EFFECT OF CHARCOAL SUPPLEMENTATION ON THE PERFORMANCE BROILER CHICKENS

Majewska T., Pudyszak K., Wysocki P.

Department of Poultry Science,
University of Warmia and Mazury in Olsztyn

Introduction

Charcoal obtained trough dry distillation of hardwood contains about 96% pure charcoal and 4% of other mineral compounds. The mineral compounds in charcoal are in organic from. When they are dissoloved in water they act as biocatalysts that can contribute to regulating metabolic processes, maintaining the proper osmotic potential of body fluids, activating enzymes, hormones and antibodies. Charcoal has enormous adsorptive properties. It acts curatively on the gastrointestinal tract, adsorbing gases such as hydrogen sulphide and ammonia that are formed there, bacterial toxins as well as mycotoxins produced by fungi (Edrington et al., 1997; Shareef et al., 1998). According to Garwacki and Wiechetek (1998) the use of charcoal is also beneficial in cases of poisoning by such compounds as alkaloids, phenol, glycosides and even strychnine and potassium cyanide. Charcoal is not digested in the gastrointestinal tract and binds various substances through physical interactions regardless of whether they are ionized or not. By binding ammonia, charcoal protects the intestines from alkalization. It prevents intestinal infections and stops the diarrhoea caused by them by adsorbing and eliminating the germs with the faeces but it is not bactericidal. The minerals contained in charcoal from bases with water , lower the surface tension of the digesta, emulsify fat, thereby support liver function and enable the digestion and assimilation of fat. The beneficial effect of charcoal on humans and animals has been know for a long time. Its favourable influence on increasing the body weight of broiler chickens, their survival and feed utilization was described by Edrington et al., (1997), Shareef et al., (1998) and Majewska et al., (1999).

The purpose of this study was to examine the effect of hardwood charcoal on the performance of broiler chickens.

Material and methods

The experiment was conducted on the 600 numbers of chicken COBB. One-day chickens were allocated to two feeding groups, each with two replicates of 150 birds. The birds in both groups were fed granulated standard feeds in a 3-stage system: starter, grower, finisher. The birds in group II received identical feeds but with charcoal on the level of 0,3% (3 kg per tone). Nutrition value of the feeds are presented in table 1.

All of the birds was weighed individually at the and of 35, 42 and 49 days of life. Feed consumption was determined per group, per week, mortality

were recorded daily. After the end of experiment 6 cocks from each group with weights close to those of the group were slaughtered and dissected. The results were subjected to statistical analysis using Stat 1 program (Mikołajczak, 1993)

Table 1. Nutritive of feed mixtures

Specification		Starter 0-13 days	Grower 14-42 days	Finisher 42-49 days
EM, kcal	Min.	1950	3020	3150
Crude protein, %	Min	21,0	19,5	17,5
Crude fibre, %	Max	4,0	4,0	4,0
Crude fat, %	Max	5,0	6,0	8,5
Avilable P	Min.	0,4	0,4	0,4
NaCl, %	Max	1,o	1,0	1,0
Lys	Min.	1,1	1,0	0,95
DL-met	Min.	0,45	0,44	0,4
Growth stimulator		Avilamycin	Avilamycin	Avilamycin
Coccidiostat		Clinocox	Clinocox	-

Results and discussion

A beneficial effect of feeds with charcoal on body weight was noted starting from 3 week of rearing (Table 2), Birds of group II were higher about 5%. Edrington et al., (1997) using superactivated charcoal (SAC) in feeding broiler found that after 21 days the chickens had 4,6% higher body weight. At the end of experiment after 49 days the birds in the group receiving 0,3% charcoal were significantly, 0,09 kg, i.c. 3,5% ($P<0,01$), heavier than those in control group. We noticed a similar tendency in studies on charcoal supplementation of broiler chickens (Majewska et al., 1999), where 0,3% charcoal was also added to feed. The addition of charcoal favorably affected the feed conversion ratio (Table 2). Birds receiving feeds with charcoal used on average 2% less feed per kilogram body weight than the birds on control group. In another experiment Majewska et al. (2002) turkeys after 18 week of rearing , given charcoal (0,3%) supplemented were 5,9% heavier (on average 870 g) and had a 6,5% better feed conversion ratio than the control group. The authors attributed this effect to presence of available microelements and the detoxicating effect of charcoal. Mortality of birds in groups was similar (3,7 – 3,1%).

The charcoal in feeds did not significantly affect the results of carcass analysis, but did significantly increase thigh muscles ($P<0,05$) (Table 3).

Conclusion

The addition of charcoal in an amount of 3 kg per ton of feed improved the performance and increased of thigh muscles

Table 2. Rearing results of chicken broilers

Specification	Groups	
	I - control	II – charcoal
Body weight, kg		
21 days	0,80[b]	0,84[a]
%	100,0	105,0
42 days	2.26[b]	2.34[a]
%	100,0	103,54
49 days	2560[b]	2650[a]
%	100,0	103,5
Feed conversion ratio kg/kg	1,98	1,93
%	100,0	97,97
Mortality,%	3,7	3,1

a, b – P<0,05

Table 3. Slaughter analysis of chicken (body weight before slaughter =100%)

Specification		Groups	
		I - control	II – charcoal
Dressing percentage	X	75.68	77.70
	v	2.72	1.81
Giblets	x	3.67	3.72
	V	11.43	6.21
Including:			
Heart	X	0.46	0.44
	V	11.26	10,0
Liver	X	2.30	2.51
	v	11.25	7.57
Gizzard	x	0.90	0,77
	v	11,87	9.65
Breast muscles	x	15.65	16.45
	v	3.61	4.16
Thigh muscles	x	8,79[b]	10.12[a]
	v	4.68	4.34
Drumstick muscles	X	7.23	7.26
	V	11.48	4.95
Muscles total	X	31.57	33.43
	v	4.80	6.02

a, b – P<0,05

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Summary

The birds in the treatment group received a feed supplemented with charcoal at a dose of 3 kg/ton (0,3%). The use charcoal had a beneficial effect on performance. After 49 days of rearing chicken given feeds with charcoal were 3,5% and had a 2% heavier better feed conversion ratio than the control group.

Key words: charcoal-supplemented, chickens, performance

QUALITY OF MEAT FROM MUSCOVY DUCKS AS DEPENDENT ON THEIR AGE

Kazimierz Wawro, Elżbieta Wilkiewicz-Wawro

Department of Breeding Methods and Animal Improvement
University of Warmia and Mazury in Olsztyn. Poland

In many developed countries a diet based on low-fat animal products is recommended as part of preventive treatment of circulatory diseases (4). Meat from Muscovy ducks seems to meet these requirements (1, 3, 6). The aim of the present studies was to evaluate the chemical. physicochemical and sensory properties of meat from Muscovy ducks reared to 9 or 10 weeks – females. and 11 or 12 weeks - males.

Material and Methods

The experimental material were 200 Muscovy ducks (sex: 1:1), reared according to the technology applied in Poland. When the rearing period was over. 20 birds were selected at random from each age group. 40 ♂ and 40 ♀ altogether. Breast muscles (musculus pectorolis superficialis and profundus) were separated from chilled carcasses, to determine by conventional methods their chemical composition (crude protein, crude fat, dry matter, ash), physicochemical properties (pH – with a pH-meter, colour lightness – with a spectrocolorimeter, water-holding capacity – by the Grau and Hamm method) and sensory properties (aroma. juiciness. tenderness, palatability – according to the methodology given by Baryłko-Pikielna et al., (2). A statistical analysis included the determination of arithmetic means ($\bar{x}$), coefficients of variation (v) and significance of differences between the means for age in sex groups.

Results

Breast muscles of older birds. both males and females. were characterized by a significantly higher content of protein. dry matter and ash (Table 1). The fat content of the muscles examined was at a similar level (from ca. 0.8%) in