

EFFECT OF DIETARY LEVELS OF SPEARMINT (*Mentha spicata*) ON BROILER CHICKS PERFORMANCE

E.O. AMASAIB^{1*}, B.H. ABD ELRAHMAN¹, A.A. ABDELHAMEED², B.A. ATTA ELMNAN and A.G. MAHALA¹

¹Department of Animal Nutrition, Faculty of Animal Production, University of Khartoum, Sudan

²Department of Animal Production, Faculty of Agricultural Science, University of Dongola, Sudan

*E-mail: samaniamasaib@gmail.com

ABSTRACT: This study was conducted to determine the effect of addition different levels of spearmint (*Mentha spicata*) on broiler chick's performance. One hundred and twenty eight day old unsexed (Cobb) broiler chicks were used in this experiment. Birds were distributed randomly into 16 pens (8/pen) as replicates, in a complete randomized design. The experimental diets were formulated with four levels of spearmint (*Mentha spicata*) of 0, 1, 1.5 and 2%. Feed and water were freely accessed. Feed intake, body weight gain and feed conversion ratio were weekly recorded and Mortality rate was recorded throughout the experiment. At the end of the experimental period, four birds from each treatment were randomly selected, weighed and slaughtered for determination of carcass weight and dressing percentage. Average feed intakes obtained from the experiment were 2680.20, 2679.11, 2708.55 and 2692.57 for diets 0, 1, 1.5 and 2%, respectively. However, the body weight gains for the treatments were 1481.63, 1512.81, 1519.57 and 1519.63, 0, 1, 1.5 and 2, respectively. Feed conversion ratios for treatments were found to be 1.92, 1.94, 1.92 and 1.99 respectively. Dressing percentage were 73.12, 74.17, 73.08 and 73.47 respectively. The results indicated that the supplementation of different levels of spearmint to the diets of broiler improved feed intake and body weight gain.

Key words: Spearmint (*Menthaspicata*), Broiler, Performance

ORIGINAL ARTICLE

INTRODUCTION

Organic poultry is relatively a new expression, which is widely spread in the developed countries and may be expand to the developing ones. In such kind of poultry production, farmers are not allowed to use chemical compounds at all or in a very low level for sake of costumers, instead they use alternatives like organic acids, probiotics, and medicinal plants, Mansoub (2011). Herbs and spices were used in poultry diets as feed additive non nutritive substance. In the presence of these substances the nourishing value of the ration are primarily included to improve the efficiency of the birds' growth, prevent disease and improve feed utilization. Herbs contain active substance that can improve digestion and metabolism (Sabra and Metha, 1990).

Mentha (Mint) mints are aromatic, almost exclusively perennial, rarely annual herbs that are widely distributed and can be found in many environments (Brickell, 2002). All mints prefer and thrive in cool moist spots in partial shade. They are fast growing, extending their reach along surfaces through a network of runners. Mint essential oil and menthol are extensively used as flavorings in breath fresheners, drinks, antiseptic mouth rinses, toothpaste, chewing gum, desserts and candies. The main medicinal action of the leaves and flowers of the mint depends on the abundant volatile oil, which has been found to contain a hydrocarbon, thymol and higher oxygenated compounds. It yields its virtues to boiling water, but particularly to alcohol. Steams are antispasmodic, choleric and carminative (Galib, et al. 2010). Mint is usually taken after a meal for its ability to reduce indigestion and colonic spasms by reducing the gastrocholic reflux (Spirling and Daniels, 2001).

The objective of the present study is to estimate the effect of feeding different levels of dietary spearmint (*Mentha spicata*) on broiler chick's performance.

MATERIAL AND METHOD

A total of 128 one-day old unsexed commercial broiler chicks (Cobb), were used in this study. Chicks were weighed and randomly divided into 4 groups of 32 chicks. Each group was further subdivided into four replicates with 8 chicks' per replicate. The initial weight of chicks ranged between 43.4 to 47.5g.

The First 7 days from the experiment was used as adaptation period, all chicks were fed the basal diet and assigned as untreated control. The experimental diets were formulated from basal diets (Table 1). And a graded levels of spearmint were added to the basal diet at a rate of (0, 1, 1.5 and 2%), and refers to as diet A, B, C and D respectively.

The proximate composition of spearmint was performed according to AOAC (1982) and was illustrated in Table 2. The average live body weights, body weight gains, feed intake and feed conversion ratio were measured on a weekly basis. Mortality rate for each treatment was recorded. Birds were slaughtered by cutting the throat and jugular vein using a sharp knife near the first vertebra. 4 birds from each replicate were selected randomly, slaughtered and the internal organs were dissected out. The chicks were weighted before and after slaughtering to determine hot weight and carcass weight. The dressing percentage was determined by expressing hot carcass weight to live weight. Completely Randomize Design was used in the experiment. The data generated from the experiment was subjected to Analysis of variance according to the SPSS using computer program. Duncan's multiple tests were used to assess significance of differences between treatment means.

Table 1 - Ingredient composition of experimental diets as percent (%)

Ingredient	Spearmint level %			
	(0)	(1)	(1.5)	(2)
Sorghum	63.79	62.98	62.35	61.70
G.N.M.	16.36	16.47	16.47	16.47
S.M.	13.50	13.00	13.00	13.00
Super concentrate	5.00	5.00	5.00	5.00
Spearmint	0.00	1.00	1.50	2.00
Lime stone	1.00	0.96	0.95	0.95
NaCl	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Oil	0.00	0.24	0.38	0.53
Total	100	100	100	100
Calculated nutrient content				
Crude protein (%)	22.78	22.71	22.72	22.73
Metabolizable energy (kcal/kg)	3110.36	3110.69	3110.31	3110.13
Calcium (%)	1.135	1.110	1.106	1.105
Total phosphorus (%)	0.665	0.658	0.656	0.654
Lysine (%)	1.119	1.114	1.113	1.111
Methione (%)	0.519	0.512	0.511	0.51
Crude fiber (%)	4.376	4.326	4.311	4.294
Crude protein (%)	23.26	23.34	23.49	23.52
Ether extract (%)	7.71	7.91	7.02	7.11
Ash (%)	6.97	6.09	6.94	6.56

G.N.M = ground nut cake meal S.M = sesame cake meal

Table 2 - Proximate analysis (%) of spearmint

Compound	Dry spearmint
DM	94.06
CP	19.25
EE	2.10
CF	19.57
Ash	12.82
NFE	40.32
ME/Kcal/kg)	1775

Metabolizable energy values of spearmint were calculated using the following equation according to Lodhi et al. (1976). $ME = 1.549 + 0.0102 CP + 0.0275 EE + 0.0148 NFE - 0.032 Cf$. ME for spearmint were 1775 Kcal/kg

RESULTS AND DISCUSSION

Feed intake

The effect of feeding graded levels of spearmint (*Mentha spicata*) on weekly feed intake is presented in Table 4. The results revealed that the dietary treatment had no significant effect ($P < 0.05$) on feed intake. The highest feed intake was obtained by the birds fed 1% spearmint during second and third week. The increment in feed intake which was illustrated in this study may be due to the flavor effect of spearmint (Deyoe et al., 1962). The insignificant effect of addition of spearmint to the basal diet may be due to the fact that, the diets were isocaloric and it is expected that the feed consumption could be similar (Scott et al., 1982), or may be due to the similar environmental during this period.

Body weight

The results of body weight gain are given in Table 5. The data is showing weekly body weight gain as affected by supplementation of spearmint. Birds fed 1% spearmint in the second and third week were grown better than

those fed higher levels of spearmint (1.5%, 2%). The body weight gain was not significantly ($P>0.05$) affected by addition of spearmint. These results were in the line of (Galib et al., 2010), who found insignificant effect of addition of peppermint on broiler body weight, but with improving performance compared to the control. Same results were noted by (Demir et al., 2008) concerning the effect of spearmint on broiler body weight.

Feed conversion ratio (FCR)

The data for feed conversion ratio is illustrated in Table 6. The results showed the effect of spearmint on feed FCR which was found to be insignificant in the first five weeks of age, but it is significantly affected by addition of spearmint in the sixth week ($P<0.05$), with the ranking to be as follows (1.84, 1.89, 1.94 and 2.04) for diet 1.5, 2, 1 and A. This may be due to change in environment during this week and increasing of bird's age.

Table 3 - Feed intake of boiler chicks (g/bird/week) as affected by addition of spearmint (*Mentha spicata*)

Weeks	Spearmint level %				± SEM
	(0)	(1)	(1.5)	(2)	
1	59.00 ^a	59.47 ^a	57.00 ^a	66.13 ^a	4.36
2	236.60 ^a	245.94 ^a	234.63 ^a	229.50 ^a	7.17
3	410.50 ^a	416.88 ^a	402.35 ^a	399.72 ^a	15.47
4	569.66 ^a	566.47 ^a	566.97 ^a	566.91 ^a	11.96
5	683.66 ^a	666.60 ^a	679.59 ^a	679.38 ^a	18.07
6	711.53 ^a	728.75 ^a	765.92 ^a	750.91 ^a	25.90

* Values are means of 4 replicate of 8 birds. * SEM = Standard error of the means. *Values with in rows with the same superscript are not statistically different ($P< 0.05$)

Table 4 - Body weight gain of boiler chicks (g/bird/week) as affected by addition of spearmint (*Mentha spicata*)

Weeks	Spearmint level %				± SEM
	(0)	(1)	(1.5)	(2)	
1	51.72 ^a	47.91 ^a	48.97 ^a	51.47 ^a	3.17
2	124.72 ^a	128.41 ^a	123.53 ^a	115.53 ^a	4.14
3	281.63 ^a	292.85 ^a	268.03 ^a	279.97 ^a	15.47
4	335.25 ^a	316.75 ^a	320.13 ^a	272.75 ^a	22.34
5	371.36 ^a	325.97 ^a	337.86 ^a	355.38 ^a	21.61
6	260.69 ^a	270.35 ^a	309.35 ^a	278.97 ^a	21.97

* Values are means of 4 replicates of 8 birds. * SEM = Standard error of the means. *Values with in rows with the same superscript are not statistically different ($P< 0.05$)

Table 5 - Feed conversion ratio as affected by addition of spearmint (*Mentha spicata*)

Weeks	Spearmint level %				± SEM
	(0)	(1)	(1.5)	(2)	
1	1.75 ^a	1.56 ^a	1.57 ^a	1.50 ^a	0.170
2	0.94 ^a	0.92 ^a	0.93 ^a	0.93 ^a	0.014
3	1.23 ^a	1.23 ^a	1.21 ^a	1.23 ^a	0.026
4	1.47 ^a	1.52 ^a	1.47 ^a	1.39 ^a	0.059
5	1.71 ^a	1.74 ^a	1.69 ^a	1.69 ^a	0.044
6	2.04 ^c	1.94 ^b	1.84 ^a	1.89 ^{ab}	0.029

* Values are means of 4 replicates of 8 birds. * SEM = Standard error of the means. *a,b,c values with in rows with different superscript differ significantly ($P< 0.05$)

Table 6 - Pre-slaughtering weight, carcass weight and dressing percentage of broiler chicks fed spearmint during 6 weeks

Weeks	Spearmint level %				± SEM
	(0)	(1)	(1.5)	(2)	
Pre-slaughtering weight (g)	1481.63 ^a	1525.81 ^a	1519.75 ^a	1519.63 ^a	42.2
Carcass weight (g)	1083.44 ^a	1131.75 ^a	1110.63 ^a	1116.53 ^a	38.79
Dressing percentage (%)	73.12 ^a	74.17 ^a	73.08 ^a	73.47 ^a	0.455

* SEM = Standard error of the means. *Values with in rows with the same superscript are not statistically different ($P< 0.05$)

Average pre-slaughtering weight (gm), carcass weight (gm) and dressing%

Dressing percentage of broiler chicks during experimental period is illustrated in Table 7. Four birds from each treatment were randomly selected and weighed before and after slaughtering to determined live weight and hot weight. The dressing weight to live weight. Dressing percentage for the four treatments found to be 73.12%, 74.17%, 73.08% and 73.47% respectively. The dressing percentage were not significantly ($P>0.05$) affected by addition of spearmint.



Effect of dietary spearmint (*Mentha spicata*) on overall performance

Data of overall feed intake, body weight gain, feed conversion ratio and dressing percentage are summarized in Table 8. Feed intake increased with increasing level of spearmint in the basal diet with the following ranking, Birds fed diet 1.5% obtained the highest feed intake (2708.55 g/chicks), followed by birds fed diet 2% (2692.57 g/chicks), A (2680.2 g/chicks) and the least feed intake was obtained by birds fed diet 1% (2679.11 g/chicks).

Table 7 - Effect of spearmint on overall performance throughout the experimental period (6 weeks)

Weeks	Spearmint level %				± SEM
	(0)	(1)	(1.5)	(2)	
Initial weight(g)	45.22 ^a	44.78 ^a	44.47 ^a	45.47 ^a	-
Final body weight (g)	1481.63 ^a	1512.81	1519.63 ^a	1519.63 ^a	42.20
Body weight gain (g)	1436.41 ^a	1468.03 ^a	1475.16 ^a	1474.16 ^a	38.79
Total feed intake (g)	2680.20 ^a	2679.11 ^a	2708.55 ^a	2692.57 ^a	63.81
FCR	1.92 ^a	1.94 ^a	1.92 ^a	1.99 ^a	0.042
Dressing (%)	73.12 ^a	74.17 ^a	73.08 ^a	73.47 ^a	0.455

* SEM = Standard error of the means
*Values with in rows with the same superscript are not statistically different (P< 0.05)

Body weight gain was also increased with increasing level of spearmint in the basal diet with the ranking found to be as follows, diet C recorded higher value for body weight gain when compared to diet A and diet B. It would be noted that as conclusion from the experiment, birds that fed diet (1.5% spearmint) were observed to have best performance in term of total body weight gain, total feed intake and economic value. These may attribute to the effect of some antimicrobial Components which may act as growth promoters (Al Ankari et al., 2004) and may be improvement of digestion and absorption of the nutrient (Brander, 1985). On the other hand Grieve (1981) and Chopra et al. (1992) referred the improvement in performance of the herb valued for its beneficial effect on the digestion.

CONCLUSION

Diet 1% spearmint improved feed intake and grown better during second and third week respectively. The study was emphasized that the best performance on birds fed diet 1.5% spearmint on body weight gain and total feed intake. Feed conversion ratio was similar for birds fed 1.5% spearmint with diet a control, while bird fed diet 2% spearmint was lowest.

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