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THYMUS VULGARIS AND THECHNOMOS DECREASE *ESCHERICIA COLI* AND INCREASE LACTOBACILLUS IN BROILER ILEUM AND CECUM

HOSSEIN AMOUEI, ALI QOTBI, MEHRDAD BOUYEH, ALIREZA SEIDAVI*

Department of Animal Science, Rasht Branch, Islamic Azad University, Rasht, Iran

***Corresponding Author Email: alirezaseidavi@iaurasht.ac.ir**

ABSTRACT

Aim of this study was study of the effects of thyme and TechnoMos on lactobacillus and *Eschericia coli* populations of broiler ileum and cecum. The studied treatments included as T1: basal diet (control); T2: basal diet included 0.025% prebiotics TechnoMos; T3: basal diet included 0.075% prebiotics TechnoMos; T4: basal diet basal diet included 0.125% prebiotics TechnoMos; T5: basal diet basal diet included 0.05% thyme extract; T6: basal diet included 0.075% thyme extract; and T7: basal diet included 0.10% thyme extract. Microflora populations of cecum and ileum collected and analyzed. Based on obtained results, dietary additive had not significant effect on ileum lactobacillus and cecum *Eschericia coli* (P>0.05), although control diet (without additive) from 1st-42nd day of age had the lowest ileum lactobacillus numerically (7.35 log CFU/g digesta) and the highest cecum *Eschericia coli* (8.16 log CFU/g digesta). Also, 0.125% prebiotics TechnoMos and 0.075% thyme extract from 1st-42nd day of age resulted to numerically the highest ileum lactobacillus (7.97 log CFU/g digesta) and lowest cecum *Eschericia coli* (7.11 log CFU/g digesta). From obtained results, it is showed that dietary additive had significant effect on cecum lactobacillus and ileum *Eschericia coli* (P≤0.05), so 0.125% prebiotics TechnoMos and 0.075% thyme extract from 1st-42nd day of age had the highest cecum lactobacillus (8.82 log CFU/g digesta) and the lowest ileum *Eschericia coli* (6.85 log CFU/g digesta).

Key words: TechnoMos, thyme, lactobacillus, *Eschericia coli*, gut, broiler

INTRODUCTION

Thymus vulgaris is a useful plant and use as additive in poultry farms sometimes. There are some research about its effects on poultry microflora and productivity **[1, 2, 3, 4]**. On the other hand, prebiotics are use as alternative additive in broiler diets and there are some reports about its useful effects on poultry microflora and productivity **[5, 6]**. However there are few reports for comparison of thyme and prebiotics on broiler miicroflora.

The aim of this experiment was investigation on the effects of thyme and TechnoMos on lactobacillus and *Escherichia coli* in cecum and ileum of broiler chicks.

MATERIALS AND METHODS

A total of 560 1-day-old male Ross 308 broiler chicks were used in this experiment. The chicks were randomly assigned to 7 treatments with 4 replicates (20 chicks/group). The chicks were housed in 28 pens (1 m^2 each) with similar environmental conditions. The pens were separated from each other with a metal mesh wall. All the pens and the equipments were cleaned, washed and disinfected properly before the chicks were placed. The experimental period lasted for 42 d, with a lightning program of 23L:1N.

A two phase feeding program was used in this investigation and consisted of provision of starter feed from 1st-21st days of age, and grower feed from 22nd-42nd days of age **[Table 1]**. The diets met or exceeded Ross 308 catalogue recommendations.

The studied treatments were as follows:

Treatment 1: basal diet (control);

Treatment 2: basal diet included 0.025% prebiotics TechnoMos from 1st-42nd day of age;

Treatment 3: basal diet included 0.075% prebiotics TechnoMos from 1st-42nd day of age;

Treatment 4: basal diet basal diet included 0.125% prebiotics TechnoMos from 1st-42nd day of age;

Treatment 5: basal diet basal diet included 0.05% thyme extract from 1st-42nd day of age;

Treatment 6: basal diet included 0.075% thyme extract from 1st-42nd day of age; and

Treatment 7: basal diet included 0.10% thyme extract from 1st-42nd day of age.

At the 42nd day of age, a bird from each replication was euthanized and cecum and ilum were removed for further culture.

Agar plates were streaked with cecum and ileum content and sent to the laboratory. To determinate bacterial growth and colony counts, the agar plates streaked on the site

were used. Collecting tubes were weighted, wrapped into aluminum sheet and autoclaved for 10 min. The culture mediums were prepared and 24 hours before collecting samples were poured into the petri dish. MRS agar (Man Rogosa Sharpe agar, 1.10660.500) to culture Lactobacilli, and Eosin Methylene Blue (EMB, 1.01347.0500) to culture *Escherichia coli* were used.

The GLM procedure of SAS 9.1 (SAS Institute Inc., Cary, NC) was used in the statistical analyses. The statistical design was: $Yij = \mu + Ti + eij$; where Yij is the observation, μ is the overall mean, Ti is the fixed effect of the treatment, (i = 7), and eij is the residual error. Duncan's test was used to compare means. Statistical significance was declared at $P<0.05$.

RESULTS AND DISCUSSION

Obtained results for the effects of diet supplementation with essential oil and prebiotic on lactobacillus and *Escherichia coli* of broiler ileum and cecum are summarized in **Table 2**.

Dietary additive had not significant effect on ileum lactobacillus ($P>0.05$), although control diet (without additive) from 1st-42nd day of age had the lowest ileum lactobacillus numerically (7.35 log CFU/g digesta). Also, 0.125% prebiotics TechnoMos from 1st-42nd day of age resulted to numerically the highest ileum lactobacillus (7.97 log CFU/g digesta).

From obtained results, it is showed that dietary additive had significant effect on cecum lactobacillus ($P\leq0.05$), so 0.125% prebiotics TechnoMos from 1st-42nd day of age had the highest cecum lactobacillus significantly (8.82 log CFU/g digesta). Also, 0.075% prebiotics TechnoMos from 1st-42nd day of age and also 0.075% thyme extract from 1st-42nd day of age had significantly the lowest effect on cecum lactobacillus (8.01 and 8.07 log CFU/g digesta respectively).

Dietary additive had significant effect on ileum *Escherichia coli* ($P\leq0.05$), so 0.075% thyme extract from 1st-42nd day of age had the lowest ileum *Escherichia coli* significantly (6.85 log CFU/g digesta). Also, control diet and 0.025% prebiotics TechnoMos from 1st-42nd day of age had significantly the highest ileum *Escherichia coli* (8.10 and 7.91 log CFU/g digesta respectively).

Dietary additive had not significant effect on cecum *Escherichia coli* ($P>0.05$), although 0.075% thyme extract from 1st-42nd day of age had the lowest cecum *Escherichia coli* numerically (7.11 log CFU/g digesta). Also, control diet resulted to numerically the

highest cecum *Escherichia coli* (8.16 log CFU/g digesta).

Based on our findings, it is showed that both thyme and TechnoMos could decrease *Escherichia coli* of ileum and cecum. Both these dietary additives could increase population of lactobacillus in ileum and cecum. Therefore, we can conclude there are positive effects of thyme and TechnoMos on ileum and cecum microflora, hence broiler digestion and productivity can affected by these additives.

Although there are similar reports for thyme **[7, 8, 9, 10]** and prebiotics **[11, 12, 13]** which our findings confirm these reports, however more experiments are necessary in order to careful investigation of thyme and TechnoMos on broiler digestion and productivity.

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Table 1. Experimental diets fed to broiler chickens.

	Starter 1-21 d	Grower 22-42 d
Ingredients, %		
Corn	**54.32**	**58.69**
Soybean meal	**39.43**	**31.87**
Mineral oysters	**0.90**	**0.79**
Corn oil	**2.16**	**5.83**
Dicalcium phosphate	**2.05**	**1.68**
NaCl	**0.37**	**0.37**
DL-methionine	**0.20**	**0.22**
L-lysine HCL	**0.07**	**0.05**
Vitamin and mineral mixture[1]	**0.50**	**0.50**
Calculated analysis[2]		
Metabolizable energy, MJ kg^{-1}	**2900**	**3200**
Crude protein, %	**22.16**	**19.20**
Calcium, %	**1.0**	**0.85**
Phosphorus, %	**0.50**	**0.42**
DCAB, mEq/kg	**236**	**202**
Lysine, %	**1.15**	**0.96**
Methionine, %	**0.50**	**0.48**
Methionine + Cysteine, %	**0.83**	**0.78**
Treonine, %	**0.79**	**0.71**

[1] Supplied per kilogram of feed - Vitamin A: 12500 IU; vitamin D_3: 1250 IU; vitamin E: 18 IU; vitamin K_3: 3.7 mg; thiamine: 1.8 mg; riboflavin: 6.6 mg; calcium pantothenate: 10 mg; niacin: 37.5 mg; pyridoxine: 32.5 mg; vitamin B12: 2.5 mg; Mn: 50 mg; Zn: 37.5 mg; Fe: 25 mg; Cu: 7.5 mg.
[2] According to National Research Council (1994).

Table 2. Mean (±SEM) of ileum and cecum lactobacillus and *Escherichia coli* at 42nd days of age in Ross 308 broilers fed the different levels of dietary prebiotics and thyme from 1st-6th weeks of age*

Trait / Treatment	Ileum Lactobacillus (log CFU/g digesta)	Cecum Lactobacillus (log CFU/g digesta)	Ileum *Escherichia coli* (log CFU/g digesta)	Cecum *Escherichia coli* (log CFU/g digesta)
Control: No additive	7.35^{a}	8.56^{ab}	8.10^{a}	8.16^{a}
0.025% prebiotics TechnoMos	7.68^{a}	8.64^{ab}	7.91^{a}	7.43^{a}
0.075% prebiotics TechnoMos	7.69^{a}	8.01^{b}	7.63^{ab}	7.71^{a}
0.125% prebiotics TechnoMos	7.97^{a}	8.82^{a}	7.38^{abc}	7.72^{a}
0.05% thyme extract	7.88^{a}	8.37^{ab}	7.47^{abc}	7.61^{a}
0.075% thyme extract	7.51^{a}	8.07^{b}	6.85^{c}	7.11^{a}
0.10% thyme extract	7.74^{a}	8.25^{ab}	7.12^{bc}	7.32^{a}
P	ns	*	*	ns
SEM (Standard Error of Mean)	0.20	0.19	0.24	0.28

* Means (± standard error) within each column of dietary treatments with no common superscript differ significantly at P<0.01 (**) or P<0.05 (*).