Sudan University of Science and Technology

College of Graduate Studies

Comparative Study Effect of Biotronic as Natural Acidifier with Antibiotic on Broiler Performance Values

أثر دراسه البايوترونيك كحامض عضوى طبيعى بالمقارنه مع المضاد الحيوى على اداء الدجاج اللاحم

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بسم الله الرحمن الرحيم

الاية

قَالَ تَعَالَىٰ:

﴿ قَالُوا۟ سُبْحَٰنَكَ لَا عِلْمَ لَنَآ إِلَّا مَا عَلَّمْتَنَآ صلے

إِنَّكَ أَنتَ ٱلْعَلِيمُ ٱلْحَكِيمُ ﴿٣٢﴾ ﴾

البقرة: ٣٢

Dedication

My respectful parents, who teach me meaning of love and who devoted their life to knowledge and wisdom. There will never be another like you

My beloved husband Mohammed Alnour, who is sharing me the dreams of success

My sweet heart "Ahmed & abd Allah"

All my friends in Sudan University of Science and Technology and out Sudan University

Acknowledgment

Firstly I would like to thank ALMIGHTY ALLAH for giving patience and health to complete this work.

I am greatly indebted to my supervisor DR.PROF Mohammed Hassan Tabidi for this constructive guidance, support and encouragement all throughout this study.

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Last, but no least; my ultimate thanks to my family for the support they provided me through my entire life and for their sincere encouragement to pursue my academic interests and fulfil my dreams.

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ABSTRACT

The experiment was conducted to investigate the effect of feeding biotronic powder (organic acid combination) on the performance and serum chemistry of broiler chicks. Five experimental diets were designed as A, B, C, D and E. A served as control group, was fed a diet without any supplementation, treatment B was supplemented with antibiotic (Flavomycin) 17mg/Kg feed , and treatment C, D and E basal diet was supplement with acidifier as growth promoters at a level of 0.2%,0.3% and 0.4% respectively. 105 broiler chicks, 7 days old were randomly distributed into 5 treatments, each treatment with 3 replicates and each replicate with 7 chicks. Average weight gain, feed consumption, feed conversion ratio, mortality rate, addressing percentage, non carcass components (heart, gizzard and liver) and chemical analysis of blood serum parameters. Economics for each group was calculated at the end of the experimental period. Results showed no significant different between groups in performance parameters, addressing percentage, non carcass components and chemical analysis of blood serum. Result obtained showed improvement of the general performance of broiler chicks and mortality rate. Abdominal fat heaviest in treatment D with level 0.3% biotronic. Diet containing biotronic decrease the total uric acid.

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ملخص البحث

اجريت هذه التجربه لمعرفة اثر اضاقة بودرة منتج البايوتررتيك على (توليفة احماض) الى عليقة كتاكيت اللاحم وتاثيره علي الاداء العام ،وكيمياء الدم فى خمس معاملات وهى أ،ب،ج،د،ه .أ هى المجموعه القياسيه بدون اضافة ،ب مضافا لها مضاد حيوى (فلافومايسين) بمعدل 17 ملجرام لكل كجرام علف ،ج،د،ه مضاف لها منتج البايوتررتيك 0.2%،0.3%،0.4% على التوالى . استخدمت فى هذه التجربه 105 كتكوت لاحم عمر 7 ايام حيث وزعت عشوائيا على خمس معاملات كل معامله لها ثلاث مكررات لكل مكرر 7 طيور وذلك لجمع البيانات عن العليقه المستهلكه معامل التحويل الغذائى والوزن المكتسب ، ومعدل النفوق ونسبة التصافى وايضا اوزان الاجزاء الداخليه.(الكبد،القلب.القانصه).حيث اوضحت النتائج انه لاتوجد هنالك فروقات معنويه على مختلف المعاملات فى مقاييس الاداء ونسبة التصافى والاجزاء الداخليه وايضا التحليل الكيميائى لمصل الدم واظهرت النتائج تحسين فى الاداء العام للدجاج اللاحم وفى نسبة النفوق .

CHAPTER ONE

INTRODUCTION

The poultry industry has developed in several areas such as nutrition generics management and food safety to maximize the efficiency of growth performance and meat yield. However now day, the poultry industry has focus more attention towards addressing public concern for environmental. Animals including poultry are vulnerable to potentially pathogenic microorganisms such as Escherichia coli, Salmonella spp,Clostridium petrningens and campylobacter sputroum.Pathogenic microbial flora in the small intestine compete with the host for nutrients and also reduce the digestion of fat and fat-soluble vitamins due to the deconjaugating effect of bile acids (**Engberg *et al* .,2000**).The feed additives are products used in animal nutrition for purposes of improving the qualities of feed from animal origin or to improve the animal's performance and health. The initial use of antibiotic in diets arose from discovery in the late 1940s; in the united state that including the fermentation products of streptomyces aureofaciens (a strain of bacteria) in the diets of simple stomached animals such as poultry resulted in growth responses (**Frost,1991**). It is important to make a distinction between antibiotics used in the treatment and prevention of disease in farm animals (prescribed therapeutic and prophylactic use) which differs from their use as feed additives to enhance growth **(Castanon,2007**). In the next 50 years, the use of antibiotic as feed additives in poultry production became virtually universal. However, the possibility of developing resistant population of bacteria and the side effects of using antibiotics as growth promoters in farm animals have been led to European union and United state ban on the use of antibiotics on farm animals as growth and health promoters. This will have avoidable consequences performance of birds in the poultry industry. Hence ,an intensive search for

alternatives such as probiotics ,prebiotics ,symbiotics ,enzymes ,toxin binders, organic acid, organic minerals, oligosaccharides and other feed additives has started in the last decade (**Fulton *et al*.,2002**).However, acidification with various weak organic acids to diets such as formic,fumaric,propionic,lactic acid and sorbic have been reported to decrease colonization of pathogen and production of toxic metabolites, improve digestibility of protein and of Ca,P,Mg and Zn serve as substrates in the intermediary metabolism (**kirchgessner and Roth 1988**).Several studies demonstrated that the supplementation of organic acid or probiotic to broiler diets increased the growth performance reduced disease and management problems(**Vlademirova and Sourdjiyska ,1996.Jin *et al* 1998.Voget *et al* ,1981.Runho *et al*,1997**). Effect of acid blend in biotronic products highly undissociated acids will have an antimicrobial to effect in the feed and in the intensive of the animal. Acids which are nearly fully dissociated are effective in reducing the PH in the feed or in the stomach and gut. The well balance acids of biotronic maintain' the PH of the small intestine at an optimum, therefore inhibiting the growth of pathogenic bacteria and promoting the beneficial gut microflora. Biotronic products are generally improving the microbial balance in the gastrointestinal tract, which is often seen as an improvement of the lactobacilli/E.coli ratio **(WWW.etoukfarda.com,2013**).

Objectives behind this research:-

- Study of Biotronic as acidifier in compare with flavomicyn on performance values (Body weight, feed intake, and feed conversion ratio and mortality rate)
- Serum chemistry.

CHAPTER TWO
LITERATURE REVIEW

2-1 Back ground of growth promoters:

The growth promoter effect of antibiotics was discovered in the 1940s, when it was observed that animals fed dried mycelia of Streptomyces aureofaciens containing chlortetracycline residues improved their growth. The mechanism of action of antibiotics as growth promoters is related to interactions with intestinal microbial population **(Dibner and Richards, 2005; Niewold, 2007**). The United States Food and Drug Administration approved the use of antibiotics as animal additives without veterinary prescription in 1951 **(Jones and Ricke, 2003**). Also in the 1950s and 1960s, each European state approved its own national regulations about the use of antibiotics in animal feeds. Growth promoters are chemical and biological substances which are added way is competition for nutritious substances (**Patterson and Brukholder, 2003**) to livestock food with the aim to improve the growth of chickens in fattening, improve the utilization of food and in this way realize better production and financial results. Their mechanism of action varies. Positive effect can be expressed through better appetite, improved feed conversion, stimulation of the immune system and increased vitality, regulation of the intestinal microflora, etc. In any case, expected results of the use of these additives are increased financial effects of production.Because of the fact that growth promoters have different mechanisms of action, it necessary to present every group individually and present the effect which can be expected with their utilization **(L.pericl *et al* 2009**).

2-2 Antibiotic use in broiler feeds benefit and disadvantage:-

Antibiotics are substances produces by some species of bacteria and fungi that have the ability to kill or inhibit the growth bacteria, or microorganisms are minute her ability to counter the growth of other microorganisms **(Tabidi *et al*, 2013**). Antibiotic feed additives as growth promoters have long been supplemented to poultry feed to stabilize the intestinal microbial flora and improve the general performances and prevent some specific intestinal pathologies (**Truscott and Al-Sheikhly, 1977 Miles *et al*., 1984; Waldroup *et al*., 1985).**However, the antibiotic growth promoters have been under scrutiny for many years and have been removed from the market in many countries **(Ratcliff, 2000**). Their usefulness has seldom been contested, it is their relatedness with similar antibiotics used in human medicine and the possibility that their use may contribute to the pool of antibiotic resistant bacteria that causes concerns **(Philips, 1999**).In light of that situation, the feed manufacturers and the animal growers have been actively looking to an efficacious alternative to antibiotic growth and organic acids.Probiotics and organic acids are the most promising alternative to antibiotics (**Green and Sainsbury,2001**).

2-**3 Probiotics use in broiler feeds**:

Probotics are individual microorganisms or groups of microorganisms which have favourable effect on host by improving the characteristics of intestinal microflora (**Fuller, 1989).** Certain species of bacteria, fungi and yeasts belong to group of probiotics. Existing probiotics can be classified into colonizing species(Lactobacillus sp., Enterococcus sp. and Streptococcus sp.) and free, no colonizing species (Bacillus and Saccharomyces cerevisiae) **(Žikić *et al*., 2006**). Probiotics display several ways of action: antagonistic action towards pathogen bacteria by secretion of products which inhibit their development,

such as bacteriocins, organic acids and hydrogen peroxide; the other way is competitive exclusion which represents competition for locations to adhere to the intestinal mucous membranes and in this way pathogen micro-organisms are prevented from inhabiting the digestive tract, and the third of pathogen bacteria **(Line *et al*, 1998**). Their effect on production results reflects in reduction of risk of diseases **(Line *et al*., 1998; Mountozouris *et al*., 2007**), they improve the function of the immune system (**Zulkifli *et al*., 2000; Kabir *et al*., 2004**) and exhibit significant influence on morpho functional characteristics of intestines **(Uśćebrka *et al*., 2005; Yang *et al*., 2009**). These effects lead to growth of broiler chickens (**Jin *et al*., 1997; Li *et al*., 2008**), improvement of feed conversion **(Li *et al*., 2008; Zulkifli *et al*., 2000; Kabir *et al*, 2004**) and reduced mortality (Mohan et al., 1996). On the other hand, no positive results could be established in application of probiotic preparations in fattening of broilers in studies by certain number of researchers **(Maiolino *et al*., 1992; Mountozouris *et al*., 2007**). Wishing to explain in a scientific way inconsistent results which they obtained in their studies, majority of authors concluded that the effect of probiotics depended on the combination of bacterial strains contained in the probiotic preparation, level of its inclusion in the mixture, composition of mixture, quality of chickens and conditions of the environment in the production facility **(Jin *et al*., 1997; Patterson and Brukholder, 2003**).

2-4 prebiotic use in broiler feeds:

Prebiotics are defined as non-digestible food components/ingredients which have positive effect on host in their selective growth and/or activation of certain number of bacterial strains present in intestines **(Gibson and Roberfroid, 1995**).The most significant compounds which belong to group of probiotics are oligosaccharides: fructo-oligosaccharides (FOS), gluco-oligosaccharides(GOS) and mannan-oligosaccharides (MOS). Their advantage compared to probiotics is that they promote growth of useful bacteria which are already present in the

host organism and are adapted to all conditions of the environment **(Yang *et al.*, 2009**). Favourable effects of addition of probiotics reflect in presence of antagonism towards pathogens, competition with pathogens, promotion of enzyme reaction, reduction of ammonia and phenol products and increase of resistance to colonization. Similar to probiotics, results of the effects on broiler performance are contradictory; in analysis of the effects of implementation of FOS on broiler performances it was established that improvement of gain was by 5-8%, and improvement of feed conversion by 2-6% **(Li *et al.*, 2008; Yang *et al.*, 2009)**.

2-5 Synbiotic use in broiler feeds:

This is relatively recent term among additives used in poultry nutrition. Synbiotics are combination primarily of probiotics and prebiotics, as well as other promoting substances which together exhibit joint effect in regard to health of digestive tract, digestibility and performances of broilers. Investigations showed that combinations used in synbiotics are often more efficient in relation to individual additives (**Uščebrka *et al.*, 2005; Li *et al.*, 2008**).

2-6 Enzymes use in broiler feeds:

Supplementation of mixtures for broiler with enzymes is applied in order to increase the efficiency of production of poultry meat. This is especially interesting if enzymes which enable utilization of feeds of poorer nutritive value are used. Numerous authors have established that by application of enzymes production performances can be improved by even 10% **(Cowieson *et al.*, 2000, Cmiljanić *et al.*, 2001**), whereas in some studies no positive effect has been reported (**McNab and Bernard, 1997; Perić *et al.*, 2002**). It is obvious that the positive effect of application of these additives depends on the quantity and quality of feeds included in the mixture, used level and type of enzyme, as well as fattening conditions (**Acamovic, 2001; Lukić *et al.*, 2002**).

Obtained results in some researches indicate that better effect is realized with utilization of two or more enzymes in food **(Silversides and Bedford, 1999; Chesson 2001**). Therefore, new enzyme combinations are constantly analyzed, as well as their optimum doses, in order to realize positive financial effect through improved utilization of feed.

2-7-1 Organic Acids:

2-7-1--1 Acidifier use in broiler feeds:

Acidifiers have been used in poultry nutrition for long time, in different forms and combinations which are constantly changing. Organic acids reduce pH value of food and in this way act as conserving agents and prevent microbiological/microbial contamination of food, and this effect is exhibited also in digestive tract of poultry **(Eidelsburger and Kirchgessner, 1994)**. Addition of dietary organic acids (citric, acetic, and lactic acid) improved the live body weight and body weight gain of broilers as compared to those of un-supplemented diet (**Abdel-fattah et *al*, 2008**).

2-7-2 Biotronic use in broiler feeds:

Biotronic is the acidifier product line of Biomin.The biotronic series includes products with the main activity in the fields of preservation and decontamination of grain and feed, improvement of digestibility and inhibition of microbial growth. The products differ through the selection of acids (Formic acid 2, 21% and Propionic acid 5,2%),salts, specific extracts and organic and inorganic carriers. The carriers are of physiological importance for the animal and are separated in inorganic (silica and phyllosilica) and organic (periodic oligosaccharides) carriers **(WWW.etoukfarda.com.2013**).

2-7-3 Effect of acid blends in biotronic:

Highly undissociated acids will have an antimicrobial effect in the feed and in the intestine of the animal. Acids which are nearly fully dissociated are effective in reducing the PH in the feed or in the stomach and gut. The well balanced acids of Biotronic maintain the PH of the small intestine at an optimum; therefore inhibiting the growth of pathogenic bacteria and promoting the beneficial gut microflora.Biotronic are generally improving the microbial balance in the gastrointestinal tract, which is often seen as an improvement of the Lactobacilli/E coli ratio (WWW.etoukfarda.com.2013).

2-7-4 Effect of acids in biotronic:

Chemical effect Decreasing PH –value in feed, stomach and intestine,

Microbial effect controlling the growth of harmful bacteria and promoting the benefical bacterial flora (lactobacilli) and Physiological effect increasing digestibility and improving metabolism(**WWW.etoukfarda.com**).

CHAPTER THREE

MATERIALS AND METHODS

3-1 site of Experiment:

This study was conducted at the poultry department of Animal Production College of Agricultural Studies, Sudan University of Science and Technology, during the period from (9 February – 23 March 2015). The ambient temperature range between 25 to38c (**Appendix 1**).

3-2-Experimental Chicks:

A total number of 105 chicks on 7 days old, unsexed broiler chicks of Aberacar strain were purchased from alocal commercial hatchery (Meico) .At the end of adaptation period, all chicks were weighed with an average initial weight of 100g.The chicks were then assigned randomly into five dietary treatment groups (A, B, C, D and E) in complete randomized design (CRD), each group was divided into 3 replicaters ,each of 7 chicks .Ground brooding rearing system was adopted for 6 weeks experimental period.

3-2-1 Vaccination program:

The chicks were vaccinated against infectious Bronchitis (IB) and Newcastle disease (ND) at 7 days of age and given multi –vitamin to chicks before vaccination to guard against stress. At 14 days they were vaccinated against Newcastle disease and infectious Bursal disease (IBD) Gumboro through drinking water. The dosage was then repeated at 21 and 28 days of age for Newcastle disease and Gumboro respectively.

3-3 Housing:

An open wire mesh-side poultry house was used. The house was constructed on concrete floor with metal sheets roof and solid brick western-easter wall up to 3 meters the eaves and 4-5 meters for apex.20 pens,1m2 each, inside the house, were prepared using wire mesh partitioning .Each pen was equipped with one feeder and drinker to allow ad libitum consumption of feed and water. Light was provided approximately 24 hours in a form of natural light during the day and artificial light during the night.Fiber bulbs (100watt) were use for this purpose. The house was cleaned and well disinfected with formalin of phenol solution before the commencement of the experiment.

3-4 Experimental Ratios:

The chicks were fed a commercial broiler pre-starter for week. Biotronic (Acidifier, Organic acids) was used in this experiment was purchased from Khartoum, Hader company .The chicks were fed on dietary treatment .The first group A fed on basal diet (negative control)without growth promoters. The second group B fed on basal diet containing an antibiotic (Flavomycin 17 mg\kg)as chemical growth promoter (positive control).The other group C,Dand E were fed on the basal diet with acidifier as growth promoter, at levels o.2,0.3 and 0.4%respectively. The basal Diet was formulated to meet the nutrients requirements of broiler chicks according to the (**NRC**, **1994**).The ingredients percent composition of the experimental diet were presented in Table (1).Experimental diets were fed for 6 weeks.

3-5 Data collected:

3-5-1 Performance data:

Performance value of experiment average body weight gain (Bw) the equation final body weight -initial weight, Feed Intake (gm) for eash group was determined weekly through the experimental period, Feed conversion ratio

(FCR)=(Feed Intake /Weight gain) .Health of the experimental stock and mortalities were closely observed and recoded daily Mortality Rate=Number of Mortality /Total Number *100.

3-5-2 slaughtering procedure:

At the end of the experiment 10 chicks were selected randomly from each group and weighed individually after an overnight fasting with only water allowed, then they were slaughtered by severing the right and left carotid and jugular vessels, trachea and esophagus .After bleeding they were scalded in hot water, hand-plucked and washed .The head was removed closed to skull, feet and shanks were removed at the hock joint.

Evisceration was accomplished by posterior ventral cut to completely remove the visceral organs. The hot carcass were weighed for calculation the dressing percentage. The legs were separated from cash carcass then they were deboned, the meat was frozen and stored for sensory evaluation.

3-5-3 Panel Test:

The stored right side of carcasses was slightly seasoned wrapped individually in aluminium foil and roasted at 190 C^o for 40 minutes with average internal temperature of 88$C^o$and served warm. Well trained panel test were used to score colour, flavour, tenderness and juiciness of meat **(Cross *et.al* 1978)** on scale of 1-8 (Appendix 2). The roasted samples were served randomly to each judge at room temperature. Water was provided to the panellist to rinse their mouth after tasting each sample.

3-6 Chemical analysis:

Experimental diets were analyzed according to AOAC(1975) Table (2), the separated serum from the collected blood samples also analyzed .

3-7CalculationS:

The_hot carcasses_were weighed for calculation the dressing percentage expressed as a percentage of live weight .Non carcasses components(heart,liver,head,abdominal fat and gizzard) also were weighed.

3-8 Experimental Design and statistical Data Analysis:

The data obtained were statistically analyzed with the standard procedure of analyses of variance (ANOVA) using completely randomized design. Significant differences between treatment means were separated using the Duncan's multiple range test with 5% probability **(Duncan, 1955).**

Table 1. The ingredients percent composition of experimental diets:

Ingredients%	A	B	C	D	E
Dura	64,14	64,14	64,14	64,14	64,14
Groundnut cake	14	14	14	14	14
Sesame cake	15	15	15	15	15
Concentrate	5	5	5	5	
Ouster shell	,487	,487	,487	,487	,487
Dicalcium Phosphate	,618	,618	,618	,618	,618
Salt	,25	,25	,25	,25	,25
Methionine	,159	,159	,159	,159	,159
Lysine	,344	,344	,344	,344	,344
Total	100	100	100	100	100

Broiler concentrate * : Crude protein 35% , crude fat 2.5%, crude fiber 3% ,lysine 11 %, methionin 4.20 %, meth + cytine 4.50 % , calcium 6.50 % ,phosphorus 6.50% , the Additive Antioxidant,Phytase,Mouldinhibitor and Salinomycin 1200mg/Kg, ** Vitamins and minerals : Supplements per Kg product : V. A 300,000 IU , V. D3 100,000 IU ,V.E 4.00 ppm, V.K 98 ppm ,V.B2 1.320 ppm , V. B 12 4.0 ppm ,pantothenate 2.0 ppm ,Niacin 20.0 ppm ,Folic acid 100 ppm, Coline 50.0 ppm ,Copper15.0 ppm ,Iodine 250 ppm ,Selenium 50 ppm,Manganese 24 ppm ,Zinc 20 ppm ,Iron 10 ppm ,Coccide 25 ppm , Antioxidant b125 ppm

Table (2):Calculated chemical analysis of experimental diets:

Diets					
Components	A	B	C	D	E
Dry matter	94.85	94.85	94.85	94.85	94.85
Crude protein	22.70	22.70	22.70	22.70	22.70
Crude fiber	04.35	04.35	04.35	04.35	04.35
Ether Extract	03.35	03.35	03.35	03.35	03.35
Ash	04.65	04.65	04.65	04.65	04.65
Nitrogen Free Extract	59.80	59.80	59.80	59.80	59.80
Calcium	01.06	01.06	01.06	01.06	01.06
Total Phosphorus	00.79	00.79	0079	00.79	00.79
Available Phosphorous	00.50	00.50	00.50	00.50	00.50
ME.cal/Kg	3117	3117	3117	3117	3117

*Calculated according to Lodhi (1976).

CHAPTER FOUR

RESULTS

4-1-Response of broiler chicks to dietary biotronic:

4-1-1 Performance:

Results obtained showed no significant ($p \geq 0.05$) difference in the performance (final body weight, body weight gain and feed intake) of broiler chicks fed on diets supplemented with antibiotic(Flavomycin) and those fed on diets supplemented with graded levels of Biotronic (Table 2). Data obtained for body weight gain showed that the chick fed on diet containing 0.3% biotronic showed numerically higher body weight followed by group 0.4%, 0.2% respectivley fed by biotronic compared to group antibiotic flavomycin, while the control group showed numerically the lowest value in the body weight gain Results also revealed that chicks fed on diet supplemented with antibiotic consumed numerically more feed followed by group fed biotronic 0. 2%, 0.4% and 0. 3% respectively ,while chicks on control diet consumed the lowest value of feed. However the higher feed consumption for the antibiotic group did not caused proportionate increase in the body weight gain, there for result in lower efficiency of feed utilization. However, there is no significant difference for feed conversion ratio (FCR) between experiment groups.

4-1-2 Values of non carcass components and dressing percentage:

Value of non carcass components (Liver, head, heart, leg and gizzard) and addressing percent of experimental chicks showed no significant ($P \geq 0.05$) different (Table 3).But the abdominal fat result showed that broiler chicks fed on diets containing Biotronic 0. 3% recorded significantly ($P \leq 0.05$) the heaviest weight compared to other tested groups, however Biotronic 0.2% and flavomycin recorded the lowest value for abdominal fat.

4-1-3 Panel Test:

The subjective meat values attributes of tested groups (Table4) showed no significant different ($P \geq 0.05$) between groups, scores given for all attributes were above moderate acceptability level.

4-1-4 Chemical Analysis of Serum:

The effect of feeding on diets containing Biotronic and antibiotic on blood serum were showed in (Table 5) there was no significant difference ($P \geq 0.05$) between control and chicks fed on diets supplemented with antibiotic in all parameters ,but there was asignificant ($P \leq 0.05$) between them and chicks fed on diets containing Biotronic while decrease the total uric acid.

4-1-5 Mortality:

In the whole total experiment period no mortality case recorded.

4-1-6 Economical Appraisal:

The economic calculation for broiler chicks fed on experimental diets were shown in (Table 6) chicks purchase and feed cost values were the main inputs considered, while the total selling value of meat is the total revenue. All chicks fed on diets containing biotronic recorded profit compared to control group.

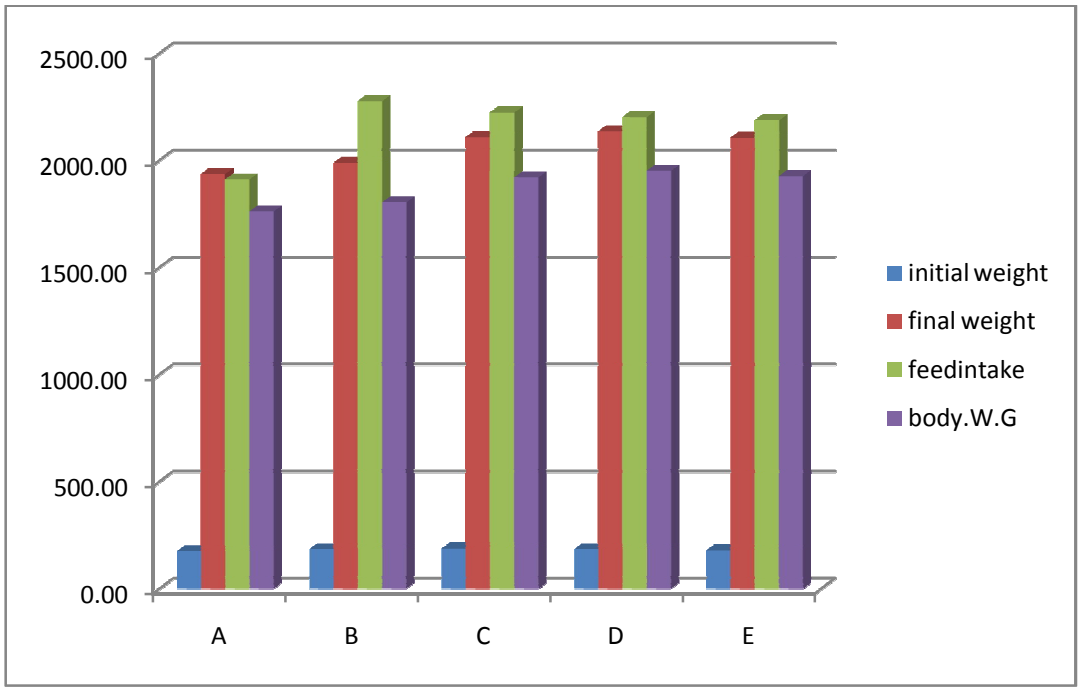
Chicks fed on diet containing 0.3% biotronic recorded the highest profit followed by chicks fed on diets contain 0.4% and 0.2% respectively compared to other tested groups, chicks fed on antibiotic diet recorded the lowest profit.

Table (3): The performance of broiler chicks fed diet containing Biotronic:

Parameter	control	Flavomycin	B 0.2%	B 0.3%	B 0.4%	SE+
Initial weight g/b	175.2	184	188	184	179.5	2.31
Final l body weight g/b	1937.6	1989.2	2109.2	2136.4	2106.7	31.7
Body weight gain g/b	1762.37	1805.23	1921.23	1952.40	1927.17	30.93
Feed intake g/b	1911.63	2277	2224.70	2202.33	2188.63	71.30
F.C.R(g.feed/gmeat)	1.09	1.26	1.15	1.13	1.13	o.o3
Mortality Rate	0	0	0	0	0	0

B=Biotronic

FCR=feed Conversion Ratio



Fig(1): The performance of broiler chicks on diet containing Biotronic

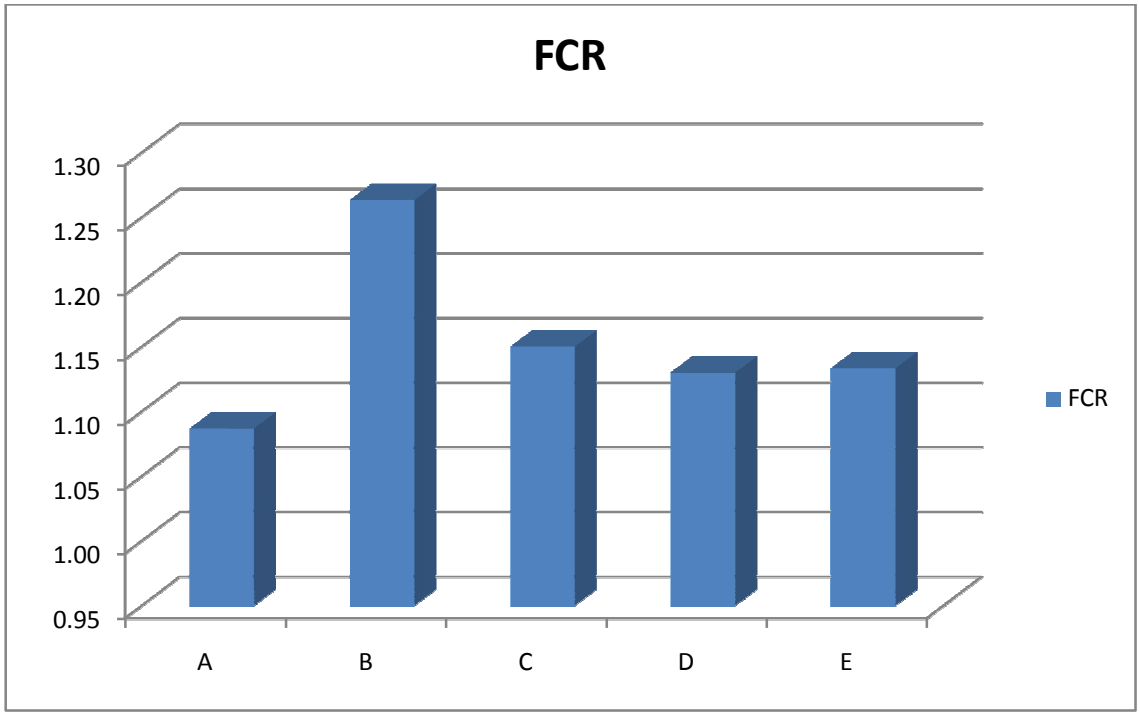
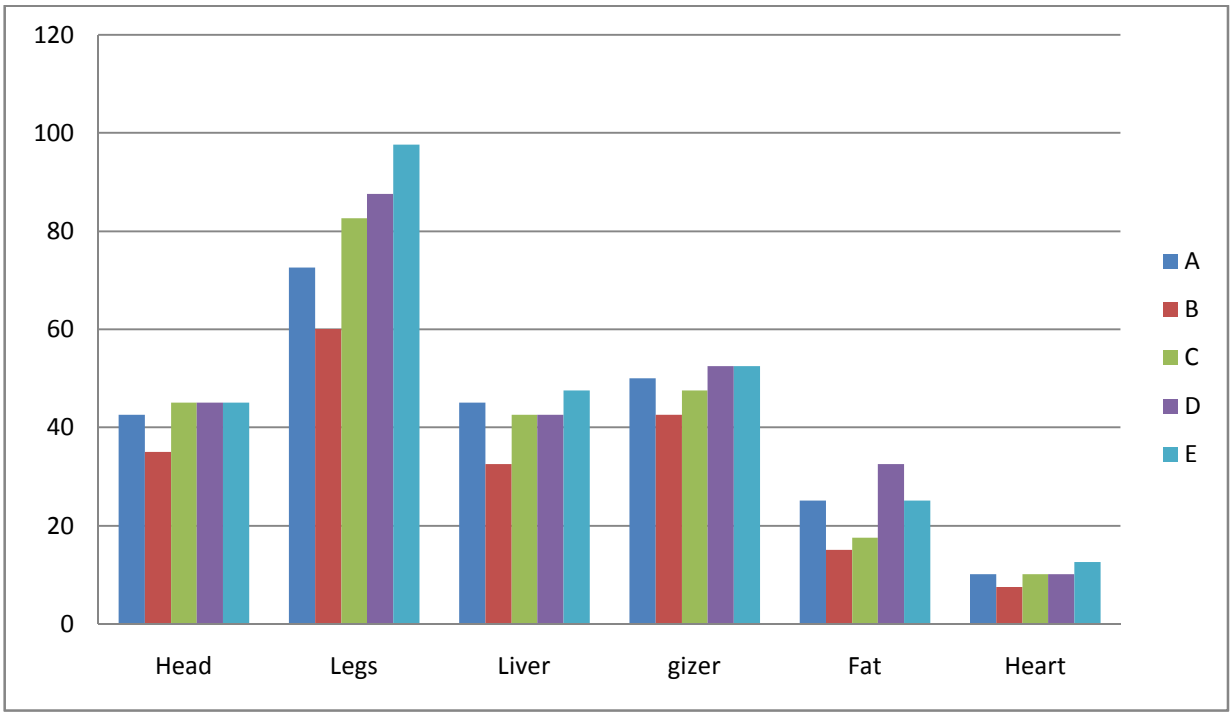


Fig (2) The FCR of broiler chicks feed on diets containing Biotronic.

Table (4) : Effect of feeding broiler chicks fed containing Biotronic on non carcass components as% of hot carcass:

Parameter	Control	Flavomycin	B2%	B3%	B4%	SE+
Hot dressing %	74.5	74	71.9	75	74.05	0
Head	42.5^{a}	35^{a}	45^{a}	45^{a}	45^{a}	.292Ns
Legs	72.5^{a}	60^{a}	82.5^{a}	87.5^{a}	97.5^{a}	.267Ns
Liver	45^{a}	32.5^{a}	42.5^{a}	42.5^{a}	47.5^{a}	.714Ns
Gizzard	50^{a}	42.5^{a}	47.5^{a}	52.5^{a}	52.5^{a}	.639Ns
Abdominal fat	25^{ab}	15^{b}	17.5^{b}	32.5^{a}	25^{ab}	.033*
Heart	10^{a}	7.5^{a}	10^{a}	10^{a}	12.5^{a}	.396Ns



fig(3) Effect of feeding broiler chicks on diets containing Biotronic on non carcass component as % of hot carcass weight.

Table (5): Effect of feeding broiler chicks on diets containing Biotronic on subjective meat attribute:

Parameter	Control	flavomycin	B2%	B3%	B4%	SE+
Tenderness	5.7	5.9	5.8	6.6	6.3	Ns
Flavor	6	6.3	5.8	5.9	6.1	Ns
Color	5.6	6.1	5.5	5.8	6.6	Ns
Juiciness	5.9	5.3	5.2	5.4	6.2	Ns

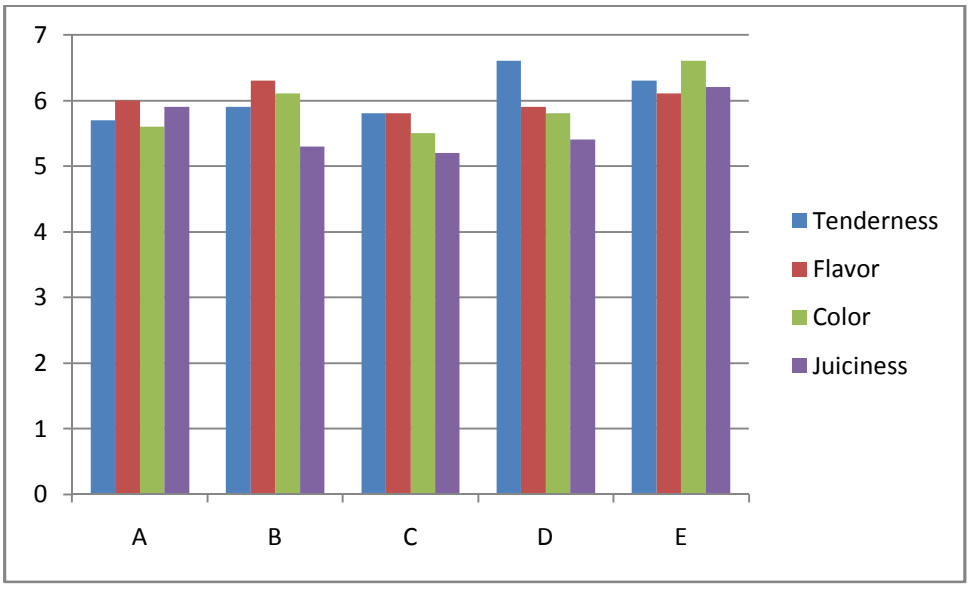
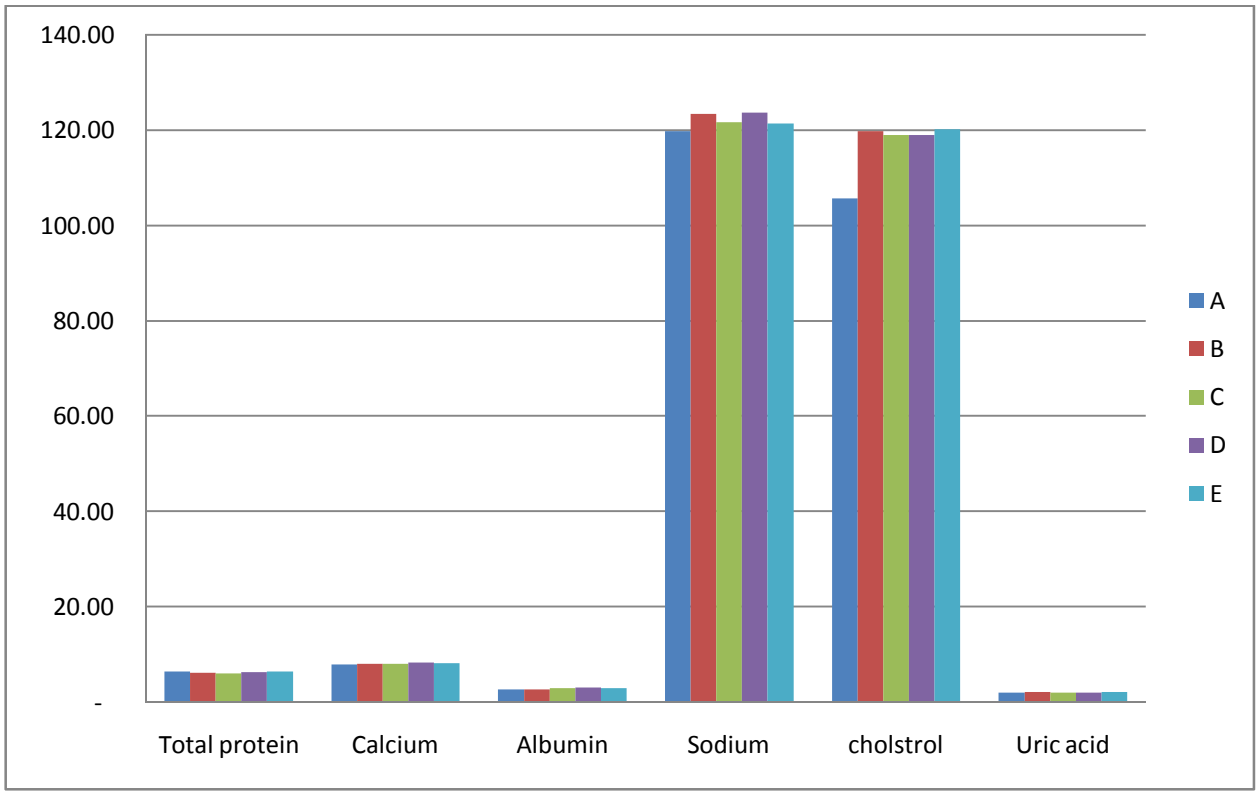


Fig (4): Effect of feeding broiler chicks on diets containing Biotronic on subjective meat attribute.

Table (6): Effect of feeding broiler chicks on diets containing Biotronic on blood serum analysis:

Treatment	Control	Flavomycin	B2%	B3%	B4%	SE+
Total protein	6.45^{a}	6.17^{a}	6.05^{a}	6.37^{a}	6.43^{a}	Ns
Calcium	7.93^{a}	8.05^{a}	8.12^{a}	8.28^{a}	8.13^{a}	Ns
Albumin	2.63^{a}	2.68^{a}	2.93^{a}	3.13^{a}	3.02^{a}	Ns
Sodium	119.67^{a}	123.33^{a}	121.67^{a}	123.67^{a}	121.33^{a}	Ns
Cholesterol	115.68^{a}	119.75^{a}	118.95^{a}	118.93^{a}	120.08^{a}	Ns
Uric acid	1.99^{c}	2.09^{ab}	2.08^{ab}	2.06^{bc}	2.14^{a}	*



Fig(5): Effect of feeding broiler chicks on diets containing Biotronic on blood serum analysis.

Table (7): The Economic Appraisal/ bird (SDG)of dietary Biotronic supplementation.

Items	**A**	**B**	**C**	**D**	**E**
Costs:					
Chicks	4.5	4.5	4.5	4.5	4.5
Feed	14,500	15,960	15,573	15,191.5	15,320
Management	4.0	4.0	4.0	4.0	4.0
Total costs	18,504.5	19,964.5	19,577.5	19,196	19,324.5
Revenues :					
Average weight Carcass	1,762.37	1,805.23	1,921.23	1,952.40	1,927.17
Price kg. of bird	26	26	26	26	26
Total Revenues	45,830.98	46,935.98	49,951.98	50,762.4	50,106.42
Profits :					
Total Revenues	45,830.98	46,935.98	49,951.98	50,762.4	50,106.42
Total costs	18,504.5	19,964.5	19,577.5	19,196	19,324.5
Profit / chick	27,326.48	26,971.48	30,374.48	31566.4	30,781.92
Profitability Ratio	1	,98	1,11	1.15	1.12

Total costs calculation according to February 2015 .

Price kilogram of bird calculated according to Aril 2015.

CHAPTER FIVE

DISCUSSION

Discussion:

The organic acids play important role as growth promoter in poultry industry .In continuous used organic acid which reduce PH value of food prevent from microbial contamination of food. Acidifier one of organic acid for feed additives, in the previous study the effect of Biotronic acidifier addition (organic acid).Results of this study showed no significant differences in the performance (Body weight gain, feed intake and feed conversion) of broiler chicks fed on diet, supplemented with flavomycin and diets supplemented with graded levels of biotronic powder. Although, chicks fed on diets supplemented with levels of biotronic (o.3%, o.4%and o.2%) respectively ,recorded the highest value of body weight gain(BWG) compared to those fed on control diet and diet with flavomycin ,while the latest group consumed more feed compared to other tested groups. These results were in line with findings **of (Lzat *et al.*, (1988);Cave(1984);Vale *et al*(2004);Watkins and Kratzer(1984) and Celyan *et al*(2003)** who reported no different in BWG and FI for organic acid .However, the results on the beneficial effects of these additives on weight gain and feed conversion ratio were reported by several researches **(Manickam *et al* (1994);Yeo and Kim (1997);Genus *et al* (2001);Voget *et al*(1981);Runho *et al*(1997);Henry *et al(* 1987**),who confirm there are some reports that high levels of organic acid depressed feed intake and weight gain , increased mortality. In the present study, the observed lack of effects of a growth promoter's effect may be associated with environmental conditions. Well –nourished healthy chick do not positively respond to growth promoters when they are housed under cleaned conditions and at moderate stoking density. Several researches reported that when chicks were housed in a clean

environment, using growth promoters such as organic acid and antibiotic were unaffective on performance **(Miller (1987); Lyons (1987); Anderson *et al* (1999)**.

On the other hand, these results disagree with (**Abdel fattah 2008**, **Ivanon (2005) and Nezhad *et al* (2007)**, who reported significantly (P≤0.05) improved live body weight gain of broiler with supplemented organic acid compared to control this may be due to decreasing PH in gastrointestinal tract with organic acid and growth inhibition of potential pathogen bacteria in the feed and in gastrotentinal tract in benefit with respect to animal health.

There was no significant difference for feed conversion ratio between all experimental groups, the results were in agreement with the report (**Voget *et al* 1981), Genus *et al* (2001)**.On the other hand these disagree with **Abdel fattah et *al* (2008)** ,acidifier supplementation reduced feed intake which improved the FCR of acidifier treated birds. This finding corroborates with the observation of Pinchasov and Jensen (1989) where they studied several organic acids, including formic and propionic acid.

Data obtained showed no significant (P≥0.05) difference in average values of hot carcass, non-carcass components (liver, heart, legs, gizzard and head) and dressing percentage. These results were in line with finding of(**Skinner et al(1991).**Similar results were found by **Alp et al (1999**) **and Kahrman *et al* (1999**) .On the other hand this result disagree with(**Lazat *et al* (1988)** who demonstrated significant (P≤o.o5) of non carcass with abdominal fat.

The result of the study showed that meat yield and the average of subjective meat quality scores (color, flavor, juiciness and tenderness) were not affected by dietary treatment at different levels, all being at moderate values. These results were in line with the finding of (**Genus *et al*(2001**).

The results showed no significant difference on blood serum between control and antibiotic groups, the addition of biotronic to control diet significantly (P≥0.05)increased the uric acids of serum that disagree(**Klocking ,1994)**.

In this research no mortality was recorded in the whole period of experiment, this might be due to the highly procedure of biosecurity applied and the growth promoter (Biotornic) dietary acidification that inhibited intestinal bacteria with the host for available nutrient, this agreement with (**Jones and Taylor 2001).**

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS:

Based on the results obtained it may be concluded that biotronic (acidifier) can be supplemented in the broiler diet up to 0. 4% without any adverse effects. Supplementation of biotronic to broiler diet significantly decreased the uric acid. Biotronic supplementation apparently improved the general performance of broiler chicks .Economically biotronic increased the profitability of a broiler flock.

RECOMMENDATIONS:

Further studies are needed to identify eventual differences among the commercially available organic acids in the best in country.

Practical implication the addition of o.3% recorded the best of performance.

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APPENDIXES

Appendix (1):

Weekly medium air temperature during the period 9 /2 to 23/3 2015.

Weeks	Medium Temperature ^{O}C
1	33.4
2	30
3	31
4	32.3
5	30.8
6	31.3
7	34.3

Source: thermometer

Appendix (2):

Card used for judgment of subjective meatQuality attributes.

Sensory evaluation card

Evaluate these sample for color, flavor juiciness tend mess. For each sample, use the appropriate scale to show your attitude by checking at the point that best describes your felling about the sample. If you have any question please ask. Thanks your cooperation.

Name: …… **Date:** ……..

Tenderness	**Flavor**	**color**	**Juiciness**
8-Extremely tender	8-Extremely intense	8-Extremely desirable	8-Extremely juicy
7-Very tender	7-Very intense	7-Very desirable	7-Very juicy
6-Moderatly tender	6-Moderately intense	6-Moderatly desirable	6-Moderatly juicy
5-Slightly tender	5- slightly bland	5-Slightly desirable	5-Slightly juicy
4- Slightly tough	4- slightly bland	4-Slightly desirable	4-Slightly dry
3-Moderatly tough	3-Moderatly bland	3-Moderatly desirable	3-Moderatly dry
2-Very tough	2-Very bland	2-Very undesirable	2-Very dry
1-Extremely tough	1-Extremely bland	Extremely undesirable	1-Extremely dry

Appendix (3)

Chicks in one day of age

Appendix (4)

Distribution of chicks in the house

List of Abbreviation

FOS=Fructo-oligo saccharides

GOS=Gluco-oligo sacchrides

MOS=Mannan-oligo sacchrides

IB=Infectious Bronchitis

IBD=Infectious Bursal disease

ND=New castle disease

BW=Body weight

BWG=body weight gain