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Growth – promoting effect of prebiotic, probiotic, short-chain fatty acid and essential oil on performance of broiler chicks under Egyptian summer conditions

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ABSTRACT:

This experiment was conducted to study the effect of prebiotic, probiotic, short chain fatty acid, organic acid, and essential oil as growth promoters on performance, economic efficiency, cecal microbial count and nutrients digestibility of broiler chickens. A total number of One hundred and eighty Unsexed broiler chickens (Arbor Acres) at 7 days of age were randomly distributed into sex treatments, each in 6 replicates, with 5 bird chicks per replicate Basal diets were supplemented with 0 control, 1st Biacid 0.5%, 2nd Valeric Acid 1.5%, 3rd Citric Acid 0.5%, 4th Fructo oligosaccharides (FOS)1% , 5th probiotic (Bacillus subtilis $1*10^{12}$)0.75% . Diets were fed during starter (7-21d) and grower (22-39d)of age and offered to bird ad libitum with free access to water up to 39 d of age, Nutrients digestibility were determined for all experimental treatments . Chicks fed diet either with Fructo oligosaccharides (prebiotic) or Valeric acid had significantly (P<0.05) greater production performance, Economic efficiency, European Production Efficiency Factor and increased the number of beneficial *Lactobacillus* than the control group. Both Valeric acid,and Fructo oligosaccharides also, had significantly (P<0.05) improved the digestibility of crude protein, ether extract, dry matter and crude fiber. In conclusion, the use of FOS at 1% as well as Valeric

acid at 1.5% are considered beneficial growth promoters for broiler chicks under Egyptian summer conditions.

Key words: prebiotic, probiotic, organic acid, Valeric acid, broiler, performance, Lactobacillus, trait.

INTRODUCTION:

It is important to achieve a high growth rate and feed efficiency in poultry production. Birds' genetic potential, diet quality, environmental conditions, and disease outbreaks should all be considered for optimum performance. Recent studies in poultry production have focused specifically on gut health apart from the factors mentioned above**(Rinttilä and Apajalahti, 2013)**;The use of nutrition-based research to develop alternatives to antibiotic growth promotor (AGP) in farm animals, including poultry, has greatly intensified in recent years **(Al-Ghamdi, 2022)** such as (probiotics, prebiotics, symbiotic, organic acids, antioxidants, enzymes, etc.).Taking a probiotic in sufficient numbers enhances the host's intestinal microbial balance, enhances colonization resistance against pathogens, and enhances immune responses **(Upadhaya et al., 2019)**. By selectively altering the gut microbiota's composition and metabolism, prebiotics affect the gut microbiota **(Racewicz et al., 2022)**. By allowing bifidobacterial and lactobacilli to grow in the gut, prebiotics may improve microbial balance **(Rehman et al., 2020).**Since prebiotics promote bacteria adapted to the environment of the gastrointestinal tract, they may be more beneficial than probiotics**(Diaz Carrasco et al., 2019).**Organic acids, such as lactic, citric acid, acetic, valeric acid, fumaric, propionic, caprylic acids, etc., have been shown to exhibit beneficial effects on the intestinal health and performance of birds **(Elnaggar et al., 2022).**Broiler chickens with organic acids supplemented in their diets had higher lactic acid bacteria (LAB) counts in their ileums and cecum. As a result of this treatment, bird intestine counts of Enterobacteriaceae and Salmonella significantly decreased **(Al-Ghamdi, 2022).** The ability of organic acids to change from the undissociated to the dissociated form, may determine how effectively they control the population of pathogenic bacteria in the gut of birds depending on the pKa value, and the hydrophobicity of acids .In terms of performance, feeding organic acids led to improved body weight gains and feed conversion ratio **(Manvatkar *et al*., 2022).** Organic acids can freely pass past the bacteria's semi-permeable membrane and into the cytoplasm of the cell in their undissociated form **(Ebeid and Al-Homidan, 2022)**; Organic acids act in such a way that, by lowering the pH of the gastrointestinal tract, they accelerate the conversion of pepsinogen to pepsin and increase the rate of absorption of proteins and minerals. In this regard, it has been reported that citric acid can prevent the formation of the calcium phytate complex, making phytate phosphorus available **(Mirakzehi *et al*., 2022)**.

This study's objective is to assess how probiotic, prebiotic, short-chain fatty acid, and essential oil growth promoters can affect broiler chicken performance, economic efficiency, gut health, European production efficiency factor (EPEF) and nutrient digestibility, under Egyptian summer conditions.

MATERIALS AND METHODS:

The field work of the present study was carried out at poultry research unit (El-Bostan farm), Faculty of Agriculture, Damanhour University, during the period from June to July 2021. A total number of 180 Unsexed broiler chickens (Arbor Acres) at 7 days of age, obtained from a commercial hatchery were randomly distributed into sex groups, each in 6 replicates, each with 5birds per replicate. Experimental chicks were fed basal diet supplemented with 0 control, 1st Biacid 0.5% (Thymoal , lactic acid ,formic acid ,butyric acid , from *interpharma comp*). , 2nd Valeric Acid 1.5%, 3rd Citric Acid 0.5% , 4th Fructo oligosaccharides 1% , 5th probiotic 0.75% from (*ATCO Pharma comp)* . Experimental diets were offered to birds through two feeding periods being starter from 7 to 21 days of age and grower from 22 to 39 days of age. In the first period ,diets contain (23% crude protein, 3042 ME/Kg) in the second period feed compotation contain (21.4 % crude protein, 3147 ME/Kg) as shown in Table 1. All experimental birds were maintained under similar management and environmental conditions. All birds were wing banded and housed in battery brooders in semi-opened room equipped with two exhaust fans to keep normal ventilation. Chicks were fed the experimental diets ad libtium and given free access to water throughout the 39 days experimental period. A light schedule of 23h light and 1 hr. dark was applied until the 7th day while, a 20h of light and 4h of dark schedule was provided from day 8 to 39 d of age. The average outdoor minimum and maximum temperature and relative humidity during the experimental period were 21.2 and 24.2°C and 56.7 and 58.7%, respectively. The brooding temperatures (indoor) were 30, 27 and 24-21°C during 7-14. 15-20, 21-39 days of age, respectively. Chicks were raised using common management practice for broiler chicks. Chicks were vaccinated with Nobilis NDV Clone 30, Gumboro, and Clone with Gumboro at days 7, 14, 21 and 28 days of age, respectively. The vaccines were obtained from **(Merck & Co., Inc., Intervet, Cairo, Egypt).**

Studied traits:

Body weight (BW) and feed intake (FI) per replicate were recorded weekly, then body weight gain (BWG) and feed conversion ratio (FCR: g feed consumed/g weight gain) were calculated. Body weight gain within each replicate was calculated based on 5 weeks intervals from the 7 to the 39 of age. The accumulative body weight gain for the entire experimental period (7-39 d) was calculated for each experimental treatment.

Feed intake (FI) and feed conversion ratio (FCR):

Feed intake was recorded at three intervals being (7-21), (22-39) and accumulated FI (7-39 d of age) for each treatment group. The average of feed consumed was calculated in grams for each experimental group and divided by the number of birds in each group. Feed conversion ratio (g feed /g gain) was calculated at the same intervals being (7-14),(22-39) d of age and accumulated FCR (7-39 d of age) for each treatment as units kilograms of feed intake to produce one unit of body weight gain during each period, using the following equation: FCR=[FI (g)/ BWG (g)].

Table 1: Composition and calculated analysis of experimental basal diets fed to broiler chicks from 7: 39 days of age.

Feed stuff (%)	Starter diet (7 to 21 days)	Grower diet (22 to 39 days)
Yellow corn	57.40	61.00
Soyabean meal 48%	29.50	26.00
Corn gluten meal 60 %	5.20	6.00
Soy oil	1.10	2.70
Full fat soy bean	2.00	0.00
Mono calcium phosphate	1.50	1.65
Limestone	1.90	1.50
Choline chloride	0.10	0.10
Sodium bicarbonate	0.20	0.20
Salt (NaCl)	0.20	0.20
DL- Methionine	0.35	0.10
L-lysine HCl	0.25	0.25
Broiler premix*	0.30	0.30
Total	100	100
**Calculated analysis (% on DM basis)		
Crude protein	22.9	21.4
ME (kcal / kg)	3042	3147
Ether extract	4.10	4.40
Calcium	1.05	0.90
Available phosphorus	0.51	0.43
Methionine	0.50	0.46
Lysine	1.40	1.23
Methionine + Cystine	0.98	0.89

*Premix Provides per kg of diet: Vitamin A, 12,000 IU; Vitamin D3, 5000 I.U; Vitamin E, 130.0 mg; Vitamin K3, 3.605 mg; Vitamin B1 (thiamin). 3.0 mg; Vitamin B2 (riboflavin), 8.0 mg: Vitamin B6, 4.950 mg; Vitamin B12, 17.0 mg: Niacin, 60.0 mg: D-Biotin, 200.0 mg: Calcium D-pantothenate, 18.333 mg: Folic acid, 2.083 mg: manganese, 100.0 mg: iron, 80.0 mg; zinc, 80.0 mg; copper, 8.0 mg: iodine, 2.0 mg; cobalt, 500.0 mg; and selenium, 150.0 m

**According to NRC (1994)

Digestion coefficient of nutrients:

At the end of experimental period, (39d of age), 3 chicks from each treatment were housed individually in metabolic cages to determine digestion coefficient of nutrients Birds were allowed to the experimental diets for 4 days collection period, in which quantities of feed intake and voided excreta were determined. Excreta was sprayed with boric acid (4%) for nitrogen fixation before drying. Samples of the feed and dried excreta were analyzed according to the official methods including moisture by oven drying (930.15), ash by incineration (942.05), protein by Kjeldahl (984.13), ether extract by Sckhlet fat analysis (954.02), as described by the AOAC International (2006). Nitrogen free extract of feed and dried excreta were calculated according to **(Abou-Raya and Galal 1971)**. Fecal nitrogen was determined according to **(Jacobsen et al.,1960).** Accordingly, records of nutrients digestibility were easily calculated.

Bacterial count:

Cecal digesta samples were taken and transferred to the sterile tubes and placed on ice and immediately sent to the Microbiology Lab to determine the counts of *Escherichia coli* and *Lactic acid bacteria*. Each sample was serially diluted from initial 10^{-1} to 10^{-9}. Then, 100 µL of diluted samples were plated on the Eosin Methelyne Blue (EMB) (for *E. Coli*) and De Man, Rogosa and Sharpe (MRS) (for *Lactobacillus*) agar media. Finally, EMB and MRS media were incubated at 37º C for 24 and 48 hours under anaerobic and aerobic conditions, respectively. The results are shown as colony forming unit (CFU) per gram of cecal digesta.

Economical evaluation:

For all experimental treatments, the economic efficiency of dietary treatments was made as below.

Economic efficiency = Total Revenue-Total costs / Total costs

Where:

Total revenue = BW * Meat Price (growing phase)

Total costs = Feed cost + Cost of supplementation + Other costs

Relative economic efficiency = (Economic efficiency of a treatment /control economic efficiency) * 100

Statistical Analysis:

The data of body weight, body weight gain, feed intake, feed conversion, slaughter traits and digestibility parameters were statistically analyzed using one-way analysis of variance using SAS computer program **(SAS User's Guide version 0.9, 2002).** All (%) data were transferred to

their crossponding arscin before analyses to normlaise data distribution. The data were analyzed by the following model: Yij = μ+ Ti + eij Where:
Yij = trait measure
μ= general mean
Ti = random effect of treatments (t= 1,2,3,4,5,6)
eij = experimental random error
Significant differences among treatments means were determined by Duncan's Multiple Range test **(Duncan, 1955).**

RESULTS:

Growth Performance:

Table 2: Effect of Biacid, Valeric Acid , Citric Acid ,FOS and probiotic supplementation on Body Weight (BW)

Age (days)	Treatments							
	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic	SEM	PValue
7	215	210	212	212	211	213	3.91	0.005
14	564	554	554	554	546	519	16.4	0.14
21	1003	993	1040	986	1021	950	8.10	0.07
28	1306[b]	1346[ab]	1409[a]	1345[ab]	1378[a]	1283[b]	13.2	0.02
35	1625[c]	1769[b]	1851[a]	1752[b]	1825[a]	1706[bc]	6.21	0.03
39	1772[b]	1878[ab]	2011[ab]	2034[a]	2078[a]	1820[ab]	6.55	0.04

a, b, c Means in the same row followed by different letters are significantly different at P ≤ 0.05 SEM=Standard error of mean's., FOS (Fructo Oligosaccharides), Biacid (Thymoal , lactic acid, formic acid ,butyric acid).

Adding both valeric acid and fructo oligosaccharides to the diet led to a significant ($p \leq 0.05$) improvement in the body weight at the ages of 28, 35 and 39 days of age as shown in Table 2 While, there was no significant effect of all the different treatments on the body weight compared to the control group at 7, 14 and 21 days of age. The addition of Citric Acid also led to a significant ($p \leq 0.05$) improvement in body weight at the age of 39 days, while the addition of Biacid and Probiotic led to an improvement in body weight, but not significantly.

Table 3: Effect of Biacid, Valeric Acid, Citric Acid ,FOS and probiotic of supplementation on Body Weight gain (BWG).

Age in days	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic	SEM	P Value
7-21	788[ab]	783[ab]	828[a]	774[ab]	810[ab]	737[b]	8.90	0.034
22-39	769[b]	885[ab]	971[ab]	1048[a]	1057[a]	870 [ab]	5.10	0.028
7-39	1557 [c]	1668[b]	1799[ab]	1822[a]	1867 [a]	1607[b]	4.54	0.02

a, b, c Means in the same row followed by different letters are significantly different at P ≤ 0.05 SEM=Standard error of mean's., FOS(Fructo Oligosaccharides) , Biacid(Thymoal , lactic acid ,formic acid ,butyric acid).

Table 4: Effect of Biacid, Valeric Acid, Citric Acid ,FOS and probiotic supplementation on feed intake (FI)

Age (days)	Treatments							
	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic	SEM	PValue
7-14	1027[b]	983[a]	974[bc]	967[bc]	989[d]	950[cd]	10.3	0.02
22-39	1573[b]	1486[c]	1761[ab]	1766[a]	1756[a]	1557[b]	7.32	0.02
7-39	2600[b]	2469[c]	2735[a]	2733[a]	2745[a]	2507[c]	8.98	0.01

a, b, c Means in the same row followed by different letters are significantly different at P ≤ 0.05 SEM=Standard error of mean's., FOS (Fructo Oligosaccharides) , Biacid(Thymoal , lactic acid ,formic acid ,butyric acid).

There was significant effect of adding any of the treatments on the body weight gain compared to the control group at the age of 7 and 21 days. While, adding any of the following additions being Valeric Acid, Fructo Oligosaccharides to the diet, led to a significantly ($p \leq 0.05$) increase in the body weight gain at the age of 22-39 and 7-39, as well as in the whole period from 7 to 39 days as shown in Table 3. It is noted that the addition of Biacid, Valeric Acid, Citric Acid and FOS to the diet at the age of 7-21 and 22-39 and 7-39 days of age significantly affect feed consumption compared to the control group, while at the age of 39 days, all previous treatments were significantly better compared to the control group. It was also found that the addition of either Valeric Acid, Citric Acid or FOS led to a significant ($p \leq 0.05$) increase in feed consumption in the whole period from the age of 7 to 39 days, compared to the control group (Table 4).

Table 5: Effect of Biacid, Valeric Acid, Citric Acid, FOS and probiotic supplementation on feed conversion ratio (FCR)

Age (days)	Treatments							
	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic	SEM	PValue
7-21	1.30[c]	1.25[b]	1.17[a]	1.24[b]	1.22[ab]	1.28[bc]	0.08	0.02
22-39	2.04[c]	1.6[a]	1.81[bc]	1.68[a]	1.66[a]	1.78[b]	0.06	0.01
7-39	1.67[b]	1.48[a]	1.52[a]	1.50[a]	1.47[a]	1.56[ab]	0.15	0.0001

a, b, c Means in the same row followed by different letters are significantly different at P ≤ 0.05 SEM=Standard error of mean's. , FOS(Fructo Oligosaccharides) , Biacid(Thymoal , lactic acid ,formic acid ,butyric acid).

The addition of any of the experimental treatments had a significant(p ≤ 0.05) effect on the FCR at 7-21,22-39 and 7-39d of age (Table5).Both Valeric acid and FOS recorded better values of FCR at 7-21d of age , however, at 22-39d of age each of Biacid , Citric Acid and FOS recorded better FCR (p ≤ 0.05) values compared to control . Collective , FOS gave the best FCR values without significant differences compared to Biacid , Valeric and Citric acid treatments at 39d of age.

Digestion coefficient of nutrients:

Table 6: Effect of Biacid, Valeric Acid, Citric Acid, FOS and prebiotic, probiotic supplementation on Apperant digestibility of the nutrients and ash retention of broiler chicks (%)

Item	Treatments						SEM	PValue
	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic		
Dry matter	52.10[e]	61.47[d]	67.50[a]	66.90[b]	67.87[a]	64.92[c]	0.54	0.001
Crude protein	67.88[d]	74.72[b]	77.94[a]	76.57[ab]	78.66[a]	71.74[c]	1.24	0.001
Ether extract	73.99[d]	82.66[ab]	83.00[a]	81.55[b]	82.85[a]	75.90[c]	0.17	0.001
Crude fiber	27.33[c]	31.11[ab]	33.54[a]	31.00[ab]	32.92[a]	29.85[b]	0.57	0.001
Apparent Ash retention	83.27[c]	85.33[b]	88.59[ab]	89.15[a]	89.77[a]	86.03[b]	1.43	0.001

a, b, c Means in the same row followed by different letters are significantly different at P ≤ 0.05 SEM=Standard error of mean's. , FOS(Fructo Oligosaccharides) , Biacid(Thymoal , lactic acid ,formic acid ,butyric acid).

Significant differences in the digestibility of the nutrients were obtainted in (Table 6). It was found that the addition of all the treatments included in the study, being FOS, Biacid, Valeric Acid, Citric Acid and Probiotic led to a significant ($p \leq 0.05$) improvement in all digestion coefficients of dry matter, crude protein, ether extract, crude fiber and apparent ash retention compared to the control group, while the addition of Valeric Acid and FOS were significantly ($p \leq 0.05$) superior to the rest of the other treatments as shown in Table 6.

Bacterial count:

Table 7: Effect of Biacid, Valeric Acid , Citric Acid ,FOS and prebiotic, probiotic supplementation on bacterial count

Item	Treatments						SEM	PValue
	Control	Biacid	Valeric Acid	Citric Acid	FOS	Probiotic		
TBC(cfu*10^{6})	3.86^{b}	3.85^{b}	4.05^{a}	3.44^{c}	4.08^{a}	3.91^{b}	0.16	0.02
E. COLI(cfu*10^{3})	1.13^{a}	0.82^{b}	0.75^{b}	0.78^{b}	0.81^{b}	0.74^{b}	0.07	0.02
Proteus(cfu*10^{3})	0.87^{a}	0.51^{b}	0.25^{c}	0.29^{c}	0.16^{c}	0.22^{c}	0.04	0.0001
Lactobacillus(cfu*10^{3})	1.88^{d}	2.52^{b}	3.05^{a}	2.37^{b}	3.11^{a}	2.95^{c}	0.14	0.04

a, b, c Means in the same row followed by different letters are significantly different at $P \leq 0.05$ SEM=Standard error of mean's. , FOS(Fructo Oligosaccharides) , Biacid(Thymoal , lactic acid ,formic acid ,butyric acid).

Significant differences ($p \leq 0.05$) in bacterial count were observed due to the main effect of treatments. (Table7) The best results were in the use of Valeric Acid and FOS Where, their addition led to a significant ($p \leq 0.05$) increase in the total number of bacteria, with significant ($p \leq 0.05$) improvement in the number of beneficial bacteria *Lactobacillus* compared to the control group. It is noted also that both *E. COLI* and *Proteus* are significantly ($p \leq 0.05$) lower by adding both Valeric Acid and FOS as shown in Table 7.

Economical evaluation:

Table 8: Effect of Biacid, Valeric Acid, Citric Acid, FOS and prebiotic, probiotic supplementation on Economic efficiency

Item	Treatment					
	control	Biacid	Valeric acid	Citric acid	FOS	probiotic
Chick's price L.E	7	7	7	7	7	7
FC (kg/chick)	2.600	2.469	2.735	2.733	2.745	2.507
Price /kg L.E	7	7.080	7.150	7.040	7.060	7.075
Feed cost L.E	18.2	17.48	19.55	19.39	19.37	17.73
Total costL.E	25.2	24.48	26.55	26.39	26.37	24.73
Weight gain (kg/chick)	1.56	1.67	1.80	1.82	1.85	1.61
Price /kg L.E	20	20	20	20	20	20
Total revenue L.E	31.2	33.4	36	36.4	37	32.2
Net revenue L.E	6	8.92	9.45	10.01	10.63	7.47
Economic efficiency*	0.19	0.26	0.26	0.275	0.287	0.231
Relative eco.eff(%)	100	136	136	144	151	121
European Production Efficiency Factor %	100	164	305	283	358	232

Highly differences in economic efficiency were observed due to the main effect of all treatments, compared to the control.The better values were in the use of FOS, valeric acid and citric acid as it improve revenue compared with control as shown in Table 7.
* Economic efficiency = Net revenue /total cost.

DISCUSSION:

Through the results of the present study, it became clear that the addition of Fructo oligosaccharides at a rate of 1%, as well as Valeric acid at a rate of 1.5%, led to a significant improvement in growth performance, and this improvement included BW, BWG, FI, and FCR .These results are on the same line with the **(Abdel-R & Sherief 2011, Nikpiran *et al*., 2013)** who found that growth performance was improved by supplementation of prebiotics . Beneficial effects for Valeric acid on broiler performance have been reported by **(Namkung *et al*., 2011; Zentek *et al*., 2012; and Khosravinia, 2015).** This improvement may be due to that the prebiotics are short-chain oligosaccharide components that are indigestible and trigger the growth and/or activity of beneficial gastrointestinal microbiota in the digestive system. These prebiotics aid in proliferating beneficial bacteria such as Lactobacillus. Prebiotics contain fiber and oligosaccharides; these influence the amylase production in the GIT, which increases the growth rate of broilers **(Micciche *et al,* 2018, Al-Nasser *et al,* 2020)** .Also, prebiotics in the gastrointestinal tract usually target lactic acid bacterial genera Bifidobacterium and Lactobacillus The development of these bacterial species has resulted in the production of the bacteriocins, which act against the development of pathogenic microbes such as Escherichia coli, which improves the health of the chicken **(Shang *et al.,* 2018, Al-Khalaifah 2018 , Mountzouris *et al.,* 2010).** As that, Valeric acid is naturally produced by the microbiota in the lower gastrointestinal tract **(Lino *et al.,* 2007)** One of the parameters influencing feed efficiency is gut morphology **(Ao and Choct, 2013).** Indeed, the results showed a significant increase in the numbers of beneficial bacteria i.e. *Lactobacillus* and significantly decreased *Escherichia coli* compared to the control group by adding any of FOS or Valeric acid .Improvement in growth performance also might be associated with the capability of FOS and Valeric acid to secrete enzymes such as amylase, protease, and lipase, which might improve the digestion rate of feed nutrients, which help in digestibility of starch, fat, and protein. So, increased availability of nutrients may be resulted in improved growth performance of broiler **(Bedford and Marlborough et al., 2000).** This was confirmed by the results of obtained here in, where the aforementioned additives led to an improvement in all nutrient digestibility, compared to the control group. This is consistent with that explained by Li **et al., (2008).** Based on what was obtained from the previous results, it was logical to add both FOS or Valeric acid to the diet to give higher economic efficiency and European Production Efficiency Factor.

Conclusion:

On the basis of these results, it may be concluded that the use of the prebiotic Fructo oligosaccharides at a rate of 1%, as well as Valeric acid at a rate of 1.5% in broiler diets can improve significantly the growth rate, nutrient digestibility, economic efficiency, European Production Efficiency Factor and increase the number of beneficial Lactobacillus compared to the control group under Egyptian summer conditions .

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الملخص العربي:

التأثير المنشط للنمو للبريبيوتيك، البروبيوتيك، الأحماض الدهنية قصيرة السلسلة والزيوت الأساسية على الأداء الإنتاجي لكتاكيت التسمين تحت الظروف المصرية صيفا

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تم إجراء هذه التجربه في الفترة من يونيو- يوليو 2021 بهدف دراسة تأثير استخدام بعض منشطات النمو مثل (البروبايوتيك – البريبايوتيك – الاحماض العضوية – الاحماض الدهنية قصيرة السلسلة – الزيوت الاساسية) علي الاداء الانتاجي و المحتوي الميكروبي للأعور ومعاملات هضم العناصر الغذائية و الكفاءة الاقتصادية ومعامل الكفاءه الاوربي في بداري انتاج اللحم. تم استخدام عدد 180 كتكوت من سلالة الاربوايكرز الغير مجنسة عمر 7 ايام وزعت بصورة عشوائية الي عدد 6 معاملات كل معاملة بها 6 مكررات بكل منها عدد 5 كتاكيت تغذت الكتاكيت في المعاملات المختلفة علي العليقة الاساسية مضاف اليها : المعاملة الاولي (بدون اي اضافة علفية) , المعاملة الثانية (بي اسيد 0.5%), المعاملة الثالثة(فاليريك اسيد 1.5%) ,المعاملة الرابعه(سيتريك اسيد 0.5%) , المعاملة الخامسة (فراكتواليجوسكريد 1%), المعاملة السادسة (بروبايوتيك 0.75) قدمت العلائق التجريبية للكتاكيت في مرحلتين الاولي مرحلة البادئ (7-21يوم) والثانية مرحلة النامي (22-39 يوم) وكانت اهم النتائج كالاتي : اظهر استخدام الاضافات العلفيه فروق معنوية مقارنة بالكنترول حيث تفوق استخدام الفراكتواليجو سكرايد او حمض الفاليرك في الكفاءة الغذائية والكفاءة الاقتصادية ومعامل الكفاءه الاوروبي وزيادة اعداد البكتريا النافعه اللاكتوباسلس اظهرت ايضا النتائج ان اضافة كلا من حمض الفاليرك او الفراكتواليجوسكرايد ادي الي تحسنا معنويا في معاملات هضم العناصر الغذائيه (الماده الجافه ، البروتين ، المستخلص الاثيري والالياف) مقارنة بمجموعه الكنترول , اظهر ايضا استخدام الفاليريك اسد فروق معنوية مقارنة بالكنترول من حيث وزن الجسم ومعامل التحويل الغذائي ومن خلال النتائج السابقة يتضح بان استخدام الفراكتواليجوسكرايد بمستوي 1% أو حمض الفاليريك بمستوي 1.5% ادي الي تحسين وزن الجسم ومعامل التحويل الغذائي وقلل من محتوي القناه الهضمية من المكيروبات الضارة مثل الايكولاي وكذلك ادي الي تحسين الكفاءة الاقتصادية مقارنة بباقي المعاملات تحت الظروف المصرية صيفا.

الكلمات المفتاحية: البريبيوتيك، البروبيوتيك، الحمض العضوي، حمض الفاليريك، فروج اللحم، الأداء، العصية اللبنية، الصفة.