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The replacement effects of peppermint (*Lamiaceaementhapiperita*) by nettle (*Urticadioica*) in mixture of different levels of medicinal plants on carcass traits in female and male broilers

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ABSTRACT

Two experiments were conducted to investigate the effects of replacement of peppermint (Lamiaceaementhapiperita)bynettle (Urticadioica) in mixture of different levels of medicinal plants on carcass traits in female and male broilers. In each of these experiments 240 broilers (Ross- 308) from 1- 42 days of age in two breeding periods including starter (1-21) and grower (22-42) days of age were used in a completely randomized design in 4 treatments and 3 replicates (with 20 birds in each replicate). The medicinal plants used in first experiment included zizaphora, mentapulagum and peppermint in second experiment peppermint was replaced by nettle. The results showed that there were significant differences between treatments in experiments about the carcass traits of female and male broilers (p<0.05). In the first experiment in female broilers the highest percent of carcass and breast (71.22) and (35.89) were observed in 3^{th} experimental group, whereas the highest percent of gizzard and thigh (3.09) and (30.85) were observed in control group. In the second experiment in female broilers like the first experiment the highest percents of carcass and breast (73.63) and (34.89) were observed in 3th experimental group and the lowest percent of abdominal fat (3.7) was observed in 4^{th} experimental group. About male broilers in the first experiment the lowest percent of abdominal fat (1.81) was observed in 3th experimental group and the highest percent of it (3.5) was observed in the control group. In the second experiment there was not any significant difference between treatments about carcass traits.

Keywords: Broilers, Medical plants, Carcass traits.

INTRODUCTION

The growth pattern in male and female broilers have significant differences; the growth rate is rapid in male broilers, and less fat is conserved in the carcass and abdominal region by considering their sexual characteristics[1-2]. High fat in the carcass is not suitable for it's hygiene, nutrient, storage properties and also it is not welcomed by the consumers [2]. The high

fat amount in the carcass decreases the storage time, and it causes bad smell and changes the color of carcass [3].

Today's, the concern of scientists is reducing the abdominal fat and instead increase the valuable parts of carcass [4-5]. One of the sources which positively affects these characteristics is medicinal plants [6-7]. Abd El-Latif*et al*, [8] found that, Thyme in diet of quail can improve the carcass and percentage of internal organs compared to control group; Abdel-Malak*et al*, [9] reported the same results by Biotonic on broilers. Alcicek *et al*, [10] used 48 mg essential oil of herbs per 1Kg of diet, and found out that it can enhance the carcass characteristics. There are anti-bacterial and anti-oxidant effects in medicinal plants [11-12]. The antibacterial components of medicinal plants affects by changing in the permeability of bacteria's membrane to Na⁺ and Ka⁺ ions [13]. Simsek*et al*, [14] worked with anise oil in broilers and saw that the carcass characters have been improved. Al- Kassie[5] reported the improvement of carcass characters and decrease in the abdominal fat under effect of thyme and cinnamon extract (100, 200 / 1000000 per Kg of diet). There are some reports indicating that medicinal plants stimulate and increase the secretion of digestive enzyme from liver and pancreas [6,15].

There are different active substances in the herbs, and there is a possibility of their interact to increase each other's effect. This study was conducted in order to evaluate the effect of nettle in the mixture of zizaphora and mentapulagum, compared to the effect of peppermint in the same mixture in male and female broiler chickens.

MATERIALS AND METHODS

A total of 240 broilers (ross-308) from 1-42 of age were divided into two groups (randomized design), one for nettle and the other forpeppermint. There were two breeding period (starter 1-21 / grower 22-42). The experiment were executed by 4 treatments and 3 repetitions in each treatment (Table 1).

Basal diet contents were chosen by the recommendation of NRC (1994). The metabolical energy level and raw protein were same for all chickens and designed based on the UFFDA software. Dried plants were obtained and the powder of them were completely mixed to the basal diet.

The environmental condition were exactly same for all the groups; all the chickens had full free access to water and food. Lightening program were 24 h for first week, but then there was 1 h darkness.

Intake feed, body weight and feed conversion ratio were calculated weekly for all chickens, also mortality rate were determined and recorded. At the end of experiment, two chicks (one female and one male) were randomly chosen from those who their weight's were close to the average weight of group.

After 9-12 h of keeping hungry to defecate the digestive system contents, the birds were weighted and then slaughtered in order to determine the carcass total weight and carcass characters percent.

The obtained data were analyzed by SAS software, and the means were compared using Duncan multiple range test by the statistical significance of P<0.05.

RESULTS

The results of effect of zizzaphora, menta and peppermint on carcass of female broilers are shown in Table 2.

Table 1: The mixtur	e of plants in	different treatments.
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Treatm	nent First experiment	Second experiment
1	Control (without medicinal plants)	Control (without medicinal plants)
2	1% zizzaphora + 0.5% menta + 0.5% peppermint	0.5% zizzaphora + $0.5%$ menta + $1%$ nettle
3	0.5% zizzaphora + 1% menta+ 0.5% peppermint	0.5% zizzaphora + 1% menta + 0.5% nettle
4	0.5% zizzaphora + 0.5% menta + 1% peppermint	1% zizzaphora + 0.5% menta + 0.5% nettle
$\begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \end{array}$	1% zizzaphora + 0.5% menta + 0.5% peppermint 0.5% zizzaphora + 1% menta+ 0.5% peppermint 0.5% zizzaphora + 0.5% menta + 1% peppermint	0.5% zizzaphora + 0.5% menta + 1% nettle 0.5% zizzaphora + 1% menta + 0.5% nettle 1% zizzaphora + 0.5% menta + 0.5% nettle

Table 2: The effect of Zizzaphora, Mentapulagum and Peppermint on carcass characters of female broilers

Characters (%)	Treatment Groups				SEM
	1	2	3	4	
Carcass	68/41 ^b	69/51 ^{ab}	71/22 ^a	67/89 ^b	0/58
Abdominal Fat	3/43	3/46	2/86	3/5	0/32
Digestive System	6/76	7/37	6/39	7/21	0/31
Gizzard	$3/09^{a}$	$3/02^{a}$	2/39 ^b	$2/74^{ab}$	0/18
Breast	$30/74^{\circ}$	31/79 ^{bc}	35/89 ^a	32/9 ^b	0/42
Lap	$30/85^{a}$	$27/49^{b}$	25/82 ^b	27/36 ^b	0/84
Liver	3/24	3/11	3/1	3/01	0/19

Values in the same row not sharing a common superscript differ significantly (P < 0.05). SEM = Standard error of mean.

Characters (%)		Treatment Groups			SEM
	1	2	3	4	-
Carcass	71/45 ^b	71/05 ^b	73/63 ^a	70/29 ^b	0/52
Abdominal Fat	4 ^b	4/91 ^a	3/79 ^b	3/80 ^b	0/21
Digestive System	6/55	5/28	6/33	7/07	0/83
Gizzard	2/46	2/51	2/41	2/38	0/28
Breast	32/32 ^b	31/26 ^b	$34/98^{a}$	$33/07^{ab}$	0/67
Lap	27/04	26/80	25/68	27/34	0/51
Liver	3/2	2/85	2/54	3	0/32

Values in the same row not sharing a common superscript differ significantly (P < 0.05). SEM = Standard error of mean.

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Characters (%)	Treatment Groups				
	1	2	3	4	-
Carcass	69/6	68/75	70/30	68/14	0/81
Abdominal Fat	$3/5^{a}$	$2/36^{bc}$	$1/81^{c}$	$3/07^{ab}$	0/34
Digestive System	6/6	8/37	6/3	8/62	0/73
Gizzard	2/79	2/83	2/67	3/21	0/2
Breast	32/23	31/07	31/06	30/26	0/99
Lap	28/48	27/85	27/41	27/87	1/17
Liver	3/02	3/36	2/81	3/37	0/2

Values in the same row not sharing a common superscript differ significantly (P<0.05). SEM = Standard error of mean.

Characters (%)		Treatment Group			SEM
	1	2	3	4	
Carcass	72/18	70/32	71/81	71/92	0/96
Abdominal Fat	3/05	4/41	3/01	3/57	0/44
Digestive System	6/38	7/14	7/52	6/46	0/92
Gizzard	2/15	2/48	2/27	2/57	0/2
Breast	33/15	30/63	32/36	32/34	1/05
Lap	27/19	27/91	27/65	27/35	0/36
Liver	2/93	3/36	2/76	2/69	0/2

Table 5:	The effect	of Zizzaphora,	Mentapulagum a	nd Nettle on c	arcass characters	of male broilers
		or Energy	n and a second and a second a			

Values in the same row not sharing a common superscript differ significantly (P < 0.05). SEM = Standard error of mean.

There were significant effects from using these plants on carcass of female chickens (P<0.05). According to the results, the usage of higher percent of menta in third group caused the highest percentage of carcass (71.22) and breast (35.89), and also the lowest percentage of gizzard (2.39) and lap (25.82) in the mentioned group. The highest percentage of gizzard (3.09) and lap (30.85), also the lowest percentage of breast (30.74) were seen in the control group. However there was no significant differences among the other carcass characters, but numerically the lowest abdominal fat and percentage of digestive system were in third group.

Table 3 shows the effect of replacement of nettle with peppermint in second experiment of female broilers. This replacement had significant influence on the carcass of female chickens (P<0.05). Same as the pervious group, the highest percentage of carcass (73.63) and breast (34.98), and lowest percentage of abdominal fat (3.79) were in third group which have had the highest menta. In contrast, the highest percentage of abdominal fat (4.91), the lowest percentage of carcass (71.05) and breast (31.26) were detected in second group with higher nettle. The other parameters had just numerical differences with the lowest percentage of digestive system in third group, and the lowest percentage of gizzard with the highest percentage of lap in 4th group.

The effect of zizzaphora, menta and peppermint on male broilers are described in the Table 4. Consumption of these plants in the dietary of male chicks showed significant effects on their carcass characters (P<0.05). The lowest abdominal fat (1.81) was seen in the third group with the highest menta, while the highest amount of abdominal fat (3.5) was in the control group. There were no significant influence in the other characters; but numerically, the highest percentage of carcass, the lowest percentage of digestive system, gizzard and lap were seen in the third group.

The replacement effect of peppermint with nettle in male birds had no significant effect (P>0.05) on their carcass quality, as described in Table 5. Meanwhile numerically the lowest abdominal fat was in third group, the highest percentage of carcass and breast and the lowest percentage of gizzard were in control group and the lowest percentage of carcass was in the second group.

DISCUSSION

The usage of higher menta in third group had noticeable effect on the studied parameters compared to the other groups, specially in female broilers; probably for their sexual characters. Enhance in the percentage of carcass and breast, and decrease in the abdominal fat, gizzard and liver in the higher menta dietary group is because of its antiseptic activity [11,16-17]. It can increase the absorption of amino acids by decreasing the bacterial colony of digestive system and preventing of their breakdown [18-20]. The antioxidant activity of medicinal plant components can preserve the nutrients from oxidation before and after consumption and increase the absorption rate [14,19]. The carvacrol in herbal plants has stimulatory effects on pancreatic

secretions[11] by increasing the secretions of digestive enzymes more amounts of nutrients like amino acids can be digested and absorbed from the digestive tract and thereby improve carcass traits. Else increasing the percents of gizzard and liver by use of nettle can have positive effects via physically grinding and increasing bile secretion on nutrient digestion. With increased amounts of absorbed amino acids, organs like breast and thigh drawn more growth. Our findings on carcass traits in this experiment are in agreement with study results of Modiry et al [21].

REFERENCES

[1] Lenstra, F. R. 1981. World Poultry Science Journal. 37: 106-110.

[2] Sizemore, F.G., and Barbato, G.F. 2002. Poultry Science. 81: 932-938.

[3] Mayes, F.J. 1980. British Poultry Science. 21: 497-504.

[4] Guler, T., Dalkilic, B. Ertas, ON. andCiftci, M. 2006. Asianian-Austeralian Journal of Animal Science. 19 (3): 425-430.

[5] Al- Kassie, G. A. M. 2009. Pakistan Veterinary Journal. 29 (4): 169-173.

[6] Hassan, I. I., Askar, A. A. and El-Shourbagy, G. A. 2004. *Egyptian Poultry Science*.24 :247-266.

[7] Pernakova, D., Mate, D. Rozanska, H. and Kovac, G. 2007. BulltanVeterinary Industry Pulawy. 51: 585-589.

[8] Abd El-Latif, S.A., Faten, A. Ahmed. and El-Kaiaty, A.M. **2002**. *Egyptian Poultry Science*. 22(1):109-125.

[9] Abdel-Malak, N.Y. Abdel-Malak, M.S. ; El-Gendi, G.M. and Naguib, E. F. **1995**. *Egyptian Poultry Science*. 15:111-139.

[10] Alcicek, A., Bozkurt, M. and Cabuk, M. 2004. African Journal of Animal Science. 34 (4): 217-222.

[11] Azaz, D., Demirci, F. Satıl, F. Kürkçüoğlu, M. and Başer, K. H. C. 2002. Antimicrobial activity of some Satureja oils. 57:817-821.

[12] Botsoglou, N.A., Florou-Paneri, P. Christaki, E. Fletouris, D.J. Spais, A.B. 2002. British Poultry Science. 43: 223-230.

[13] Kamel, C. **2001**. Tracing modes of action and the roles of plant extracts in non-ruminants. In: Garnsworthy PC, and Wiseman J. (Editors). Recent advances in animal nutrition. Nottingham: Nottingham University Press.pp 135-150.

[14] Simsek, UG., Ciftci, M. Dalkilic, B. Guler, T. and Ertas, ON. **2007**. *Revue de Medecine*. 158 (10): 514-518.

[15] Hernández, F., Madrid, J. García, V. 2004. Poultry Science. 83: 169-174.

[16] Cowan, M. M. 1999. Clinical Microbiology. Review. 12: 564-582.

[17] Dorman, H.J.D., and Deans, S.G. 2000. Journal Applied Microbiologhy. 88: 308-316.

[18] Mellor, S. 2000a. World Poultry.16(1): 14-15.

[19] Mellor, S. 2000b. World Poultry. 16: 30-33.

[20] Ultee, A., Kets, E. P.W. and Smid, E.J. **1999**. *Applid Environmental Microbiology*.1999; 65: 4606-4610.

[21] Modiry A, Nobakht A, Mehmannavaz Y (**2010**). Investigation the effects using different mixtures of Nettle (*Urticadioica*), Mentapulagum(*Oreganumvulgare*) and Zizaphora (*Thymyus vulgaris*) on performance and carcass traits of broilers.Proc. 4th Iran. Cong. Anim.Sci., pp. 252-254.