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EVALUATE THE EFFECT OF YUCCA SCHIDIGERA AND OREGANO OIL EXTRACTS (PRO-COCC)® ON GROWTH PERFORMANCE AND SALMONELLA INFECTION IN BROILERS

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ABSTRACT

The present experiment was conducted to study the effect of *Yucca schidigera and* Oregano oil extracts on growth performance and *Salmonella* infection in broiler. Our results showed that both *Salmonella* Typhimurium field and standard strains were susceptible to *Yucca schidigera* and oregano oil extracts (pro-cocc) ®. The inhibition zones diameter in case of 100% concentration of pro-cocc were 24 mm and 25 mm, but the inhibition zones diameter recorded to ciprofloxacine were 31 mm and 32 mm against *Salmonella* Typhimurium field and standard strains, respectively. A total of 150 one day old broiler chicks were divided into 6 equal groups.Group (G1) provided with balanced ration without treatment (negative control). Group (G2) infected with *Salmonella* by dose (0.5 ml×10^8) orally and provided with basal diet without treatment (positive control). Group (G3) provided with basal diet and supplemented with (Pro-cocc)® in the drinking water by dose 1ml /4 L drinking water for 1week then infected with *Salmonella* by the same dose.Group (G4) non-infected provided with basal diet and supplemented with (Pro_cocc)® by the same dose.Group (G5) fed the basal diet and infected with *Salmonella* by the same dose thensupplemented with(Pro_cocc) ® by the same dose after 24 hrs from infection. Group (G6) received basal diet and infected with *Salmonella* by the same dose then treated with Ciprofoxacin by dose 5mg/kg orally after 24 hrs from infection. The result revealed that body weight on 14 day was non-significantly changed in all treatment groups but it tended to decreased in G2 while G4 showed significant increase in body weight on the 28th day with improvement in body weight gain (BWG), feed intake (FI) and feed conversion rate (FCR). G5 showed significant increase in BW and BWG on the 28th day compared with G2.There were no significant increases in serum aminotransferase (AST and ALT) in G3, G4 and G5. While glutathione peroxidase enzyme (GSH.PX) were significantly increased in G4 with significant decreased in total cholesterol

and serum ammonia. G2 showed significant increase in aspartate amino transferase (AST), alanine amino transferase (ALT), Total Cholesterol and serum ammonia with significant decrease in Total Protein and GSH-PX enzyme. G6 showed significant increase in AST and ALT on the14th day followed by significant improvement on 28th day. Also the highest *Salmonella spp.* colonies count detected in positive control group (G2) followed by group (G5) on day 14th and 28th. *Salmonella* typhymurium could be detected in examined chicken thigh muscle after 14th days of the experiment in rate of 25% while the rate of isolation of the examined organism decreased after 28th days to be 10%.

Key words:

Broiler, yucca, organem, *salmonella.*

INTRODUCTION

Chicken meat is an important source of dietary protein, and the industry has improved high grade because of intensive farming techniques, comprehensive and balanced feeding, automation equipment, and other new technologies. However, diseases in production are problematic especially with the development of antibiotic resistant bacteria.

Therefore, exploring safe, green and efficient additives that increase immunity in broilers has become a research priority**. (Su *et al.,* 2016).**

Yucca schidigera commonly named yucca, a native plant in arid deserts of American southwest and Mexico, is also in Zhejiang province, China grown as an ornamental.

It is recognized as a source of sustenance and drug by native Indians due to its health-promoting activity **(Patel 2012).**

Yucca extract contains steroidal saponins and polyphenols. The former fractions are involved in the reduction of ruminal ammonia as kinds of urease inhibitor, and have antiprotozoal activity due to their ability to complex with cholesterol of protozoal cell membranes causing cell lysis and death; furthermore,they also reduce total cholesterol and low density cholesterol levels in blood plasma.

The latter fractions that founded in *Yucca schidigera* bark contain resveratrol, which possesses antioxidant, antiplatelet, ant mutagenic, antiviral and anti-inflammatory in addition to cancer preventing activities **(Piacente *et al*., 2005).**

Yucca schidigera extract has been successfully used as feed additives in the poultry industry. It can be enhancing the growth and productivity in broiler production **(Sahoo *et al.,* 2015).**

Also it is used as a natural medicine, a foaming agent, flavor enhancer in the food and beverage industries, and as an additive for feed in the poultry and cattle industries.

(Aslan *et al.* 2005) said that some researchers have shown that yucca plant has ammonia binding capacity, antibacterial and antiprotozoal effects. Physiological activities of yucca extracts would depend on their saponin content.

Among thousands of essential oils constituents, the two isomers thymol and carvacrol possess great antibacterial activity, which are also major components of common used herbs such as thyme and oregano **(Du *et al*., 2016).**

Beneficial effects of herbal extracts or active substance in animal nutrition may include the stimulation of appetite and feed intake, the improvement of endogenous digestive enzyme secretion,activation of immune responseandantibacterial,antiviral,antioxidant and anthelmintic actions **(Ashour *et al.,* 2014).** *Yucca schidigera* is a medical plant grows widely in the deserts. Yucca is a source of steroidal saponins which used commercially as a saponin source.

Poultry meat is one of the major vehicles of *S.* typhimurium infections is considered one of the major zoonotic food-borne pathogens representing an important public health problem worldwide. It can cause a variety of clinical manifestations ranging from mild gastroenteritis to bacteremia and extra intestinal localized infections involving many organs **(Rabie *et al.,* 2012)**.

Poultry products have always topped the incidence of salmonellosis in many developing countries including India,Egypt, Brazil and Zimbabwe **(Yang *et al.,*2011)**.Contamination with *Salmonella* in poultry products can occur at multiple steps along the food chain, which includes production,processing,distribution,retail marketing,handling and preparation **(Dookeran *et al.,* 2012)**.

The objective of this study was to investigate the effect of *Yucca schidigera* and oregano oil extracts (pro-cocc)® on growth performance, some biochemical parameters beside their efficacy on *Salmonella* infection in broilers.

MATERIAL AND METHODS

***Yucca schidigera* and oregano oil*:* pro-cocc®** obtained commercially from Biotrade-Italy for Propharma-Egypt. Each liter contains *yucca schidigera* extract (Saponins 10 g) and oregano oil extracts (Carvacrol 60.2 g+ Thymol 4 g) by dose 1ml/ 4 liter water (recommended dose).

Ciprofloxacin:

Ciprofar®: obtained commercially from Pharco.Com, Egypt. Each film coated tablet contains 500 mg ciprofloxacin by dose 5mg/ kg orally **(Atta and Sharif 1997).**

Bacterial strain:

S. Typhimurium ATCC 14028 standard strains were used as positive control (obtained from serology department, animal Health Research Institute, Dokii, and Giza). *S.*Typhimurium field strain isolated previously from broiler chicken and confirmed by using conventional polymerase chain reaction (PCR).

In Vitro Antibacterial activity testing of *Yucca schidigera* and oregano oil extracts (pro-cocc)®

1-Agar well diffusion assay:

Yucca schidigera and oregano oil extracts (pro-cocc) ® tested for their antibacterial activity against *S. Typhimurium* strain by agar well diffusion method according to **(Wayne 2002).** Ciprofloxacin antibiotic disc (5µg) (oxoid) used as standard antibiotic have potential effect on *Salmonella* Spp. 100µL of 5% dimethylsulphoxide (DMSO) was added to (100µL) extract to solubilize it. All plates of the tested organisms after (24 h) of incubation, was noted for the zone of inhibition which measured by millimeter (mm).

2-The microdilution method for determine Minimum inhibitory concentration (MIC): The minimum inhibitory concentration was investigated following the standard protocol CLSI M31-A2 document **(CLSI, 2002)**.The microdilution method was performed using 96-well microtiter plates (TPP,Switzerland) including double-fold serial dilutions of (pro-cocc) ® and ciprofloxacin in LB broth® (Acumedia, Michigan, USA), and the wells were inoculated with 1×106 CFU of bacteria (in a 0.2 ml final volume). The incubation period was 24 h at 37°C. The range of the concentrations assayed for extract and antibiotic in range 512-0.5 µg/ml. MIC value is the lowest antimicrobial concentration that inhibits microorganism growth.

Table (1): Composition and nutrient level of basal diet used in the experiment.

Ingredients%	Starter (0-21 day)	Finisher (21-28 day)
Corn	**57**	**58**
Soyabean meal	**37.5**	**32**
Oil	**3**	**5.4**
Limestone	**1**	**1.86**
Di-calcium phosphorus	**0.75**	**1.37**
Premix	**0.75**	**1.37**

Experimental design:

One hundred and fifty (150) one day old Cobb broiler chicks from a commercial hatchery. Chicks were reared on floor rearing, temperature was adjusted according to chicks age and subjected to drinking water and feed ad-libitum according to National Research Council **(NRC, 1994)** for 4 weeks, and mortality was less than 2% during accommodation period. Chicks were divided randomly into six groups.

Group1(G1): It was non-infected provided with basal diet without treatment (negative control).

Group 2 (G2): It was infected with *Salmonella* Typhimurium by dose 0.5 ml of (10^8CFU/ml) orally and provided with basal diet without treatment (positive control).

Group 3 (G3): It was provided with basal diet and supplemented with Pro_cocc in the drinking water by dose 1ml /4 L drinking water for 1week then infected with *Salmonella* by the same dose.

Group4(G4): It was non-infected provided with basal diet and supplemented with Pro-cocc by the same dose.

Group 5 (G5): It was fed the basal diet and infected with *Salmonella* Typhimurium by the same dose then supplemented with Pro_cocc by the same dose after 24 hrs from infection.

Group 6 (G6): It was received basal diet and infected with *Salmonella* Typhimurium by the same dose then supplemented with Ciprofoxacin by dose 5mg/kg orally after 24 hrs from infection.

Blood sample:

Blood samples were collected from wing vein puncture under aseptic precautions from five chicks in each group after 14 and 28 days. Blood sample was taken without anticoagulant in a clean and dry centrifuge tube, left to clot at room temperature and centrifuged at 3000 rpm for 15 min. Serum samples were collected in dry clean capped tubes and kept in deep freeze at- 20ºC for further analysis.

Tissue samples: after 14 and 28 days from beginning of the experiment in all groups chicks were slaughtered, thigh muscle, heart and liver samples were taken for bacterial examination Samples were frozen and stored at -20º C until examined.

Growth performance:

Body weight (BW) was measured on day 14 and 28. Feed intake (FI), body weight gain (BWG) and feed conversion rate (FCR= feed/gain) were measured during day 14 to 28 **(Sahoo *et al.*, 2015).**

Biochemical studies:

All biochemical parameters were carried out using commercial kits, the used protocol for each parameter was done as recommended by the manufacture manual. The liver transferases (ALT and AST) activities were estimated according to **Murray (1984)**. The total serum protein was measured according to **Tietz (1995).** Total cholesterol level was carried out according to **White *et al* (1970).** GSH-Px activity was determined according to **Hissin and Hilf (1976).** Determination L-Malondialdehyde (MDA) according to **Esterbauer *et al*., (1982).**Serum ammonia concentration was determined using coupled enzymatic assay **Ishihara *et al* (1972).**

Total plate counting for *Salmonella.*

The pooled samples (liver, spleen, cecum and heart) of each broiler chicks collected on day 14 and 28 were dissected out aseptically and placed in sterilized separate plastic petri dishes. After pooling and weighting, the samples were homogenized and suspended in sterile physiological saline (1 part of sample: 9 parts of PS) to obtain a stock solution. Consecutive ten-fold dilutions, from the stock solution, were made. The different dilutions were cultured onto duplicate XLD agar plates. All such plates were incubated at 37ºC for 24 hours. The presumptive colonies in XLD were counted and submitted for further biochemical identification for *Salmonella* spp. confirmation as recommended by ISO 6579 **(Anonymous, 2002).** The bacterial count was calculated according to **Mamnur Rashid *et al.*, (1994).**

Isolation of *S.* Typhimurium from chicken thigh muscles was performed according to **USDA (2004)** protocols as following: 1ml of diluted sample suspension was enriched in 9 ml of Rappaport-Vassiliadis broth (RV;Oxoid®), incubated at 43°C/24 hr., followed by streaking a loopful of selective enrichment broth on Xylose lysine deoxycholate (XLD®) agar (Merk®) and *Salmonella* Shigella (SS) agar media and incubated at 37°C/24 hr.

Statistical analysis:

The data obtained from this investigation were statistically analyzed by F-test according to **Tamhane and Dunlop (2000)** using MSTAT-C computer program.

RESULTS AND DISCUSSION

Regarding the antimicrobial activity of *Yucca schidigera* and oregano oil (Pro-cocc)® our results showed that both *Salmonella* Typhimurium field and standard strains were susceptible to Pro-cocc. The inhibition zones diameter Incase of 100% concentration of Pro-cocc were 24 mm and 25 mm, but the inhibition zones diameter recorded to ciprofloxacine were 31 mm and 32mm against *Salmonella* Typhimurium field and standard strains, respectively.

These illustrated the better antibacterial effect of (Pro-cocc)® containing oregano oil on gram negative bacteria which agreed with previously mentioned by **Chaudhry *et al.* (2007) and Vale-Silva *et al.*, (2012).**

Yucca schidigera and oregano oil (Pro-cocc)® possessed MIC values range from (13.33 - 16 µl/ml) against *Salmonella* Typhimurium field and standard strains. These MIC values were higher than MIC values of ciprofloxacin by two log dilution as shown in the (Table 2).

The effect of *Yucca schidigera and* oregano oil extracts on broiler performance was presented in (Table 3). Body weight on 14th days reveals non-significant changes in all treatment groups except in G2 there was significant decrease in body weight compared with G1(negative control). A significant decrease in growth performance was cleared in broilers as a result of *Salmonella* **(Marcq *et al* 2011 and Abudabos *et al* 2016).**

The lowering in performance described to decrease in feed intake in broilers due to mucosal damage, diarrhea and systemic infection **(Cardinale *et al.*, 2005 and Vandeplas *et al.*, 2009).** Body weight on 28th days significantly increased in G4 with improvement in body weight gain, feed intake and feed conversion rate. Also G5 showed significant improvement in body weight and body weight gain on 28th days compared with G2.

This improvement in the performance in the mentioned groups may be due to natural

saponins of *Yucca schidigera* which have positive effects on improved nutrient absorption and emulsification oils and fats promoting their digestion **(Alfaro *et al.*, 2007).**

These results agree with **Su *et al.*, (2016)** who recorded that body weight and body weight gain tend to increase from 28th day to 42th in broiler received 100 mg /kg *Yucca* extract. Also **Cabuk *et al.*,(2004)** mentioned that feed conversion ratio was improved in broiler supplemented by *Yucca schidigera* at the 42th day.

Animal performance may improve in response to the beneficial effects of thymol ingestion on feed utilization and enzyme stimulation and improvement in digestibility, in addition to the antibacterial activity **(Abd El-Hack *et al.*, 2016).**

Ahmadifar *et al.*,(2011) suggested that administration of 2.0 and 3.0 gr/kg thymol in rainbow trout juveniles diet can improved some growth parameters (final weight, food conversion ratio). **Du *et al* (2016)** who said that supplementation of essential oils mainly (Carvacol and Thymol) did not influence growth performance during day 0 to day 14 but during 14 and 28 day trended to improve FCR in broiler.

The effect of *Yucca schidigera and* oregano *oil* extracts on some biochemical parameters was presented in (Tables 4, 5). The present results revealed that AST and ALT in group 3, 4 and 5 non-significantly changed compared with G1. **(Ashour *et al.*, 2014)** recorded that there were non-significant changes in AST and ALT of rabbits fed diet supplemented with *yucca schidigera* extracts.

Group 2 showed significant increase in all biochemical parameters except total serum protein and GSH-PX enzyme which revealed significant decrease compared to G1. The liver enzymes increase in the blood as a result of damaged liver cells affected by *Salmonella* as the main systemic organs affected by *Salmonella* is liver **(Abudabos *et al.*, 2016).**

G6 showed significant increase in AST and ALT on 14 day with significant improved in the same parameters on 28 day compared with G1.Also the same group showed significant decrease in GSH-PX and significant increase in MDA (Tables 4, 5).

Enrofloxacin at100mg/kg body weight in broiler chicken for 5 consecutive days caused elevation of serum ALT activity but 6 days after the withdrawal the values returned to the control levels. Also authors reported that serum AST activity was found to be higher than the control group in those receiving 10mg/kg body weight enrofloxacin, and then decreased after withdrawal time of the drug **(Sureshkumar *et al.*, 2013).** Also they added that enrofloxacin injection at the recommended dose of 5 mg/kg IM, once daily to healthy dogs produced

transient increases in AST and mean corpuscular volume levels. Similar effects are reported in humans receiving ciprofloxacin and enrofloxacin.

Total serum protein tends to decrease in G5 and G6 at day 14 followed by significant improved at 28th day. **Abaza and El-said (2005)** recorded high level of total protein was in growing rabbits recived 100mg of *yucca schidigera.*

Group 4 showed significant decrease in total cholesterol and ammonia level in addition to significant increase in GSH-PX activity. The level of total cholesterol was improved in rat received *Origanum Majoranum* Extract **(Soliman *et al*., 2014).** Also total cholesterol was decreased in rabbits received *Yucca* extract in diet **(Ashour *et al.*, 2014).**

Acamovic and Brooker (2005) said that herbal plant which rich in flavonoids such as *Yucca* extract extend vitamin C activity that act as antioxidant which improves immune function. GSH-PX is considered to be the 1st line of cellular defense against oxidative damage **(Su *et al.*, 2016).**

Dietary supplementation of *Yucca* extract to control diet revealed a significance positive effect on GSH-PX and CAT activities in rabbit **(Ashour *et al.*, 2014).** Also **Cheeke *et al.*, (2006)** said that *Yucca* plant is a rich source of beneficial phenolic compounds, the resveratrol and *Yuccaals* having strong antioxidant. On the other hand **Lin *et al* (2003)** described that supplementation of herbs in chickens' diet results in an increase in serum antioxidant enzyme.

Our results agree with **(Aslan *et al.*,2005)** who found that supplementation of *yucca schidigera* improve glutathione concentrations and decreased cholesterolemia in laying hens.

It has been reported that saponins bound cholesterol and lower its absorption from digestive tract so it can be reduced cholesterol concentrations **(Aslan *et al.*, 2005)** that can be explain by the antioxidant properties of saponins which were based on their capacity to increase glutathione concentration **(Aslan *et al.*, 2005).**

Su *et al* (2016) observed that there were no significant difference in MDA level in broilers received *Yucca* extract on 28th day. The same result cleared by **(Aslan *et al.*, 2005)** in laying hens supplied by *yucca schidigera*.

Ammonia is one of the microbial products that are known to have negative effects in birds, animals and humans**.** Saponin, as the main chemical component of *Yucca schidigera* extract is present in steroidal form, which physically binds to ammonia and reducing the level of free ammonia **(Sahoo *et al.*, 2015).** Saponin, as the main chemical com-ponent of *Yucca*

*schidigera*extract is present in steroidal form, which physically binds ammonia, reducing the level of free ammonia.

Serum ammonia was significantly decrease by supplementation of *yucca schidigera* extract to rabbit diet **(Ashour *et al.,* 2014).** These authors added that supplemented dietary *Yucca* extract reduced plasma ammonia concentration in poultry and in rabbits**.**

Saponin, as the main chemical com-ponent of *yucca schidigera*extract is present in steroidal form, which physically binds ammonia, reducing the level of free ammonia**.**

Biochemical blood parameters are often related to health status which acts as good indicators of pathological, physiological and nutritional status of the animal **(Ashour *et al.,* 2014).**

Salmonella spp. count in tissue samples collected from broiler chickens in all groups on day 14 and 28 showed that, the highest *Salmonella spp.* colonies count in positive control group (G2) had 5.1×10^3 CFU/ml and 2.2×10^2 CFU/ml followed by group (G5) 1.5×10^2 CFU/ml and 50 CFU/ml on day 14 and 28 respectively (Table 6).

Interestingly, we found that group 3 which supplemented with (pro-cocc®) before infection had lower number of *Salmonella spp*. in comparison with other infected groups as (pro-cocc®) contain *Yucca schidigera* extract that reduce the bacterial adhesion to host cell and this result similar to previously stated by **Moric, (2013**). Also, reduction in *Salnomella spp.* count in groups treated with pro-cocc justified by previous study by **Sjolander *et al.* (1997)** who found that, the saponin containing extract as *Yucca schidigera* extract increased immune responses by up regulating T -helper (Th - 1 and Th - 2) cells , as well as potentiating antigen-specific antibody responses.

Salmonellosis is one of the most important zoonotic bacterial pathogens of food-borne infection all around the world. In our study (Table 7) shows that *Salmonella* typhymurium could be detected in examined chicken thigh muscle after 14th days of the experiment in rate of 25% .While the rate of isolation of the examined organism decreased after 28th days to be 10%. These results were higher than those reported by **EL-Shraway and Abd-Elhafez (2018)** who isolated the organism in rate of 5%, while **(Abd El-Aziz, 2013)** detected *S.* Typhymurium *in* percent of 44% from examined chicken muscle which is higher than our results. **Mohamed and Aly (1998)** failed to detect *Salmonella* spp. in 30 chickens in Assiut city, Egypt. These differences in the prevalence of *Salmonella* in chicken referred to many factors, such as isolation methods, sample type, size, and seasonal variations.

Egyptian Organization for standardization and quality (2005) prohibit the consumption of any food containing any amount of *S.* TyphimuriumThis organism with its poultry impacts and zoonotic importance can be controlled by exceeding the standards public health hazards control systems in poultry farms, proper implementations of preventative programs through sanitation and sound management, disinfection and proper use of antibacterial agents and regular surveillance **(EL-Shraway and Abd-Elhafez, 2018).**

CONCLUSION

Supplementation of *Yucca schidigera* and oregano oil extracts (prococc)® have a positive effect on growth performance, some biochemical parameters, *Salmonella* count and isolation in examined broilers.

Abbreviations:

BW: body weight BWG: body weight gain FI: feed intake FCR: feed conversion rate AST: aspartate amino transferase ALT:alanine amino transferase GSH.PX: glutathione peroxidase enzyme LB: lysogeny broth LDL: low density lipoproteinPCR: polymerase chain reaction MDA: Malondialdehyde.

Table (2): Antimicrobial activity of *Yucca schidigera* and oregano oil extracts (pro-cocc) ® and ciprofloxacine against *Salmonella* Typhimurium *strains.*

Strains	Inhibition zone diameter(mm)*				MIC value (µl/ml)*	
	pro-cocc® concentration			Ciprofloxacin (5ug/disc)	Pro - cocc®	Ciprofloxacin
	100%	75%	50%			
***S. Typhimurium* field strains.**	**24±1**	**15.33±0.57**	**6.66±0.57**	**31.33±0.57**	**16±0**	**0.833±0.28**
***S. Typhimurium* standard strains.**	**25±1**	**17±1**	**7±1**	**32±0**	**13.33±4.61**	**0.666±0.28**

***Mean value ± SD.**

Table (3): Effects of *Yucca schidigera* and oregano *oil* extracts (pro-cocc)® on body weight, body weight gain, feed intake and feed conversion rate (FCR) of broiler (M±S.E) (n=5).

Group	Body weight on 14th day (gm)	Body weight on 28th day (gm)	Body weight Gain (1428th) day(gm)	Feed intake (14-28th) day (gm)	F.C.R (14-28th) day
G1	259±13.45ab	700±15.8b	441±17.49ab	1110	2.51
G2	169±15.36c	545±33.9c	376±43.16b	950	2.53
G3	280±9.35ab	740±29.15b	460±34.09b	1064	2.3
G4	299±7.14a	860±18.7a	561±22.8a	1130	2.01
G5	255±16.58b	780±46.36ab	525±51.23a	1100	2.09
G6	255±16.5b	690±48.47b	435±58.9ab	1105	2.5

Different letters at the same column means that there was a significant change at p<0.05.

Table (4): Effects of *Yucca schidigera and* oregano oil extracts (pro-cocc)® on some biochemical parameters in broiler (M±S.E) (n=5).

Group	14 day				28 day			
	AST (U/L)	ALT (U/L)	T. Serum Protein (g/dl)	T. Cholesterol (mg/dl)	AST(U/L)	ALT (U/L)	T. Serum Protein (g/dl)	T. Cholesterol (mg/dl)
G1	19.8±1.39b	27±1.51c	7.8±0.16a	120±2.9c	20.2±1.24b	27.20±1.46b	7.9±0.15a	121.40±2.42b
G2	44±1.70a	54.6±2.69a	6.5±0.14c	196±6.8a	43.6±2.03a	55±2.68a	6.60±0.17b	198.60±6.07a
G3	22±1.92b	28.2±4.4c	7.64±0.14a	125±2.23c	22.40±1.80b	29±3.8b	7.68±0.14a	124.40±2.35b
G4	19.6±0.86b	26.6±1.86c	7.88±0.18a	107±4.35d	19.60±0.50b	26±1.6b	7.96±0.19a	104.40±4.43c
G5	21.8±1.46b	25.40±2.06c	7.16±0.15b	126±2.11c	21.40±1.36b	25.6±1.7b	7.44±0.23a	124.20±2.08b
G6	40.20±2.59a	44.60±2.69b	7.30±0.18bc	152±2.54b	23.80±1.98b	30.6±1.12b	7.66±0.24a	132.40±1.24b

Different letters at the same column means that there was a significant change at p<0.05.

Table (5): Effects of *Yucca schidigera and* oregano *oil* extracts (pro-cocc)®on some oxidative markers and serum ammonia in broiler (M±S.E) (n=5).

Group	14 day			28 day		
	GSH-Px (mg/L)	MDA (m/g %)	Ammonia(ug/dl)	GSH-Px (mg/L)	MDA (m/g %)	Ammonia (ug/dl)
G1	0.78±0.035b	0.18±0.010d	92.4±0.60bc	0.83±0.041a	0.19±0.011d	92.8±0.73b
G2	0.22±0.038d	1.45±0.25a	94.6±0.67a	0.23±0.032c	1.42±0.24a	95±0.83a
G3	0.82±0.045ab	0.38±0.031cd	90.6±0.40c	0.83±0.045a	0.38±0.030cd	89.8±0.37c
G4	0.91±0.019a	0.14±0.002d	87.2±0.37d	0.92±0.021a	0.15±0.010d	86.6±0.50d
G5	0.52±0.036c	0.73±0.15bc	91.4±0.50c	0.53±0.037b	0.65±0.095bc	91±0.44bc
G6	0.45±0.04c	1.05±0.24ab	94±1.2ab	0.46±0.039b	0.92±0.23b	92.6±0.74b

Different letters at the same column means that there was a significant change at p<0.05.

Table (6): Effect of prococc® on *Salmonella spp.* enumeration in experimentally infected broiler chicks with *Salmonella* Typhimurium.

groups	*Salmonella* Spp. count(CFU/ml)*	
	On day 14	On day 28
G1	0	0
G2	5.1×10^3	2.2×10^2
G3	80	0
G4	0	0
G5	1.5×10^2	50
G6	1.2×10^2	0

***Colony Forming Unite.**

Table (7): Prevalence of *Salmonella typhimurium* in examined chicken thigh muscles (n=60) after 14 and 28 days of infection with *S.* Typhimurium.

Samples (thigh muscles)	Total No.	%
14 days	15	25
28 days	6	10

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تقييم تاثير مستخلصى اليوكاشيدجرا و زيت الاورجانيم (البروكوك) على معدلات النمو وعدوى السالمونيلا فى بدارى التسمين

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الملخص العربى

تم عمل التجربة الحالية لدراسة تاثير مستخلصى اليوكاشيدجرا و زيت الاورجانيم على معدلات النمو وعدوى السالمونيلا فى بدارى التسمين. اظهرت النتائج ان عطرة السالمونيلا تيفيميريم الحقلى والقياسى كانوا عرضة للبروكوك.

تم تقسيم150كتكوت عمر يوم الى ستة مجموعات متساوية كالتالى المجموعه الاولى اعطيت عليقة متوازنة بدون علاجات (مجموعه ضابطه سالبه) . المجموعة الثانية معداة بميكروب السالمونيلا بجرعة (0.5 مل × 10^8) بالفم واعطيت عليقة متوازنة بدون علاجات (مجموعه ضابطه موجبة). المجموعة الثالثة اعطيت عليقة متوازنة مع اعطاءها البروكوك فى مياه الشرب بجرعة امل/4 لتر لمدة اسبوع ثم عدوتها بميكروب السالمونيلا بنفس الجرعة . المجموعة الرابعة غير معداة واعطيت عليقة متوازنة وتم اعطاؤها البروكوك بنفس الجرعة . المجموعة الخامسة تغذت على عليقة متوازنة وتم عدوتها بميكروب السالمونيلا بنفس الجرعة ثم اعطاؤها البروكوك بنفس الجرعة بعد 24 ساعة من العدوى .المجموعة السادسة اخذت عليقة متوازنة وتم عدوتها بميكروب السالمونيلا بنفس الجرعة ثم علاجها بالسيبروفلوكساسين بجرعة 5ملجرام / كيلوجرام بالفم.

وقد اوضحت النتائج ان وزن الجسم عند 14 يوم لم يحدث به تغير معنوى فى كل المجموعات المعالجة لكنه نقص معنويا فى المجموعة الثانية . المجموعة الرابعة اظهرت زيادة معنوية فى وزن الجسم عند اليوم 28 مع تحسن فى وزن الجسم المكتسب ،استهلاك الغذاء ومعدل تحويل الغذاء. المجموعة الخامسة اظهرت زيادة معنوية فى وزن الجسم ووزن الطائر عند 28 يوم مقا رنة بالمجموعة الثانية .

كما اوضحت النتائج انه لا يوجد زيادة معنوية فى انزيم الاسبرتات امينوترانسفيريز وانزيم الالانين امينوترانسفيريز فى كل من المجموعة الثالثة, الرابعة والخامسة بينما انزيم الجلوتاثيون بيرواكسيديززاد معنويا فى المجموعة الرابعة مع نقص معنوى فى كل من الدهون الكلية ونسبة الامونيا.

كما اظهرت المجموعة الثانية زيادة معنوية فى فى انزيم الاسبرتات امينوترانسفيريز وانزيم الالانين امينوترانسفيريز و الدهون الكلية والامونيا مع نقص معنوى فى البروتين الكلى و انزيم الجلوتاثيون بيرواكسيديز. المجموعة السادسة اوضحت زيادة معنوية فى انزيم الاسبرتات امينوترانسفيريز وانزيم الالانين امينوترانسفيريز عند 14 يوم اتبعته بتحسن ملحوظ عند 28 يوم. كما اوضحت النتائج ان امداد الطيور بمستخلصى اليوكاشيدجرا و زيت الاورجانيم (البروكوك) له تاثير ايجابى على معدلات النمو وبعض القياسات البيوكميائية