JMBFS

Journal of Microbiology, Biotechnology and Food Sciences

International peer-reviewed scientific online journal

Published by Faculty of Biotechnology and Food Sciences

Haščík et al. 2013 : 3 (2) 118-121

MEAT PERFORMANCE OF CHICKENS HUBBARD JV AFTER APPLICATION OF PROPOLIS EXTRACT

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ARTICLE INFO

Received 4. 6. 2013
Revised 9. 9. 2013
Accepted 16. 9. 2013
Published 1. 10. 2013

Regular article

OPEN ACCESS

ABSTRACT

Influence of propolis extract on meat performance of chickens' hybrid combination Hubbard JV was evaluated in this experiment. The feed mixture has been made without addition antibiotic preparation and coccidiostats. However, propolis extract was added to the feed mixtures of experimental groups during the whole fattening period in followed amounts: 150 mg kg^{-1} (1st experimental group – E1) and 450 mg kg^{-1} (2nd experimental group – E2). Fattening lasted 42 days. Live body weight increased by 7.63 g in E1 and by 14.13 g in E2 compared with control group (1507.37 g). Carcass body weight was higher in experimental groups (1022.37 g – E1 and 1019.75 g – E2) compared with control group (1005.12 g). The weight of giblets was lower in experimental groups (117.79 g – E1 and 117.16 g – E2) compared with control group (119.06 g). The carcass yield of chickens was higher in E1 (75.27%) compared with control group (74.92%), Carcass yield of chickens was higher in E1 (75.27%) compared with control group (74.92%) but E2 (74.76%) was lowest. and there were no significant differences ($P \geq 0.05$) among the groups.
Propolis extract did not influence the meat performance. Slight increase of live body, resp. of carcass body weight at the end of fattening can have a positive effect on the overall economics of chicken meat production.Based on the results, propolis extract is available supplement for chickens fattening.

Keywords: Meat performance, propolis extract, Hubbard JV, broiler

INTRODUCTION

Poultry meat and products from poultry meat are generally popular, because they are no subjects of cultural or religious limitations and they are perceived as healthy and nutritive matters for their relatively low fat content and higher content of unsaturated fatty acids in comparison with other meat. **Van Horne (2002)** states, advantages of poultry meat are availability for wide range of population and price acceptability. Poultry meat is suitable material for production of functional foods determined to human consumption; nowadays, agricultural and food research is centred on functional foods **(Berri *et al.*, 2001; Straková *et al.*, 2003; Guéye, 2009)**. Instead of poultry meat production, quality composition of poultry meat is important in the food industry, too and the composition is influenced by various intravital and extravital factors, where the main role has quality of feed mixture and supplements used in poultry nutrition **(Pesti *et al.*, 1986; Koelkebeck *et al.*, 1993; Gonzalez-Alcorta *et al.*, 1994; Haščík *et al.*, 2005a, 2012)**.
During the last decades, various supplements for feed mixtures were evaluated as a substitution for expensive components or as supplements affecting the quality of meat and egg **(Haščík *et al.*, 1994; Angelovičová, 1999; Polák, 2003; Pokorná, 2003; Arpášová *et al.*, 2009ab and others)**. Entry of Slovakia into the European Union was associated with important changes in production of poultry meat and eggs. Then, a new era of the conditions and regulations of the European Community (EC) has begun. One of the basic EC measures was removing of animal meals and growth stimulators or antibiotics from poultry feed mixtures, where upon new possible supplements has started to apply in poultry nutrition and verify their positive effects to microorganisms of poultry gastrointestinal tract **(Corrier *et al.*, 1995; Kačániová *et al.*, 2005, 2006ab, 2007; Nováková *et al.*, 2008)** and of carcass body **(Carazzoni *et al.*, 1998; Demeterová, 2004; Marcin *et al.*, 2004; Angelovičová *et al.*, 2005, 2006; Mudroňová *et al.*,2005; Haščík *et al.*, 2005b, 2007, 2008, 2009; Tuberoso *et al.*, 2005; Basile *et al.*, 2006; Bozin *et al.*, 2006; Opletal, 2006; Singh *et al.*, 2006; Trevisan *et al.*, 2006; Liptaiová *et al.*, 2009 and others)**.
Natural material with possible positive properties to ensuring the production of safety foodstuffs is one of the bee products – propolis **(Prytzyk *et al.*, 2003; Wang *et al.*, 2004; Shalmany and Shivazad, 2006; Seven *et al.*, 2008; Haščík *et al.*, 2012 and others)**. Propolis is a resinous material and mixture of sugars, wax and plant exudates collected by bees from different plant sources, which directly influence the propolis composition, because more than 300 components were identified in propolis **(Ghisalberti, 1979; Mochida *et al.*, 1985; Amoros *et al.*, 1992; Markham *et al.*, 1996; Valle, 2000; Banskota *et al.*, 2001)**. Propolis may be used in animal nutrition in dried and milled form or as a propolis extract, since it is characterized by: antibacterial properties **(Ghisalberti, 1979; Mochida *et al.*, 1985; Pepeljnjak *et al.*, 1985; Nowottnick, 1995; Velikova *et al.*, 2000)**, anticarcinogenic properties **(Burdock, 1998)**, fungicide properties **(Dimov *et al.*, 1991; Murad *et al.*, 2002; Ota *et al.*, 2001)**, antiviral properties **(Amoros *et al.*, 1992; 1994)**, local-anaesthetic properties **(Paintz and Metzner, 1979)**, anti-inflammatory properties **(Strehla *et al.*, 1993; Miyataka *et al.*, 1997)**, antioxidant properties **(Sun *et al.*, 2000; Isla *et al.*, 2001)**, hepatoprotective properties **(Gonzales *et al.*, 1995)**, immunostimulatory properties **(Dimov *et al.*, 1991)**, cytostaticproperties **(Frenkel *et al.*, 1993; Banskota *et al.*, 2001)**. And finally, propolis may be a part of therapy in veterinary or human medicine. Application of propolis in animal nutrition has had many positive impacts on their health state, increase of feed intake, body weight and on the improvement of antioxidant and antimicrobial properties **(Kimoto *et al.*, 1999; Prytzyk *et al.*, 2003; Wang *et al.*, 2004)**.
Based on these findings, the aim of the experiment was to evaluate and verify the influence of feed mixtures with propolis extract on meat performance of Hubbard JV chickens. Propolis extract was applied into the normally produced commercial feed mixtures without antibiotic preparations and coccidiostats.

MATERIAL AND METHODS

The experiment was performed in testing station Zámostie Company with broiler chickens of Hubbard JV hybrid combination. The study enrolled 400 chicks in one day old, which were divided into 4 groups (n=100): control (C) and experimental groups (E1, E2). The fattening duration was 42 days. Chickens were bred on the deep litter (sawdust). Feed was served using tubular feeders. Feed mixtures used in this experiment were mixed and prepared bya company Biofeed Company with seat in Kolárovo in accordance with Gazette of Ministry of Agriculture and Rural Development (2004). Feed mixtures were analysed in term of basic nutrients and energy value at the Department of animal nutrition (Faculty of Agrobiology and Food Resources, Slovak University of Agriculture in Nitra). Feed mixture was served manually at periodic intervals each day and chickens were fed by the system *ad libitum*. In all evaluated groups of experimental, starter feed mixture HYD-01 (powder form) was served to 21st day of age and HYD-02 (powder form) was served from 22nd days to 42nd day of age. Feed mixtures were made without antibiotic preparations and coccidiostats. Nutritional value of feed mixtures (Table 1) was uniform in each group during the experiment, but the propolis extract was added to feed mixtures HYD-01 and HYD-02 in experimental groups in a dose of 150 mg kg^{-1} (E1) and 450 mg kg^{-1} (E2). Propolis originated in the Slovak Republic. Propolis extract was prepared from milled propolis, which was subsequently mixed to 80% ethanol **(Krell, 1996)**. Propolis solution was extracted in water bath at 80 °C under reflux for 1 hour. The solution was centrifuged after extracting and cooling. Obtained supernatant was evaporated using a rotary vacuum evaporator at temperature of water bath of 40-50 °C and then a residue was weighted. The evaporation residue at amounts of 15 g (E1) and 45 g (E2) were separately dissolved in 1000 cm^3 of 80% ethanol and applied into the 100 kg of each feed mixture intended for evaluated group of Hubbard JV chickens. Water was available *ad libitum* by self-powered system using nipple drinkers with drip tray. At the end of the fattening (42nd day), 60 pieces from each group were selected for carcass analysis (30 male pieces and 30 female pieces). We evaluated the live body weight, carcass body weight, weight of giblets and carcass yield.Obtained data were statistically assessed using programme Statgraphics Plus version 5.1 (AV Trading, Umex, Dresden, Germany). Basic variation-statistical values (arithmetic average, standard deviation) were calculated. Analysis of variance followed by Duncan test was used to determine significance of differences between the groups.

Table 1 Composition of the diets

Ingredients (%)	Starter (from 1st to 21st day of age)	Grower (22nd to 42nd day of age)
Wheat	34.00	37.00
Maize	33.92	37.52
Soybean meal (48% N)	23.00	18.00
Fish meal (71% N)	5.00	3.00
Dried blood	-	1.00
Ground limestone	1.00	0.95
Monocalcium phosphate	0.80	0.70
Fodder salt	0.10	0.10
Sodium bicarbonate	0.15	0.20
Lysine	0.13	0.08
Methionine	0.18	0.20
Clinacox 0.5%	0.02	-
Palm kernel oil Bergafat	1.20	0.70
SACOX 12%	-	0.05
Premix Euromix BR 0.5 %[1]	0.50	0.50
Analysed composition [g kg^{-1}]		
Crude protein	212.40	191.62
Fibre	30.51	29.68
Ash	27.01	20.90
Ca	8.23	7.18
P	6.56	5.87
Na	1.77	1.71
Linoleic acid	13.53	14.06
ME_N [MJ kg^{-1}] by calculation	12.07	12.16

Legend: [1] active substances per kilogram of premix: vitamin A 2 500 000 IU; vitamin E 50 000 mg; vitamin D3 800 000 IU; niacin 12 000 mg; d-pantothenic acid 3 000 mg; riboflavin 1 800 mg; pyridoxine 1 200 mg; thiamine 600 mg; menadione 800 mg; ascorbic acid 50 000 mg; folic acid 400 mg; biotin 40 mg; vitamin B12 10 mg; choline 100 000 mg; betaine 50 000 mg; Mn 20 000 mg; Zn 16 000 mg; Fe 14 000 mg; Cu 2 400 mg; Co 80 mg; I 200 mg; Se 50 mg

RESULTS AND DISCUSSION

The results of basic parameters in meat performance of Hubbard JV chickens (without gender separation) are recorded in the Table 2.

Table 2 Meat performance of Hubbard JV chickens (without gender separation) without and with propolis extract in their diet

Parameter	Control	E1 (150 mg kg^{-1})	E2 (450 mg kg^{-1})
Live body weight [g]	1507.37±158.66	1515.00±152.14	1521.50±117.50
Carcass [g]	1005.12±115.77	1022.37±103.74	1019.75±74.66
Giblets [g]	119.06±11.10	117.79±9.12	117.16±8.51
Carcass yield [%]	74.92±2.36	75.27±1.17	74.76±0.75

Legend: C – control group, E – experimental group

Live body weight of chickens increased (P ≥ 0.05) after propolis extract application in experimental groups (1515.00 g – E1, 1521.50 g – E2) compared with control group (1507.37 g). Our results are in agreement with **Shalmany and Shivazad (2006), Seven *et al.* (2008)** and **Tekeli *et al.* (2011)**, who applied propolis extract into the feed mixture in amount of 150 mg, 250 mg, 0.5 g and 3 g or 1000 ppm, as well as **Haščík *et al.* (2010)**, who used propolis extract for the nutrition of Ross 308 chickens in amount 200 mg. kg^{-1}, 300 mg.kg^{-1} and 400 mg.kg^{-1}. Also our study confirms by **Bonomi *et al.* (1976)** and **Ghisalberti (1979)** who they state that propolis application may increase the body weight and the values may increase by 20%. Values of carcass body weight showed a similar trend as values of live body weight. The higher values of carcass body weight were found in experimental groups (1022.37 g – E1, 1019.75 g – E2) compared with control group (1005.12 g). Achieved results concerning higher values of the carcass body weight of Hubbard JV chickens in experimental groups with application of propolis extract in their diet is consistent with findings of **Seven *et al.* (2008)** and **Haščík *et al.* (2010)**, who found that the carcass body weight was increased in Ross 308 chickens groups which was fed by propolis. The weight of giblets slightly decreased (P ≥ 0.05) in experimental groups (117.79 g – E1, 117.16 g – E2) compared with control group (119.06 g), similarly as described by **Haščík *et al.* (2010)**. Carcass yield was highest (P ≥ 0.05) in E1 (75.27%), lower value was found in the control group (74.92%) and the lowest value was found in E2 (74.76%), but all values met the requirements of the normative carcass yield of chickens (72%) and it is convenient with results by **Straková *et al.* (2002)** and **Haščík *et al.* (2009)**.

CONCLUSION

Based on the results of the work, propolis extract, applied in the feed mixtures HYD-01 and HYD-02 for Hubbard JV chickens during the whole period of fattening (42 days), had an influence on slight increase the live weight and carcass body weight at the end of fattening compared with control group and there were no significant differences (P ≥ 0.05) among the groups. Propolis extract may be used as suitable supplementary in chicken nutrition, since it does not influence the meat performance and slight increase of live body weight at the end of fattening and of carcass weight can positively affect on economics of chicken meat production related to chickens of Hubbard JV hybrid combination.

Acknowledgments: The work was financially supported by project VEGA 1/0129/13 and by European Community under project no 26220220180: Building Research Centre „AgroBioTech".

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