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Effects of Feed Enhanced with Agri-Mos Prebiotic on Productive Performance, Carcass Traits, Blood Plasma Parameters, Oxidative Status and Histo-Morphologicaly of Growing NZW Rabbits

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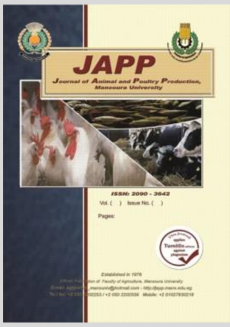

ABSTRACT

The recent study was outlined to explore the effects of added prebiotics (Agri-MOS) on growth performance, carcass characteristics, blood constituents and oxidative status of NZW rabbits. A total number of 75 (42-days old) NZW rabbits were randomly divided into 5 groups; each group included 5 replicates of 3 rabbits each. Rabbits were reared in metallic batteries under comparable management circumstances and fed 5 pelleted diets similar in all nutrients content from 6 to 13 weeks old. Agri-MOS was supplemented to the experimental diets at zero (control), 0.25, 0.50, 0.75 and 1.00 g/kg diet, respectively. The experimental groups of rabbits subjected either to 0.75 or 1.0 g Agri-MOS addition achieved significantly higher live body weight and percentage of empty carcass compared to other treatments. Rabbits group fed 1.0g Agri-MOS-supplemented diet had the lowest count of *Esherichia coli*. However, *Lactobacillus spp.* of cecal contents was higher in the groups fed Agri-MOS-supplemented diets compared to the control group. Blood plasma content of glucose, total protein, albumin, lipids profile, liver and kidney function, oxidative status and thyroid hormones of growing NZW rabbits were significantly affected by feeding Agri-MOS-supplemented-diets. In conclusion, dietary Agri-MOS supplementation up to 1.0g/kg diet enhanced productive performance, oxidative status, cecum microbial counts and histomorphological section of rabbit cecal, without unfavorable effect on the physiological responses of NZW rabbits.

Keywords: Rabbit, Prebiotic (MOS), Performance, blood, carcass, cacum.

INTRODUCTION

In the last few years, rabbit production has been gaining impressive attention mainly as a source of meat, since they have high reproduction rate, small body size, rapid growth rate and high meat yields (Basavaraj *et al*., 2011). Markowiak and Śliżewska (2018) reviewed that animal production is indistinguishable from nourishment and healthiness of the customer besides, animal gut pathogens, such as *Salmonella*, *Campylobacter*, *Yersinia* and *Listeria*, are a straight source of nourishment disease and a cause of zoonosis. Consequently, novel methods of animal reproduction aimed at improved quality and safety of meat, whereas taking animal welfare and admiration for the natural environment into consideration. Both Feed additives and rabbits feed got to meet some severe criteria; with no concurrent increase of rabbits breeding costs.

Prebiotics as an alternative to antibiotics, are non-digestible feed ingredients. They usefully influence growth and activities of gut microflora by discriminating invigorating the growth or metabolic activity of a few intestine microflora (Gibson and Roberfroid, 1995). Prebiotics such as MOS (Mannan oligosaccharides) and fructosan oligosaccharides (FOS) are derivative from bacteria cells and yeast. Also, Abd El-Aziz *et al*., (2020) reported that prebiotics may have an indirect positive impact on performance parameters and production profitability in rabbits. It has been assumed that a few of the benefits in productive performance of weaned rabbits might be due to the useful impacts of prebiotic on the gut health (Peeters *et al*., 1992; Gibson and Fullar, 2000 and Pinheiro *et al*., 2004). The most targets of the recent study were to assess the impacts of presence or absence of Agri-MOS as prebiotic on growth performance, carcass characteristics, blood constituents, oxidative status and cecal histology of growing NZW rabbits.

MATERIALS AND METHODS

Practical experiments of this research were accomplished out at the Poultry Station, Agriculture Research and Experimental Center, while the chemical analyses were conducted at the Poultry Production Department, Faculty of Agriculture, and Mansoura University. This study was conducted to investigate the feasibility of supplementing Agri-MOS prebiotic containing Mannan oligosaccharide (MOS) to the diet on the growth performance of NZW rabbits throughout the age from 6 to13 wks-old.

Experimental Animals and Management:

A total number of 75 weaned NZW rabbits of 42-d-old were randomly assigned into 5 equal treatments of 15 rabbits per treatment (nearly similar in average body weight) and divided into 5 replicates each. Three rabbits of each replicate were housed together in galvanized wire cages (50×50×45 cm) and supplied by a feeder and stainless-steel nipple for drinking. Pelleted diets (17.00 % CP and 2600 kcal/kg diet) and fresh water and were

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provided *ad libitum* the whole time of the trial phase from 6- 13-wks of age. The experimental weaned rabbits were raised underneath the same administrative and sterile conditions.

Experimental Diets:

Five test pelleted diets were formulated (Table 1) to cover the nutrient requirements for rabbits concurring to NRC (1977). The first one was free of probiotic and considered as control. The 2nd diet was the control +0.25 g Agri-MOS/kg , 3rd diet was the control +0.5g Agri-MOS/kg , 4th diet was the control + 0.75 g Agri-MOS/kg and 5th diet was the control + 1.0g Agri-MOS/kg. Every one of the investigational diets were formulated to be iso-nitrogenous and iso–caloric (17.00 % CP and 2600 kcal/kg diet), and to get the all fundamental nutrient requirements of weaned NZW rabbits.

Data collection:

Initial live body weights (LBW) of weaned animals were recorded at the beginning of growing phase (6wks-old). Live body weight (LBW) and feed intake (FI) was recorded every 28 days on a replicate group basis. Body weight gain (BWG) and feed conversion ratio (FCR) were calculated all over the trial period. Death of growing NZW rabbits was recorded daily during the growing stage.

Table 1. Ingredients and Calculated values of the test pelleted diets nourished to growing NZW rabbits (42-91 days old).

Ingredients	Control
Yellow corn	14
Soybean meal, 44%	12
Wheat bran	30
Clover hay	27
Barly	15
Limestone	1.4
Premix[1]	0.3
Salt	0.3
Total	100
Calculated analysis (%)[2]	
DE, kcal/kg	2600
Crude protein, %	17.00
Crude fiber, %	13.75
Ether extract, %	2.99
Ca, %	1.00
P, %	0.60

(1)Each 3Kg vitamin and mineral mixture contained12000000IU Vit A, 2500000IU Vit.$D_3$10000mg Vit.E,2500mg VitK_3,1000 mg VitB_1,4000 mg Vit.B_2,1500 mg Vit. $B_6$10mg Vit.B_{12},10000mg Pantothenic acid, 20000mg Nicotinic acid,1000gm Folic acid, 50mg Biotin, 500gmCholine chloride, 60gm Manganese, 55gm, Zinc,100 mgSelenium, 1000mg Iodine,35gmIron,10gm Copper, 250mg Copalt, and Carrier $CaCo_3$to 3kg.

(2)Calculated(NRC (1977)except test materials(calculated according to its determined values,Table.1).

Slaughter test and Blood constituents:

At 13 weeks of age, five rabbits from each treatment were arbitrarily taken and fasted for 14 h earlier than sacrifice, weighed after being fasted and slaughtered to inclusive bleeding, then, they were skinned, weighed and eviscerated to obtain carcass quality. Empty carcass % was expected by partitioning the weight of warm eviscerated carcass devoid of liver, spleen, kidney, heart and lungs by the LBW. The internal organs as well as abdominal fat were alienated and weighed separately to approximation their relative weights of LBW. Five blood samples were collected at the ending of the experiment from butchered rabbits in heparinized tubes according to treatment, to determine some blood plasma biochemical components. Blood samples were taken at 3000 rpm for 20 minutes for individual plasma, -20°Ċ for further analysis. Stored in Colorimetric methods were used to estimate blood plasma components using a commercial kit manufactured by Diamond Diagnostics.

Histological section preparation:

Representative samples of cecum were carefully dissected and glued in a sufficient volume of formalin solution (10 percent). By using the technique of the paraffin method concurrent with Junqueira *et a1*. (2013), permanent sections were prepared. Stains of Hematoxyllin and eosin (H&E) were utilized. Sections of ceca Tissue were inspected by electronic microscope and after that subjected to a computerized camera with a magnification power of X8.

Statistical analysis:

Data gotten in this were measurably analyzed using one-way investigation of change of SAS Program (SAS, 2004).Variations among means (P≤0.05) were isolated by Duncan's New Multiple Different Ranges test (Duncan, 1955).

RESULTS AND DICUSSIONS

Growth performance:

Effect of additions of prebiotic oligosaccharides (Agri-MOS) on growth performance is shown in Table 2. Dietary supplementation of Agri-MOS at all levels significantly (P<0.05) increased growth performance parameters including final BW, BWG, and FI with significant improvement in FCR in rabbits during the entire length of the experimental when compared to the control one. Dietary supplementation of Agri-MOS at a level of 1 g/kg diet showed significantly the best results concerning all growth performance parameters (Table 2).

Table 2. Growth performance parameters of NZW rabbits as influenced by dietary prebiotic (Agri-MOS) supplementation during the growing period (6-13 wk).

Dietary	Live body weight (g)		6-13 wk of age		
Treatment	Initial (6 wk)	Final (13 wk)	TBWG	TFI	FCR
T1(Control)	784	1910^c	1126^c	3915^c	3.48^c
T2 (0.25 g Agri-MOS)	784	1994^b	1210^b	3987^b	3.30^b
T3 (0.50 g Agri-MOS)	780	2058^a	1278^a	4126^a	3.23^{ab}
T4 (0.75 g Agri-MOS)	780	2008^{ab}	1228^{ab}	3970^b	3.23^{ab}
T5(1.0 g Agri-MOS)	781	2109^a	1328^a	4103^a	3.09^a
SEM	3.19	13.14	13.42	13.62	0.0307
Sig	NS	**	*	*	*

a-b Means with different superscripts in the same column are significantly distinct at(P≤0.05

MOS= Mannan oligosaccharides.

These results indicated that dietary prebiotic (Agri-MOS) addition had a positive impact on growth performance of growing NZW-rabbits.

In harmony with the recent results, Abd El-Aziz, *et al.,* (2020) reviewed that dietary addition of prebiotic oligosaccharides, in particular Mannan-oligosaccharides (MOS) and Isomalto-oligosaccharides (IMO) significantly accelerated body weight gain (BWG) in rabbits, and superior feed conversion ratio (FCR). Bovera *et al.,* (2019) found that rabbits appeared comparable growth rates compared with the average of those nourished Mannan-oligosaccharides diets, nevertheless impeded feed conversion ratio (FCR). Moreover, weaned rabbits fed MOS at 1.0 g/kg reported superior growth rates and FCR than those nourished at 1.5 g/kg.

Carcass characteristics:

Impact of feeding Agri-MOS-diets on carcass characteristics of NZW rabbits are shown in Table 3. Results have shown that percentages of skin plus foot, heart, liver, kidneys and AF (abdominal fat) weights were not affected significantly (P≤0.05) for experimental rabbits either fed Agri-MOS-enhanced diets or having the control diet.

Table 3. Carcass characteristics of NZW rabbits (13-week-old) as affected by feeding prebiotic (Agri-MOS) supplemented-diet.

Dietary Treatment	Live body Wt. (g)	Skin+foot (%)	Empty carcass (%)	Liver (%)	Heart (%)	Kidneys (%)	Abdominal fat (%)
T1(Control)	1910^{c}	17.67	52.96^{c}	4.00	0.333	1.033	0.347
T2 (Control 0.25 g Agri-MOS)	1994^{b}	17.16	53.96^{b}	4.11	0.330	1.103	0.357
T3 (Control 0.50 g Agri-MOS)	2007^{ab}	17.49	54.48^{a}	4.14	0.326	1.110	0.356
T4 (Control 0.75 g Agri-MOS)	2058^{a}	17.47	54.19^{ab}	4.17	0.326	1.083	0.373
T5(Control 1.0 g Agri-MOS)	2109^{a}	17.49	54.29^{a}	4.14	0.326	1.076	0.360
SEM	0.026	0.062	0.116	0.029	0.004	0.015	0.006
Significance	**	NS	**	NS	NS	NS	NS

[a, b] Means with different superscripts in the same column are significantly distinct at(P≤0.05 MOS= Mannan oligosaccharides

As can be obtained in Table 3, significant differences were observed among diverse treatments in the percentage of empty carcass of the experimental treatments. Experimental groups of rabbits subjected to feed 0.75 or 1.0g Agri-MOS-addition (T3 and T5) achieved significantly higher percentage of empty carcass compared to other treatments. Our data are in close agreement with many investigators (Abdel-Hamid and Farahat ,2015 and Abd El-Aziz *et al.,* 2020) who confirmed that carcass traits including the weight of hot and reference carcasses, percentage of perirenal, and periscapular fat relative to reference carcass weight were significantly affected by feeding MOS-supplemented-diets. However, the data of our study are in disagreement with those reported by Rotolo *et al.,* (2014) who found the carcass traits were not affected by supplementing the diet of weaned rabbits with prebiotic oligosaccharides.

Cecal microflora:

The most fermentative activity site in rabbits is the cecum, which is characterized by the very different characteristics of the microbial flora population (De Martino and Nizza, 2019). When the rabbit was nourished from milk to dry nourish when it was 28 days-old; the microbial vegetation develops significantly (Padilha *et al.,* 1995), uniquely influencing protective processes, physiological, nutritional and immunological in the host animal (Marteau and Boutron-Ruault, 2002). Microbial load in NZW rabbits' caeca as influenced by different Agri-MOS-supplemented diets is presented in Table (4).

The count of Coliformes of cecal contents was the highest (P≤0.05) in the control one (T1), but group fed 1.0g Agri-MOS-supplemented diets (T5) had the lowest count of Esherichia coli. , while the Lactobacillus spp. count of cecal contents were higher (P≤0.05) in the groups fed Agri-MOS-supplemented diets compared with the control group. In experimental NZW rabbits, outcome on the role of prebiotics are clear and compelling in decreasing total bacterial and coliforms (E.Coli) counts and at the identical time favoring the development of Lactobacillus within the ceca. In congruity with our outcomes, Xu et al. (2002) affirmed that addition of 0.02% fructo-oligosaccharides expanded Lactobacillus and Bifidobacterium pigs. The impact of incorporation of prebiotics or probiotics on intestinal microflora was accounted for in past discoveries (Fortun-Lamothe and Boullier, 2007). Examination on the method of activity of MOS brought up that MOS can tie to mannose-explicit lectin of gram-negative microbes those express Sort fimbriae, for example, Salmonella and E.coli, bringing about their discharge from the digestive system (Baurhoo et al., 2007). On the other hand, Oso et al. (2013) revealed that rabbits nourish diets containing oxytetracycline demonstrated superior total bacterial and cecal coliform counts than those nourish diets supplemented either with prebiotics or probiotics.

Table 4. Caecal microflora of NZW rabbits (13-week-old) as affected by feeding prebiotic (Agri-MOS) supplemented-diet.

Dietary Treatment	T.bacterial count	*Coliformes* (*E.Coli*)	*Lactobacillus spp.*
1(Control)	14.94^{a}	5.32^{a}	6.93^{e}
T2(Control 0.25g Agri-MOS)	13.63^{b}	4.99^{ab}	7.28^{d}
T3(Control 0.50g Agri-MOS)	12.56^{c}	4.72^{b}	7.95^{c}
T4(Control 0.75g Agri-MOS)	11.89^{d}	3.23^{c}	8.93^{b}
T5(Control 1.0g Agri-MOS)	11.81^{d}	2.16^{d}	9.85^{a}
SEM	0.013	0.014	0.016
Significance	**	**	**

[a-b] Means with different superscripts in the same column are significantly distinct at(P≤0.05)
MOS= Mannan oligosaccharides.
SEM=Standard error of the means

Plasma biochemicals:

Liver function, oxidadive status, and thyroidhormones:

Blood plasma parameters:

Data in Tables 5 and 6 and Figures 1,2 show that blood glucose levels and plasma content of total protein, albumin, lipids profile, liver and kidney function, oxidative status and thyroid hormones of growing NZW rabbits (13wks-old) were significantly affected by feeding Agri-MOS-supplemented-diets. However, results showed that serum globulin levels did not significantly changed (P≤0.05) with dietary MOS supplementation. A numerical increase in serum globulin was observed in T4 (0.75g Agri-MOS-addition diet) group. Also, the data showed that the inclusion of Agri-MOS in NZW growing rabbits diet at the studied levels had significantly affected (P≤0.05) blood glucose level compared to control group. There are numerical slight decreases in blood glucose of rabbits in T2, T3, T4 and T5 groups, which recorded 142.44, 143.09, 139.05 and 140.82 mg/dl respectively. Dietary supplementation with different levels of Agri-MOS has significant effect (P≤0.05) on reducing serum total lipids, triglycerides, cholesterols and LDL.

Table 5. Some plasma biochemical parameters, lipid profile of 13-wks-old NZW rabbits as inflated by feeding Agri-MOS-supplemented-diets.

Dietary Treatment	Tprot g/dl	Album g/dl	Globulin g/dl	T lipids g/dl	T cholest g/dl	TriG g/dl	HDL g/dl	LDL g/dl	glucose mg/dl
T1(Control)	5.78^{a}	3.47^{a}	2.31	6.39^{a}	87.83^{a}	53.96^{a}	28.00^{b}	27.06^{a}	151.06^{a}
T2 (Control 0.25 g Agri-MOS)	5.75^{ab}	3.39^{ab}	2.36	6.47^{a}	85.47^{a}	51.18^{b}	31.57^{a}	26.82^{b}	142.44^{b}
T3 (Control 0.50 g Agri-MOS)	5.77^{ab}	3.41^{a}	2.36	6.41^{a}	85.19^{a}	48.87^{b}	30.33^{ab}	25.58^{b}	143.09^{b}
T4 (Control 0.75 g Agri-MOS)	5.80^{a}	3.39^{ab}	2.41	6.39^{a}	82.11^{ab}	45.43^{b}	30.25^{ab}	25.49^{b}	139.05^{b}
T5(Control 1.0 g Agri-MOS)	5.28^{b}	3.17^{b}	2.11	5.26^{b}	78.44^{b}	45.93^{b}	31.81^{a}	23.25^{b}	140.82^{b}
SEM	0.081	0.043	0.044	0.080	1.245	1.4	0.416	0.416	1.003
Sig	*	*	NS	*	*	**	*	*	*

$^{a-c}$: Means with different superscripts in the same column are significantly distinct at(P≤0.05
SEM= Standard error of the means MOS= Mannan oligosaccharides

Table 6. Liver & Kidney function, oxidative status and thyroid hormones of growing NZW rabbits (13wks-old) as affected by fed Agri-MOS-supplemented-diets.

Dietary Treatment	AST U/L	ALT U/L	Creat mg/dl	MDA nmol/ml	SOD nmol/ml	CAT U/ml/h	T3 ng/dl	T4 ng/dl
T1(Control)	54.53^{a}	14.16^{a}	1.12^{a}	38.17^{a}	68.02^{b}	37.07^{c}	4.07^{b}	17.91^{b}
T2 (Control 0.25 g Agri-MOS)	53.93^{a}	12.95^{b}	1.07^{ab}	34.95^{b}	72.22^{ab}	39.83^{b}	5.14^{a}	18.89^{ab}
T3 (Control 0.50 g Agri-MOS)	50.13^{b}	11.81^{b}	1.00^{ab}	31.89^{bc}	73.85^{ab}	41.73^{ab}	5.32^{a}	19.05^{a}
T4 (Control 0.75 g Agri-MOS)	49.12^{b}	11.55^{b}	0.95^{b}	31.04^{bc}	74.18^{a}	44.53^{a}	5.17^{a}	19.12^{a}
T5(Control 1.0 g Agri-MOS)	50.24^{b}	11.32^{b}	0.98^{b}	30.11^{c}	76.08^{a}	44.93^{a}	5.13^{a}	19.08^{a}
SEM	1.09	0.58	0.06	1.42	1.71	1.16	0.17	0.25
Sig.	**	**	*	**	*	**	*	*

$^{a-c}$: Means with different superscripts in the same column are significantly distinct at(P≤0.05
SEM= Standard error of the means
MOS= Mannan oligosaccharides

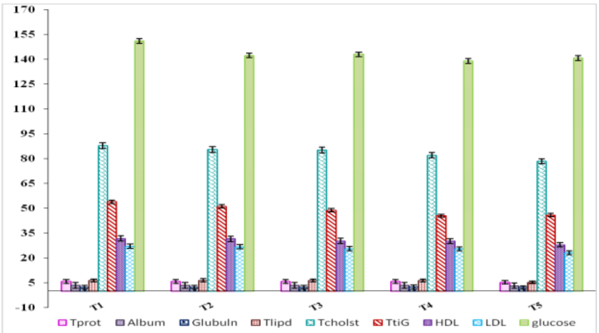

Fig. 1. Some plasma biochemical parameters, lipid profile of 13wks-old NZW rabbits as affected by fed Agri-MOS-supplemented-diets.

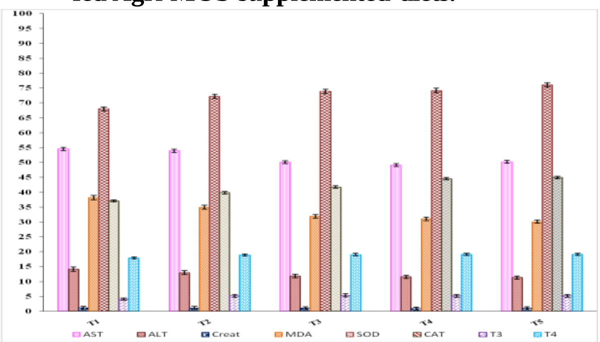

Fig. 2. Liver & Kidney function, oxidative status and thyroid hormones of growing NZW rabbits (13wks-old) as affected by fed Agri-MOS-supplemented-diets.

Rabbits subjected to feeding Agri-MOS -supplemented diets (T2, T3, T4& T5) had significantly lower AST and ALT concentration (P<0.05) of plasma compared to the control group. Creatinine concentrations at the end of the experimental period were significantly lower in rabbits of T2, T3, T4 and T5 groups recording 1.07, 1.0, 0.95 and 0.98 mg/dl, respectively, compared to the control group which recorded the highest value being 1.12 mg/dl. Triiodothyronine and thyroxin values rise (P<0.05) in groups fed Agri-MOS supplemented diet, compared to rabbits subjected to feeding the control diet. In this respect, Abo-Elmaaty *et al.* (2019) observed differences in rabbits fed diet supplemented with symbiotic. Attia *et al.* (2013) reported that the decrease in liver enzymes can signify better liver functionality. In this respect, the MOS group showed lower values for both AST and ALT, compared to the control group, but maximized AST. On the other hand, Abo-Egla *et al.* (2013) reported that neither dietary Cucumber Veins Straw till 30% level nor addition with MOS or NZ had significant effects on plasma constituents (creatinine, total lipids, total cholesterol and enzymatic activities of ALT (alanine aminotransferase) and AST (aspertate aminotransferase)) of growing rabbits.

The effects of dietary Agri-MOS-supplements on anti-oxidant activities concerning the MDA, SOD and CAT content of growing rabbits are explained in Table 6. The nutritional Agri-MOS supplementing therapies influenced all the above trends statistically (p≤0.05). The activity of SOD was significantly ($p \leq 0.05$) enhanced in the Agri-MOS-treated groups as Agri -MOS supplements at levels of 1.0 had the highest SOD when compare with the control one. Compared to those of other groups, enriching rabbit diets with 0.75 and 1.0g Agri-MOS/kg diets provided the best SOD and CAT activities. Conversely, in the control one, the highest ($p \leq 0.05$) MDA concentration was observed. The SOD plays a most important role in shielding cells from oxidative damage; this process requires specific nutrients to be current in the diet (Ashour *et al*., 2014). Moreover, Markowiak and Śliżewska (2018) analyzed that the results of studies on the effect of prebiotics on animal health are often contradictory, as a result of the high specificity, different doses and time of application of individual compounds.

Histo-morphological section of rabbit cecum:

The effect of Agri-MOS supplementation into weaned rabbit diets on the histopathological of cecum are shown in Figures (3-7). Microscopic examination of cecal sections as affected by prebiotic (Agri-MOS) addition showed numerous changes due to investigational treatments.

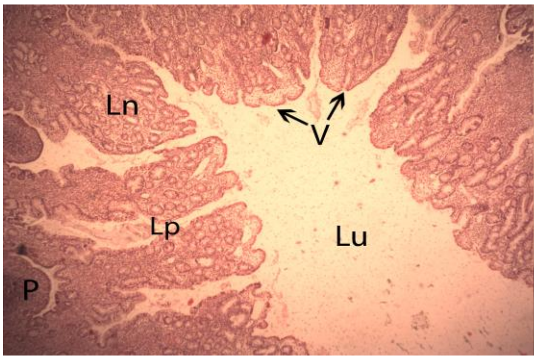

Figure 3. T.S.In the Cecal from the control Treatment (X8)

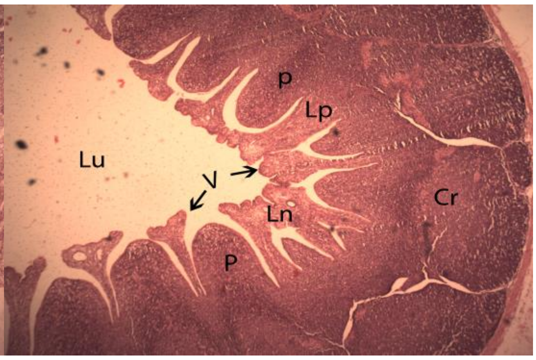

Figure 4.T.S.In the Cecal from the 0.25 g Agri-MOS Treatment (X8)

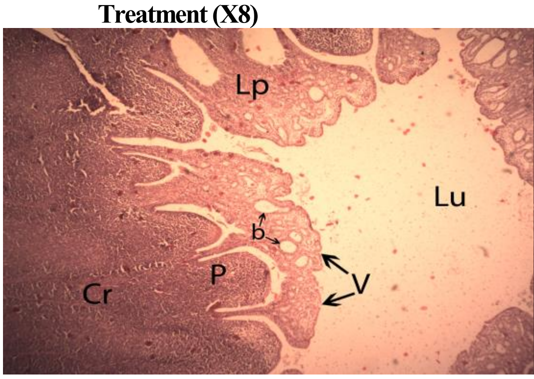

Figure 5.T.S.In the Cecal from the 0.50 g Agri-MOS Treatment (X8)

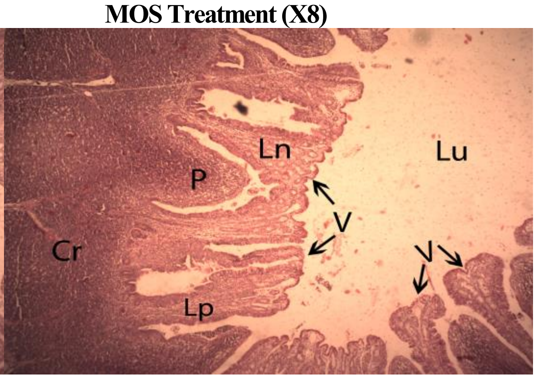

Figure 6.T.S.In the Cecal from the 0.75 g Agri-MOS Treatment (X8)

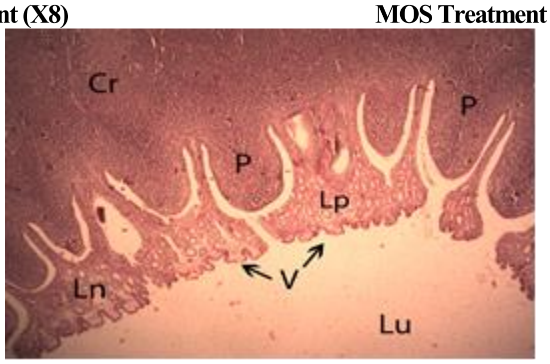

Figure 7.T.S.In the Cecal from the 1.0 g Agri-MOS Treatment (X8)

Note. Abbreviation key: V = villi; P = plicae; Ln = lymph node; Lu = lumen; Cr = crypts; b = blood vessels; Lp = lamina propria.

The groups that fed Agri-MOS-supplemented diets (T2, T3, T4 and T5) showed an improvement in the crypts in the base of the tissue or surface compared to control group. The treated groups T4 and T5 suggested that there were improvement in production of mucus compared with control group.

The improved bodily fluid layer overlying the epithelial lining of the intestine can serve as an anti-bacterial shield that anticipates the authoritative of enteric pathogens, such as enter pathogenic *Coliformes* (Mack *et al.*, 2003 and Abo El-Maaty *et. al*., 2019). In this connection, Linden *et. al*., (2008) reported enhanced mucosal surfaces with increment clearance of the pathogen from the gastrointestinal tract. On the other hand, Birchenough *et al.* (2015) reviewed that goblet cells have a role in resistance at the intestinal mucosa.

CONCLUSION

Based on the gotten results, dietary Agri-MOS supplementation up to 1.0g/kg diet had an enhancing effect on productive performance, oxidative status and histomorphological section of rabbit cecal, without any unfavorable effect on their physiological responses.

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تأثير العلف المدعم بالمنشط النمو الحيوى الأجريموس على الأداء الإنتاجى وخصائص الذبيحة، بلازما الدم، الحالة التأكسدية والهستولوجية للأرانب النيوزلاندى الأبيض النامية

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أجريت هذه الدراسة بهدف تقييم تأثير إضافة منشط النمو الحيوي الأجريموس على أداء النمو ، خصائص الذبيحة ومكونات الدم والحالة التأكسدية وهستولوجى الأعور للأرانب النيوزيلاندى الأبيض النامية. حيث تم توزيع عدد 75 أرنب نيوزيلاندي أبيض عمر الفطام (42 يوم) بشكل عشوائي على خمس مجموعات تجريبية، تضم كل مجموعة خمس مكررات بكل مكررة ثلاث أرانب. تم تسكين الأرانب فى بطاريات معدنية تحت ظروف رعائية متماثلة، وتم التغذية على خمس علائق تفى بالإحتياجات الغذائية للأرانب النامية من عمر 6 إلى 13 أسبوع. تم إضافة المنشط النمو الحيوى أجريموس إلى العلائق التجريبية بمستويات: صفر (المجموعة الضابطة) ، 0,25 ، 0,50 ، 0,75 ، 1,0 جم أجريموس/ كجم علف، على التوالي. وقد أوضحت النتائج أن مجموعات الأرانب المغذاه على علف مدعم بمنشط النمو الحيوى الأجريموس بمستويات 0,75 و 1,0 جم /كجم علف حققت أعلى معنوية فى وزن الجسم والنسبة المئوية للذبيحة مقارنة بالمعاملات التجريبية الأخرى. كما أوضحت النتائج أيضا أن المجموعة المغذاه على علف مدعم بمستوى 1,0جم أجريموس كانت أقل معنويا فى العد البكتيري الضار(الاشيرشياكولاى) مع إرتفاع معنوي للعد البكتيري النافع (اللاكتوباسلس) فى الأعور لجميع المجموعات المدعم غذائها بالاجريموس مقارنة بمجموعة الكنترول. كما أوضحت النتائج تأثر محتوى بلازما الدم من الجلوكوز والبروتين الكلى والألبيومين ووظائف الكبد والنشاط التأكسدى وهرمونات الغدة الدرقية والخصائص الهستولوجية للأعور للأرانب النيوزيلاندى الأبيض النامية إيجابيا بالتغذية على العلف المدعم بالمنشط النمو الحيوي الأجريموس. وخلصت هذه الدراسة إلى أن إضافة المنشط الحيوى الأجريموس إلى علف الأرانب حتى مستوى 1,0جم/كجم علف يؤدى الى تحسن فى الأداء الإنتاجى والحالة التأكسدية والعد البكتيري النافع فى الأعور وتحسن الخصائص الهستولوجية للأعور فى الأرانب النامية دون تأثيرات سلبية على الإستجابة الفسيولوجية للأرانب النيوزيلاندى الأبيض النامية.