IJBPAS, July, 2015, 4(7): 4843-4849

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

EFFECT OF DIFFERENT LEVELS OF THYME ESSENTIAL OIL AND THECHNOMOS PREBIOTIC ON SOME BLOOD METABOLITES OF BROILERS

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ABSTRACT

An experiment was conducted in order to investigation on effect of a plant extract (thyme), and prebiotics (TechnoMos) on some blood parameters of broiler Ross 308. The studied treatments were as: treatment 1) basal diet (control); treatment 2) basal diet included 0.025% prebiotics TechnoMos from 1st-42nd days of age; treatment 3) basal diet included 0.075% prebiotics TechnoMos from 1st-42nd days of age; treatment 4) basal diet basal diet included 0.125% prebiotics TechnoMos from 1st-42nd days of age; treatment 5) basal diet basal diet included 0.05% thyme extract from 1st-42nd days of age; treatment 6) basal diet included 0.075% thyme extract from 1st-42nd days of age; and treatment 7) basal diet included 0.10% thyme extract from 1st-42nd days of age. From obtained results, Dietary additive had not significant effect on uric acid ($P>0.05$), although control diet (without additive) from 1st-42nd day of age had the highest blood uric acid numerically (6.62 mg/dl). Also, 0.075% thyme extract from 1st-42nd day of age resulted to numerically the lowest blood uric acid level (4.80 mg/dl). From obtained results, it is showed that dietary additive had significant effect on alkaline phosphatase ($P\leq0.05$), so 0.125% prebiotics TechnoMos from 1st-42nd day of age had the highest blood alkaline phosphatase significantly (660.75 U/L respectively). Also, 0.075% thyme extract from 1st-42nd day of age and also 0.075% prebiotics TechnoMos from 1st-42nd day of age had significantly the lowest effect on blood alkaline phosphatase level (481.25 and 519.0 U/L respectively).

Key words: *Thymus vulgaris*, Prebiotics, Glucose, Uric Acid, Alkaline Phosphatase, Broiler

INTRODUCTION

Nowadays, plant and medical plant extracts uses as additive in broiler diets in order to improvement of bird health and productivity. Some researchers reported efficiency of thyme (*Thymus vulgaris*) as additive into broiler diets **[1, 2, 3, 4]**. Meanwhile there are many reports about demonstrated positive effects of commercial prebiotics like as TechnoMos on broiler and broiler breeder parameters **[5, 6]**. However, there is not enough report for simultaneous comparison of TechnoMos and thyme on some plasma constitutes of broilers. The objective of the present study was to investigate the effects of three levels of thyme extract and three levels of commercial prebiotics (TechnoMos) on some plasma constitutes of broiler chicks.

MATERIALS AND METHODS

Five hundred and sixty (560) day-old Ross 308 male broiler chickens (43.5 g) were purchased from a commercial hatchery. The broiler chickens were placed in 28 land cages (20 chicks per land cage) with dimensions of 2.0 × 1.0 meters, which provided a floor area of 0.10 m^2 per bird, in a thermostatically-controlled curtain side-wall poultry barn. The cage floors were covered with paper roll litter, and the birds remained in the land cages for the duration of the experiment, which ended at 42 days of age. Each cage of 20 chickens was assigned to a replication of specific dietary treatment group.

Ambient temperature within the poultry barn was maintained with supplemental heat from thermostatically controlled gasoline rocket heaters, and humidity was added to the barn atmosphere via a water spray to maintain relative humidity between 55-65%. Ambient temperature was controlled at 32 °C at placement and decreased periodically to 24 °C at 3 weeks of age and was maintained at 24 °C until the termination of the investigation. Lighting was provided by 23 watt fluorescent tubes in ceiling fixtures. Constant light was provided on day 1, but on day 2, lighting was established at 23 hours per day until the end of the study. Air circulation within the poultry barn was facilitated by 3 wall-mounted 60 cm diameter fans on one end of the barn and 160 cm diameter wall-mounted fans on the other end of the barn to establish tunnel ventilation.

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.

This study was conducted in a completely randomized design with seven treatments and four replicates per treatment. Data were analyzed using the generalized linear model (GLM) procedure and the statistical comparison was made by Duncan test at the 95% probability level.

RESULTS AND DISCUSSION

The effects of diet supplementation with different levels of thyme essential oil and Thechnomos prebiotic on some blood metabolites of broilers, are presented in **Table 2**.

From obtained results, it is showed that dietary additive had significant effect on glucose ($P \leq 0.05$), so 0.075% thyme extract from 1st-42nd day of age and also control diet (without additive) had the highest blood glucose significantly (170.96 and 170.54 mg/dl respectively). Also, 0.10% thyme extract from 1st-42nd day of age and also 0.125% prebiotics TechnoMos from 1st-42nd day of age had significantly the lowest effect on blood glucose level (100.70 and 114.29 mg/dl respectively).

Dietary additive had significant effect on cholesterol ($P \leq 0.05$), so 0.125% prebiotics TechnoMos from 1st-42nd day of age had the highest blood cholesterol significantly (144.31 mg/dl). Also, 0.10% thyme extract from 1st-42nd day of age resulted to significantly the lowest blood cholesterol level (123.49 mg/dl).

Dietary additive had not significant effect on triglycerides ($P>0.05$), although control diet (without additive) from 1st-42nd day of age had the highest blood triglycerides numerically (108.33 mg/dl). Also, 0.05% thyme extract from 1st-42nd day of age resulted to numerically the lowest blood triglycerides level (89.98 mg/dl).

Dietary additive had not significant effect on uric acid ($P>0.05$), although control diet (without additive) from 1st-42nd day of age

had the highest blood uric acid numerically (6.62 mg/dl). Also, 0.075% thyme extract from 1st-42nd day of age resulted to numerically the lowest blood uric acid level (4.80 mg/dl).

From obtained results, it is showed that dietary additive had significant effect on alkaline phosphatase ($P \leq 0.05$), so 0.125% prebiotics TechnoMos from 1st-42nd day of age had the highest blood alkaline phosphatase significantly (660.75 U/L respectively). Also, 0.075% thyme extract from 1st-42nd day of age and also 0.075% prebiotics TechnoMos from 1st-42nd day of age had significantly the lowest effect on blood alkaline phosphatase level (481.25 and 519.0 U/L respectively).

Based on our findings, we can conclude there are positive effects of thyme and TechnoMos on blood markers.

There are similar reports on thyme **[7, 8, 9, 10]** and prebiotics **[11, 12]** which our findings confirm these reports. We suggest more researches is necessary about other effects of thyme and TechnoMos on broiler productivity and immunity.

ACKNOWLEDGMENTS

This article was prepared based on the MSc thesis of the first author. Authors gratefully acknowledge the support of Rasht Branch, Islamic Azad University, Rasht, Iran.

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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 blood constitutes 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	Glucose (mg/dl)	Cholesterol (mg/dl)	Triglycerides (mg/dl)	Uric Acid (mg/dl)	Alkaline Phosphatase (U/L)
Control: No additive	170.54^{a}	142.46^{ab}	108.33^{a}	6.692^{a}	619.25^{ab}
0.025% prebiotics TechnoMos	144.44^{ab}	130.55^{abc}	107.11^{a}	5.00^{a}	543.25^{bc}
0.075% prebiotics TechnoMos	143.10^{ab}	141.81^{ab}	100.46^{a}	5.09^{a}	519.00^{c}
0.125% prebiotics TechnoMos	114.29^{b}	144.31^{a}	90.56^{a}	6.51^{a}	660.75^{a}
0.05% thyme extract	141.55^{ab}	132.67^{abc}	89.98^{a}	5.73^{a}	616.50^{ab}
0.075% thyme extract	170.96^{a}	127.05^{bc}	106.85^{a}	4.80^{a}	481.25^{c}
0.10% thyme extract	100.70^{b}	123.49^{c}	97.05^{a}	5.79^{a}	516.50^{bc}
P	*	*	ns	ns	**
SEM (Standard Error of Mean)	16.74	5.06	14.89	0.64	0.35

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