

## RESEARCH ON THE INFLUENCE OF THE OREGANO OIL USE OVER THE PRODUCTIVE PERFORMANCES AND QUALITY OF DUCK MEAT

Monica MARIN, Dumitru DRĂGOTOIU, Carmen Georgeta NICOLAE, Georgeta DINIȚĂ

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd,  
District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67,  
Email: marin\_monica\_zoo@yahoo.com, dimitrudragotoiu@yahoo.com,  
carmennicolae19@yahoo.com, georgetadinita@yahoo.com

Corresponding author email: marin\_monica\_zoo@yahoo.com

### Abstract

*The aim of the study is to highlight the effect of oregano oil used in vegetable fat mixture recipes from compound feed over the growth performance and slaughter of the ducklings. The experiments were conducted on 150 ducklings hybrids, intensively grown in two phases (phase I 0-21 days and phase II 22-56 days), the difference between compound feed recipes consisting of different proportion of oregano oil added to the sunflower oil, used as a source of fat, respectively at the control batch has been given only sunflower oil, for the experimental batch 1 was added 0.5% oregano oil, and for the experimental batch 2, was used 1% oregano oil. It was noted that through the use of the oregano oil in the feed of ducklings, there have improved their growth performance represented by the body weight, the average daily gain, the average daily and specific intake of compound feed. Slaughter random, the chemical composition of meat and the blood content in total cholesterol were not influenced by the type of fat introduced into the compound feed. Instead, there has been noticed a positive influence in the use of oregano oil over the glucose level, superoxide dismutase and glutathione peroxidase from blood, as well as a decrease of losses through mortality.*

**Key words:** oregano oil, ducks, productive performances, meat quality.

### INTRODUCTION

An important contribution to providing the market with meat is brought by ducks, this thing being possible primarily due to the tendency of poultry products diversify, and secondly due to the improvement of ducklings technology intensive growth, which resulted in comparable performances to those of broilers (Van et al., 2000).

Feeding the meat ducklings at optimal nutritional requirements for obtaining a high quality meat is essential.

Current research on ducklings nutrition are in a continuous progress, oriented to elucidate the action mode of nutrition - genetics and nutrition - technology main interrelations in order to determine the optimal levels of nutrients to satisfy the nutritional requirements of birds (Pop et al., 2006).

From the wide range of substances or compounds that can be used in duck feeding, with a potential positive effect on the health state, on the productive performances and on the economic results for the research

conducted, it was selected the oregano oil that contains two compounds with antibacterial, antiviral, antifungal, respectively carvacrol and thymol were chosen (Baser, 2008).

The aim of the research undertaken is to analyze the effect of the oregano oil administered in different doses in recipes of compound feed over the growth performance and of those at slaughter for the ducklings.

### MATERIALS AND METHODS

The biological material was represented by 150 ducklings, meat Pekin breed hybrid, distributed in three uniform experimental batches in terms of body weight and sex ratio.

The used growth technology was in intensive system, on land, on permanent litter. The density was of 15-20 birds/m<sup>2</sup> in the first 2 weeks, after which the density decreases, reaching 4 birds/m<sup>2</sup> at the age of 2 months, at which the slaughter is performed.

Bedding straw were used and the microclimate conditions, i.e. temperature, humidity, air speed, have been fulfilled according to the

technological norms of duck growth. The ducklings feeding was done in tronconic feeders and watering in gutters. The food and water distribution of was ad libitum.

The compound feed recipes used in the experiment were isoproteic and isocaloric (Dragotoiu et al., 2014), on periods of growth, namely: starter (0-21 days) - 2812 kcal metabolizable energy/kg compound feed, 18.93% crude protein, 0.88% lysine, 0.69% methionine + cystine, 0.21% tryptophan, 1.25% calcium and 0.83% phosphorus, and during the growing-finishing (22-56 days) - 2732 kcal metabolizable energy/kg, 16.2% crude protein, 0.74% lysine, 0.60% methionine + cysteine, 0.17% tryptophan, 1.14% calcium, 0.68% phosphorus.

The structure of the used recipe during the starter phase was represented by corn 67.2%, soybean meal 25.5%, fishmeal 2%, vegetable fat 2.2%, calcium carbonate 0.75%, dicalcium phosphate 0.8%, salt 0.3%, DL-methionine 0.15%, choline premix 0.1%, vitamin-mineral premix 1%. In the growing-finishing phrase the compound feed recipe was composed of corn 75.3%, soybean meal 9.6%, sunflower meal 10.3%, vegetable fat 1%, calcium carbonate 0.7%, dicalcium phosphate 0.6%, DL-methionine 0.1%, choline premix 0.1%, salt 0.3%, vitamin-mineral premix 1%. The difference between the versions was the different proportion of oregano oil added to the vegetable oil used as a source of fat, respectively the control batch received only sunflower oil, the experimental batch 1 was added 0.5% oregano oil in the sunflower oil and for the experimental batch 2 was used 1% oregano oil mixed with sunflower oil (Table 1).

Table 1. Experimental schema

Specification	Batch			Objectives
	Control	Experi- mental 1	Experi- mental 2	
Ducklings number (heads)	50	50	50	- Determination of productive performances (body weight, total gain/period, average daily gain, daily intake of compound feed, specific intake); - Slaughter rate; - Chemical composition of meat - Blood parameters; - Mortality.
Experiment duration (days)	56	56	56	
Used oregano oil proportion (%)	0	0.5	1.0	

During the experimental period were followed the productive performance registered by ducklings, respectively the weight evolution, total gain, average daily gains, the daily intake of compound feed and specific intake of compound feed.

At the age of 8 weeks were conducted slaughters for determining the slaughter rate, the meat chemical composition and physiological blood serum constants.

## RESULTS AND DISCUSSIONS

Table 2 presents the results on the evolution of ducklings body weight from the experimental batches. It appears that at the age of 21 days the average body weight of duckings records values between 695.43 g (control batch) and 755.12 g (experimental batch 2), differences between the batches being significant ( $p < 0.05$ ).

Table 2. Evolution of ducklings body weight during the experimental period

Batch	Initial weight	Weight at 21 days	Weight at 56 days
Control	44.60±1.12	695.43±6.23	2396.45±22.12
Experimental 1	46.22±1.07	728.72±5.97	2456.86±30.42
Experimental 2	45.37±0.99	755.12±5.85	2505.62±28.17

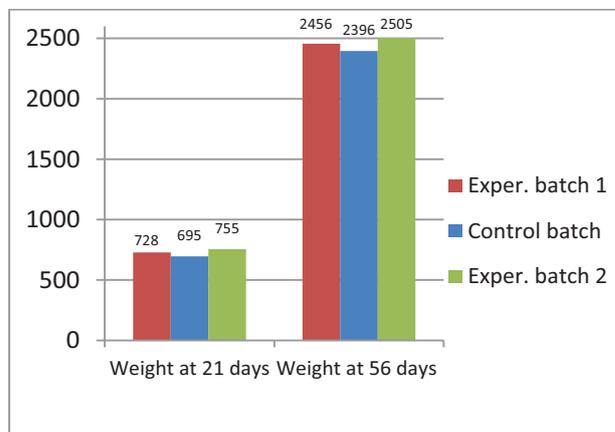


Figure 1. Body weight evolution on growing phrases

At the age of 8 weeks were obtained ducklings average body weights (Figure 1) between 2396.45 g (control batch) and 2505.62 g (experimental batch 2). The ducklings batches that had in the compound feed recipe the mixture of sunflower and oregano oil showed higher weights compared to the control batch due to the antimicrobial effect of the oregano oil that acts as a natural antibiotic, having a

stimulating action of the secretion of digestive juices, an antioxidant effect.

Based on the average weights recorded during the experimental period were calculated the average daily gains and the total gains of ducklings (Table 3). The average daily gain recorded by the experimental batches showed significant differences versus the control batch, increasing by 2.52% in the experimental batch 1 and by 4.62% in batch 2.

Table 3. Weight gains obtained by the ducklings during the experimental period

Batch	Total gain (g/period)	Average daily gain (g/head/day)
Control	2351.85±32.26	41.99±1.64
Experimental 1	2410.64±40.12	43.05±1.43
Experimental 2	2460.25±29.94	43.93±1.38

From the analysis of data on the evolution of the body weight and average daily gains, it is observed that the best results were obtained in the experimental batches that had the recipe sunflower oil supplemented with oregano oil, results that have been confirmed also by other researchers (Fotea et al., 2010). In the case of using oregano powder, there have not been obtained effects over the final body weight, feed intake, feed conversion ratio or (Park et al., 2015).

The average daily intake increased in the experimental batches by 1.52% for the first batch and by 1.88% for the second batch, compared to the control batch (Table 4).

The specific intake of compound ranged from 2.98 kg compound feed/kg gain in the experimental batch 2 and 3.03 kg feed/kg gain in the experimental batch 1 compared to the control batch that recorded an intake of 3.06 kg feed/kg gain (Table 4).

Table 4. Evolution of compound feed intake for the ducklings during the experimental period

Batch	Average daily intake (g/head/day)	Specific intake (kg compound feed/kg gain)
Control	128.49±8.43	3.06±0.09
Experimental 1	130.44±9.15	3.03±0.11
Experimental 2	130.91±7.76	2.98±0.09

Table 5 presents the ducklings slaughter rate, as well as the chemical composition of meat.

The slaughter rate was between 74.12% for the control batch and 75.98% for the experimental batch 2, the differences being insignificant, regardless the nature of the used fat source.

Table 5. Slaughter rate and chemical composition of duckling meat during the experimental period

Batch	Slaughter rate (%)	Crude protein (%)	Crude fat (%)
Control	74.12±2.45	20.12±0.36	2.73±0.06
Experimental 1	75.87±4.29	20.45±0.22	2.80±0.04
Experimental 2	75.98±2.98	20.22±0.39	2.71±0.05

The crude protein from meat was similar for all the three batches (20.12% for the control batch, 20.45% for the experimental batch 1) and the crude fat from meat presented similar values for the analyzed batches (2.71-2.80%).

It can be stated that the addition of oregano oil does not influence the slaughter rate and the chemical composition of meat, results that were affirmed also by Kirkpinar et al. (2014), who tested the effect of oregano and garlic essential oils on carcass characteristics, meat composition, color, pH and sensory quality of broiler meat.

By analyzing the blood serum it has been determined its content in total cholesterol, glucose, superoxide dismutase, glutathione peroxidase (Table 6). The average blood analyzed values are in normal physiological limits. In terms of the total cholesterol, similar values are observed in all batches, feature also confirmed by Bampidis et al. (2005) in experiments carried out on female early maturing turkeys.

Table 6. Blood parameters of ducklings

Specification	Batch		
	Control	Experimental 1	Experimental 2
Total cholesterol (mg/100 ml)	175.32 ±12.45	177.87 ±19.34	173.21 ±14.57
Superoxide dismutase (U/g haemoglobin)	1423 ±26.17	1510 ±30.19	1556 ±31.84
Glutathione peroxidase (U/l)	4532 ±54.78	4895 ±44.82	5007 ±49.03
Glucose (mg%)	187.12 ±10.79	165.75 ±15.37	156.39 ±16.52

At the experimental batches it is noticed an increase of the superoxide dismutase and glutathione peroxidase enzymes values, suggesting that the oregano oil would have a beneficial effect on the antioxidant activity in the body, results confirmed by the research undertaken by Park et al. (2015) on ducks in whose food was used dried oregano powder.

The glucose content recorded lower average values in the experimental batches, suggesting

a better metabolism of the energy source from feed.

During the experiment, the mortality of ducklings from the three experimental batches (Figure 2) was recorded daily, calculating the cumulative mortality rate, which ranged from 2.5% in the control batch and 1.34% in the experimental batch 2. The mortality decrease is due to the antimicrobial effect of the oregano oil, which acts as a natural antibiotic, preventing diseases and increasing animal productions (Hume, 2011).

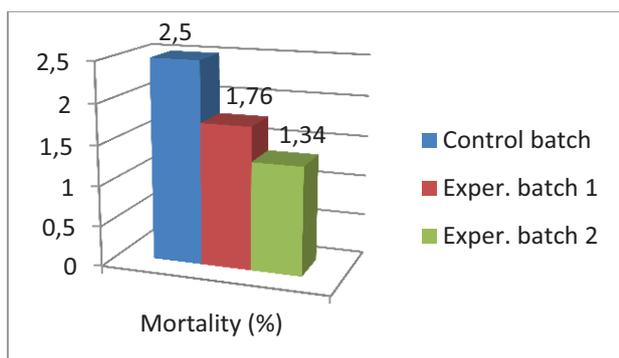


Figure 2. Registered mortality evolution at the experimental batches

## CONCLUSIONS

At the age of 21 days the average weight of the ducklings batches fed with compound feed recipes, in which was added a mixture of sunflower and oregano oil, was higher compared to the one for the ducklings which consumed as vegetable fat sunflower oil.

At the age of 8 weeks the ducklings body weight was with 2.5 up to 4.5% higher in the batches that used oregano oil compared to those that only used sunflower oil.

The ducklings weight gain was influenced by the addition of oregano oil, the smallest gains being recorded for the batch in whose recipe was added only the sunflower oil.

The specific intake of compound food of ducklings ranged from 3.03 kg/kg gain (batch E1) and 2.98 kg/kg gain (batch E2), pointing out a trend of improvement tendency in the batch for which the used proportion of oregano oil was higher (1%).

The slaughter rate and the chemical composition of the meat derived from ducklings were not influenced by the type of fat introduced into compound feed.

The experimental batches which consumed oregano oil recorded the lowest values of blood glucose, as well as the highest values of superoxide dismutase and glutathione peroxidase.

At the experimental batches was noted a reduction in the actual output through mortality, especially in the experimental batch 2, where the total period percentage was 1.34%.

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