

DIETARY ARTEMISIA ABSINTHIUM EFFECT ON GROWTH RATE AND FEED CONVERSION OF CHICKENS

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ABSTRACT

The aim of our study was to assess the dietary effect of *Artemisia absinthium* L. supplementation on the growth intensity and feed conversion of fattened chickens. A total of 120 female Ross 308 chickens at the age of 21 days were divided into 4 dietary groups. Chickens of the control group were fed a basal diet. Chickens of experimental groups were fed diets supplemented with meal of *Artemisia absinthium*; specifically, the A1, A5 and A10 groups were given diets with the addition of 1, 5 and 10 % *Artemisia absinthium* to the basal diet, resp. The supplementation of *Artemisia absinthium* to diets for fattened chickens led to the alteration of chicken growth rate in the assessed periods ($P < 0.01$), however, the final BW of chickens didn't vary among respective dietary groups ($P > 0.05$). Within the entire experimental period, the FCR value increased with the elevating proportion of *Artemisia absinthium* in a diet.

Keywords: diet; wormwood; meat-type chicken; production performance

INTRODUCTION

Options to control avian coccidiosis include anticoccidal chemicals, vaccines and natural products. Anticoccidal chemicals, coccidiostats, coccidioides, and ionophores have long been used as a major tool to control coccidiosis in poultry production. While this is an effective and economically acceptable approach, the threat of resistance to these substances and public demands for residue-free meat has encouraged development of alternative control strategies (Chapman et al., 2010).

Vaccinations made up of one or more strains of wild-type or attenuated *Eimeria* species are among the other option for controlling coccidiosis in poultry farms (Muthamilselvan et al., 2016).

The use of phytogetic products as an alternative to anticoccidal agents can overcome the risks posed by chemical drugs. Moreover, poultry fattened with herbal additives are generally well accepted among current consumers (Srinivasu et al., 2020). The genus *Artemisia* is of interest due to its wide range of pharmacologic properties, such as antioxidant, anti-inflammatory, immune-boosting and antiparasitic effects. The dried plant of *Artemisia absinthium* L. (AA) is, among other specifications, characterised by high levels of proteins, which can play an effective role in fighting against various diseases (Amin et al., 2022).

The aim of our study was to assess the dietary effect of *Artemisia absinthium* L. supplementation on the growth intensity and feed conversion of fattened chickens.

MATERIAL AND METHODS

A total of 120 female Ross 308 chickens at the age of 21 days were used in the experiment. The chickens were divided into 4 dietary

groups of 30 individuals in each. Dividing of chickens in dietary groups was done with the aim of achieving an even distribution of body weight (BW) values and no different average BW among the dietary groups assessed. Chickens were housed in floor pens of the accredited experimental stable of the Department of Animal Breeding, Animal Nutrition and Biochemistry, University of Veterinary Sciences Brno under controlled housing conditions that respected standards used for husbandry of Ross 308 chickens (Aviagen, 2018).

The 2-phase feeding program was used; when the grower diet was fed from 21 to 35 days of age and the finisher diet was fed from 36 to 42 days of age (experiment finishing). The ingredient and nutrient composition of the basal diet is stated in Table 1; the basal diet was offered to chickens in the control (C) group. Chickens of experimental groups were fed diets supplemented with dry meal from whole aerial parts of *Artemisia absinthium* L. In particular, the A1, A5 and A10 groups were given the diets with the addition of 1, 5 and 10 % AA meal to the basal diet, respectively. Feed and water were supplied ad libitum. At 21, 28, 35, and 42 days of age, chickens were weighed and feed intake (FI) was recorded. The average weight gain and FI adjusted for mortality were used to find the feed conversion ratio (FCR; feed/gain). The arithmetic mean was determined for BW and average daily gain (ADG) in particular dietary groups. To test normality of data distribution in these variables, the Shapiro-Wilk test was used. The normality was found in the both variables. A one-way ANOVA was used to analyse the diet effect on BW and ADG of chickens in their respective ages. Differences among groups were tested by the HSD post-hoc test. The significance was considered at the $P < 0.05$ level. All

statistical analysis were carried on by STATISTICA CZ, v. 10 software.

Table 1. Composition of a basal diet as fed basis

	Grower	Finisher
<i>Ingredient composition (%)</i>		
Wheat	9.38	9.68
Maize	49.5	49.5
Soybean meal	30.5	30.5
Canola oil	4.8	3.5
Monocalcium phosphate	0.7	0.7
Limestone	1.25	1.25
NaCl	0.24	0.24
NaHCO ₃	0.20	0.20
Lysine	0.14	0.14
Methionine	0.23	0.23
Threonine	0.60	0.60
Maize sprouts	2.0	3.0
Mineral and vitamin premix	0.5	0.5
Mastercube®	0.5	0.5
<i>Nutrient composition (%)</i>		
Crude protein	19.2	19.3
Crude fibre	2.29	2.26
Crude fat	10.0	7.2
Ash	5.36	5.44
Metabolizable energy (MJ/kg)	14.4	14.1

RESULTS AND DISCUSSION

The AA herb meal supplemented to the chicken diet contained (on dry matter basis) following nutrients: 11.4 % of crude protein, 33.5 % of crude fibre, 2.2 % of fat, 44.9 % of nitrogen-free extractives and 8.1 % of ash. The dietary addition of AA to the grower at levels 5 and 10 % in our study led to a decrease in growth intensity ($P < 0.05$, $P < 0.01$, resp.) in the period between 21 and 27 days of age in chickens

compared to the group C, which was also associated with significantly ($P < 0.01$) lower BW of chickens at 28 days of age in the group A10 (Table 2). On the contrary, subsequently in period between 28 to 34 days of age, chickens in the group A10 showed the highest growth intensity ($P < 0.01$).

Table 2. Average body weight and daily weight gain of chickens in relation to *Artemisia absinthium* supplementation to diet

Age	Diet				<i>P</i>
	C	A1	A5	A10	
Body weight (g)					
At 21 days	766.6	742.9	735.4	758.4	0.276
At 28 days	1312.0 ^A	1265.6	1233.8	1187.3 ^B	0.001
At 35 days	1905.3	1882.6	1832.9	1928.6	0.231
At 42 days	2571.9	2485.3	2471.6	2589.6	0.099
Average daily gain (g)					
21 to 27 days	77.9 ^{A,a}	74.7 ^{A,a,b}	71.2 ^{A,b}	61.3 ^B	<0.001
28 to 34 days	84.8 ^B	88.1 ^B	85.6 ^B	105.9 ^A	<0.001
35 to 42 days	95.2 ^{A,a,b}	86.1 ^{B,b}	91.2 ^{a,B,a}	94.4 ^{A,a,b}	<0.001
21 to 42 days	86.0	83.0	82.7	87.2	0.060

^{a,b}: Means within a row with different superscript letters differ at $P < 0.05$; ^{A,B}: Means within a row with different superscript letters differ at $P < 0.01$.

This compensatory growth of chickens fed a finisher diet with addition of 10 % AA in that period was associated with an increase in their average BW, which was not different to the other dietary groups evaluated ($P > 0.05$), as well as, with the higher feed intake and most favourable feed conversion (1.54 kg/kg; Table 3). At the end of the

fattening period, the intensity of the growth did not differ among the chickens in groups C, A5 and A10 ($P > 0.05$), resulting in same final BW at 42 days among dietary groups evaluated ($P > 0.05$). An increase in feed consumption for groups A5 and A10 during this period led to the worsening of feed conversion than in chickens of the group C.

Table 3. Average feed intake and feed conversion of chickens in relation to *Artemisia absinthium* supplementation to diet

Age	Diet			
	C	A1	A5	A10
Feed intake (g/bird/day)				
21 to 27 day	113.9	109.3	108.9	106.5
28 to 34 day	145.4	140.8	141.6	163.2
35 to 42 day	165.1	164.4	170.8	188.0
21 to 42 day	141.5	138.2	140.4	152.6
FCR (kg/kg)				
21 to 27 day	1.46	1.46	1.53	1.74
28 to 34 day	1.72	1.60	1.65	1.54
35 to 42 day	1.73	1.91	1.87	1.99
21 to 42 day	1.65	1.67	1.70	1.75

FCR: feed conversion ratio.

In the course of the entire evaluated experimental period in our study, the FCR value elevated adequately with the increasing proportion of AA in a diet (Table 3). The initial reduction in growth intensity of chickens fed diets with addition of 5 and 10 % AA meal could be

related to both the intrinsic changeover to experimental diets and the likely slightly different nutritional composition of these diets compared to a basal diet (group C). The consequent significant increase in both growth intensity and feed consumption in chickens fed diets with higher AA inclusion indicates a stimulating effect of AA meal on the physiology of chicken GIT. This was likely related to higher levels of digestion, as well as altered nutrient absorption, especially during the period from 28 to 42 days of age. It would be advisable to conduct other profiled study, where diets with different levels of AA would be formulated as isoenergetic and isonitrogenous in order to better understand intrinsic dietary AA effects on chicken performance.

Recently, Cetin et al. (2019) didn't find differences in BW of chickens, when AA was supplemented at the level of 1.2 to 4.7 %; this is not consistent with our results. In addition, increased chicken BW at 42 days of age was reported by Kostadinović et al. (2015) if chickens were fed diets with supplementation of 15 and 20 % AA; the level of 10 % AA supplementation to the diet didn't alter chicken BW in their study. Similarly to our results, Kostadinović et al. (2015) recorded increased FCR values for chickens fed diets with higher AA levels. It should be added that the content of both basic nutrients and biologically active substances in the AA herb can vary significantly depending in particular on the geographical location of origin, the type of soil and the altitude of cultivation, the harvest time, the length and method of storage and so on (Amin et al., 2022).

CONCLUSION

The inclusion of *Artemisia absinthium* in diets for fattened chickens resulted in an alteration of chicken growth intensity in the assessed

period, with the final BW of chickens before slaughter not differing significantly among evaluated dietary groups. Furthermore, as the proportion of *Artemisia absinthium* in diets increased, the feed conversion was worsening proportionally in fattened chickens. In order to further clarify the dietary *Artemisia absinthium* effects on the chicken organism, further studies would be appropriate.

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