Session S.05
Abstr. No 3849
Present. No 34

Effect of dietary extruded chickpea supplementation on meat quality of broiler turkeys

V. Christodoulou[1], V.A. Bampidis[2*], E. Labrinea[3], J. Ambrosiadis[4], J. Arkoudelos[3], B. Hučko[5]

[1]Animal Research Institute, National Agricultural Research Foundation (N.AG.RE.F.), 58100 Giannitsa, Greece; [2]Department of Animal Production, School of Agricultural Technology, Alexander Technological Educational Institute, 57400 Thessaloniki, Greece; [3]Institute of Technology of Agricultural Products, N.AG.RE.F., 14123 Athens, Greece; [4]Laboratory of Technology of Animal Origin Food, School of Veterinary Medicine, Aristotle University, 54006 Thessaloniki, Greece; [5]Department of Microbiology, Nutrition and Dietetics, Czech University of Life Sciences, 16521 Prague, Czech Republic.
* Corresponding author. Tel.: +30 231 0791313; fax: +30 231 0791325. E-mail address: bampidis@ap.teithe.gr (V.A. Bampidis).

INTRODUCTION

Among grain legumes, chickpea (*Cicer arietinum* L.) is a feedstuff rich in protein, energy, minerals, and vitamins, which has been introduced as an alternative cultivation to increase agricultural income in defective and arid zones. Recent studies have reported that chickpea can replace to some extent soybean meal in diets for domestic food producing animals. The objective of this study was to evaluate extruded chickpeas as a protein and energy replacement for soybean meal in diets of broiler turkeys relative to meat quality.

MATERIALS & METHODS

In an experiment with 200 day old male broiler turkeys (B.U.T. 9; see 1), the effect of partial and total replacement of soybean meal with extruded chickpeas (*Cicer arietinum* L.) on meat quality was determined. All birds used in the experiment were cared for according to applicable recommendations of the U.S. National Research Council (2). In the 84 day experiment, turkeys were allocated to five dietary treatments being: ECKP0, ECKP200, ECKP400, ECKP600 and ECKP800 of 40 birds each (five subgroups of 8 birds in each treatment), and received a diet *ad libitum*. The diet for ECKP0 treatment had no chickpeas (control), while those for treatments ECKP200, ECKP400 ECKP600 and ECKP800 included 200, 400, 600 and 800 kg/t of wet extruded (at 120°C for 20 sec) chickpeas, respectively. At the end of the experiment, 5 turkeys, randomly selected from each treatment (1 from each subgroup), were fasted for 18 h (water was allowed), weighed, and euthanized. After dressing, samples of the right breast muscles (m. *pectoralis superficialis* and m. *pectoralis profundus*), and the right leg muscles, of the carcass of all birds were removed for chemical composition analysis (3), color evaluation (HunterLab Chroma Meter DP-9000, Reston, VA, USA), sensory evaluation (sensory panel), and fatty acid (FA; Varian CP – 3800, Varian Analytical Instruments, Walnut Creek, CA, USA) and cholesterol analysis (4). Data were statistically analyzed by one-way analysis of variance, and significant differences among treatment means were tested using linear and quadratic contrasts at the 5% probability level (5).

RESULTS

Results showed that extruded chickpeas used as an alternative protein source to replace soybean meal in broiler turkey diets, at inclusion levels up to 800 kg/t, did not substantially affect meat quality (Table).

Table. Chemical composition of male broiler turkeys at 84 day of age.

	Treatment[a]						Significance level[b]	
	ECKP0	EKCP200	ECKP400	ECKP600	ECKP800	SEM	Linear	Quadratic
Right breast muscles								
Moisture (%)	71.1	71.9	71.4	73.6	73.3	0.344	0.007	0.858
Protein (% DM)	88.8	89.7	87.9	91.5	90.3	0.492	0.158	0.733
Fat (% DM)	6.7	6.5	8.4	6.2	6.2	0.347	0.561	0.229
Ash (% DM)	3.9	4.3	4.4	4.5	4.5	0.066	0.004	0.077
Cholesterol (mg/100 g)	31.9	32.5	33.3	32.6	29.4	0.669	0.303	0.112
Right leg muscles								
Moisture (%)	74.0	74.8	71.2	73.9	72.9	0.451	0.328	0.460
Protein (% DM)	78.3	76.4	73.1	73.5	76.2	1.135	0.399	0.197
Fat (% DM)	18.6	18.5	24.5	22.5	19.2	1.166	0.535	0.153
Ash (% DM)	4.2	4.3	4.0	4.1	3.9	0.095	0.228	0.754
Cholesterol (mg/100 g)	60.7	56.8	64.8	53.7	56.1	1.425	0.189	0.550

[a] ECKP0 = control treatment, ECKP200 = treatment with 200 kg/t extruded chickpea, ECKP400 = treatment with 400 kg/t extruded chickpea, ECKP600 = treatment with 600 kg/t extruded chickpea, ECKP800 = treatment with 800 kg/t extruded chickpea. [b] Numbers are probability values.

CONCLUSION: Broiler turkeys fed on diets with extruded chickpeas, at inclusion levels up to 800 kg/t, used as an alternative protein source to replace soybean meal, exhibit excellent meat quality.

ACKNOWLEDGEMENTS

The authors thank ELVIZ S.A. (Plati Imathias, Greece) for extrusion of chickpeas and the staff of Animal Research Institute, N.AG.RE.F. (Giannitsa, Greece) for help provided during this study.

References:

1. Christodoulou, V., Bampidis, V.A., Hučko, B., Mudřík, Z., 2006. The use of extruded chickpeas in diets of broiler turkeys. Czech J. Anim. Sci. 51, 416–423. **2.** National Research Council, 1996. Guide for the care and use of laboratory animals. National Academy Press, Washington, D.C., USA. **3.** Association of Official Analytical Chemists, 1990. Official Methods of Analysis of the AOAC. Helrich, K. (Ed), 15th ed. Arlington, Virginia, USA. **4.** Maraschiello, C., Díaz, I., Regueiro, J.A.G., 1996. Determination of cholesterol in fat and muscle of pig by HPLC and capillary gas chromatography with solvent venting injection. J. High Resol. Chromatogr. 19, 165–168. **5.** Steel, R.G.D., Torrie, J.H., 1980. Principles and Procedures of Statistics. A Biometrical Approach, 2nd ed. McGraw-Hill Book Co., New York, NY, USA.