.4 Survivability

The survivability during the experimental period was 93, 97, 97 and 93 percent for T_0, T_1, T_2 and T_3 groups respectively. No significant differences ($P>0.05$) was observed in livability among different treatment group, during the study experimental Period. Table 4.1 indicates that, The survivability did not vary significantly ($P>0.05$) among different treatment groups during the experimental period, in present study 93.33% survivability was found in T_3 (3.0 ml Panamin/litre of water), it was disagreed with the report of Palic *et al.* (1998) who reported that Flavomycin showed superior performance in survivability.

Table 4.1 Performance of broiler on different levels of growth promoter (panamin) of different ages

Parameters	Age in days	Dietary treatment groups				level of significance
		T_0	T_1	T_2	T_3	
Body weight (g/bird)	Initial	147.97	147.23	147.58	147.45	NS
Body weight gain (g/bird)	8-14	$210.33^{b}\pm2.89$	$217.67^{ab}\pm4.16$	$219.00^{a}\pm6.56$	$224.67^{a}\pm1.15$	*
	15-21	$366.00^{c}\pm3.46$	$366.67^{c}\pm4.04$	$376.33^{b}\pm6.51$	$393.67^{a}\pm1.53$	**
	22-28	$505.33^{b}\pm3.51$	$505.33^{b}\pm4.36$	$506.33^{b}\pm5.69$	$538.67^{a}\pm7.02$	**
	8-28	$1081.67^{c}\pm2.08$	$1084.67^{c}\pm6.43$	$1101.67^{b}\pm6.43$	$1157.00^{a}\pm7.00$	**
Feed Consumption (gm/bird)	8-14	346.67±4.62	342.00±15.72	334.00±5.57	354.67±2.31	NS
	15-21	$647.00^{b}\pm7.00$	$652.67^{b}\pm2.31$	$662.67^{a}\pm2.31$	$645.67^{b}\pm4.93$	**
	22-28	$842.00^{a}\pm4.58$	$832^{b}\pm8.54$	$809.67^{c}\pm2.08$	$834^{ab}\pm2.00$	**
	8-28	1835.67±7.51	1826.67±2.08	1806.33±2.31	1834.33±4.93	**
Feed Conversion ratio (g/bird)	8-14	$1.65^{a}\pm0.03$	$1.57^{b}\pm0.03$	$1.53^{b}\pm0.05$	$1.58^{b}\pm0.01$	*
	15-21	$1.76^{a}\pm0.06$	$1.78^{a}\pm0.03$	$1.76^{a}\pm0.02$	$1.64^{b}\pm0.03$	**
	22-28	1..67±0.06	1.66±0.06	1.60±0.06	1.55±0.05	NS
	8-28	$1.70^{a}\pm0.02$	$1.68^{ab}\pm0.03$	$1.64^{ab}\pm0.02$	$1.59^{b}\pm0.05$	**
Livability	8-28	93.33±2.89	96.67±1.53	96.67±1.53	93.33±2.89	NS

^{abc} figures in the superscripts with similar alphabet did not differs significantly ** (P<0.01) * (P<0.05); NS (Non-significant)

Where, T_0=Control group, T_1= 1.0 ml panamin/litre of water, T_2= 2.0 m1 panamin/ litre of water, T_3 = 3.0 ml panamin/ litre of water

4.5 Meat yield characteristics

The meat yield characteristics are shown in Table 4.2.This study showed that that there was no significant (P>0.05) differences bewteen the weight of heart and liver. This study demonstrated significant difference (P<0.01) in dressing yield. The highest dressing yield (63.12%) was found in treatment T_1 follwed by T_3, T_2 and lowest value (60.20%) was found in T_0. Abdominal fat content of broiler significantly (P<0.01) decrased by supplementation of growth promoter (panamin)on the ration. Among the different treatments amount of abdominal fat lowest in T_3 (1.41%) followed by T_2 (1.73), T_0 (1.89) and T_1 (1.93) respectively. The study demonstrated significnat difference (P<0.01) between gizzard weight. The highest gizzard weight was found in T_0 and lowest in T_3. T_3 (3.0 ml Panamin/ litre of water) improved dressing yield. The increased dressing yield on T_3 may possibly be explained by increasing live weight. However, the results are agreed with the findings of reported that edible meat yield as a percentage of body weight increased due to adding growth. In T_3 (3.0 ml Panamin/litre of water) breast meat yield was also greater than control. This result agreed with the findings of Kidd *et al*. (2004) found that high-density amino acid in diets throughout life optimized breast meat yield. Abdominal fat percentage is lower in T_3 (3.0 ml Panamin/litre of water) than control. This result is similar with Kidd *et al*. (2004) found abdominal fat and in addition to some carcass parameters were lowered as dietary amino acid density increased.

Table 4.2 Meat yield characteristics of different treatments groups

Parameters	Different treatments				Level of significance
	T_0	T_1	T_2	T_3	
Dressing weight (%)	$60.20^{b}\pm2.20$	$63.12^{a}\pm1.12$	$63.34^{ab}\pm1.34$	$62.56^{ab}\pm1.20$	**
Liver weight(%)	2.63±0.20	2.46±0.46	2.93±0.03	3.09±0.09	NS
Gizzard weight(%)	$2.95^{a}\pm0.05$	$2.75^{b}\pm0.05$	$2.76^{b}\pm0.20$	$2.40^{c}\pm0.20$	**
Heart weight(%)	0.64±0.10	0.63±0.03	0.67±0.02	0.58±0.10	NS
Abdominal fat weight (%)	$1.89^{a}\pm1.10$	$1.93^{a}\pm0.10$	$1.73^{b}\pm0.03$	$1.41^{c}\pm0.10$	**

^{abc} Figures in superscript with similar alphabet did not differ significantly (P<0.01); NS (Non-significant), (p>0.05)**

CHAPTER V

SUMIVIARY AND CONCLUSION

An experiment was carried out with Ross-308 broiler at poultry shed of Hajee Mohammad Danesh Science & Technology University, Dinajpur for a period 4 weeks to study the performance on different feeding level of growth promoter (panamin) in broilers. The birds were assigned to four (4) treatments T_0 (control), T_1 (1.0 ml panamin/litre of water), T_2 (2.0 ml panamin/litre of water) and T_3 (3.0 ml panamin/litre of water) having 3 replications each, the number of birds in each replication was 10 (ten). Feed was supplied *ad-libitum* and fresh drinking water was available all the times. Body weight, feed intake, feed conversion ratio, livability meat yields, dressing percentage, internal organ weight and fat content of broilers on different treatments were recorded. The live weight among different feeding level of growth promoter (panamin) were highly significant ($P<0.01$) at 15-21, 22-28 and 8-28 days of age, the body weight of broilers at T_0 (control), T_1, T_2 and T_3 treatment groups were 1081.00gm, 11084.67gm, 1101.67gm and 1157.00gm respectively. Live weight was increased significantly ($P<0.01$) on T_3 (3.0 ml panamin/litre of water) compared to control. Feed consumption was not significantly different ($P>0.05$) among the different treatments during the age of 8-14 days but highly significant differences was found ($P<0.01$) at the age 15-21 days, 22-28 days and 8-28 days. However, total feed consumption on T_0 (control), T_1, T_2 and T_3 were 1835.67 gm, 1826.67gm, 1806.33gm and 1834.34 gm respectively at 8-28 days of age (Table 4.1). A significant difference ($P<0.01$) was found in feed conversion among birds fed on different levels of growth promoter (panamin) at 15-21 days and 8-28 days of age. Feed conversion ratios during 8-28 days of age was 1.70, 1.68, 1.64 and 1.59 in T_0, T_1, T_2 and T_3 groups respectively. Survivability was almost similar in all dietary treatments ($p>0.01$). In this experiment, highest survivability (96.67%) was observed in T_1, T_2 group at 1.0 ml growth promoter (Panamin) and 2.0 ml growth promoter (Panamin) per litre in comparison to others groups. Survivability was 93.33% in T_0 and T_3 group. Dressing weight (%), gizzard weight (%) and abdominal fat weight (%) were highly significant ($P<0.01$) in different treatment and non-significant different ($P>0.05$) found in liver weight (%) and Heart weight (%). It may be concluded

from the study that addition of growth promoter (panamin) may be beneficial. The most economic and efficient level of growth promoter (panamin) was found to be 3.0 ml of panamin/litre of water followed by the other levels, although fat content was slightly changed and abdominal fat proportion decreased. However, farmers should be careful during using growth promoter (panamin) in broilers and these should be withdrawn from the diet before 1 (one) week earlier of marketing to avoid some adverse effect on human health.

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