ISSN: 1220-3173; E-ISSN: 2457-7618

CONSIDERATIONS REGARDING THE SUPPLEMENTATION OF BROILER CHICKEN DIETS WITH SEA BUCKTHORN (*HIPPOPHAE RHAMNOIDES*)

CONSIDERAȚII PRIVIND SUPLIMENTAREA RAȚIEI PUILOR BROILER CU CĂTINĂ (*HIPPOPHAE RHAMNOIDES)*

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ABSTRACT

Two groups of broilers were bred from the age of 5 days to the age of slaughter. The diet of one of the broiler groups was supplemented with sea buckthorn (*Hippophae rhamnoides*). Although addition was barely 1% and the protein ratio in the sea buckthorn powder was 11.83%, the production performances and the majority of the values of some chemical parameters increased. The total proteins, uric acid, GOT, amylase and lipase were also increased. The amount of "good" cholesterol (HDLC) increased, compared to the control group, by 53.33%. The adding of sea buckthorn in the feed seems to have a beneficial effect on chickens.

Keywords: broiler, sea buckthorn, feed

REZUMAT

Două loturi de broileri au fost crescuți de la vârsta de 5 zile și până la sacrificare. Hrana unui lot de pui broiler a fost suplimentată cu cătină (*Hippophae rhamnoides*). Deși adaosul a fost de doar 1% și procentul de proteină din pulberea de cătină este de 11,83% performanțele productive și majoritatea valorilor unor parametrii chimici au crescut. Proteinele totale, acidul uric, GOT, amilaza și lipaza au avut valori mai mari. Cantitatea de colesterol "bun" HDLC a crescut comparativ cu lotul martor în proporție de 53,33%. Adaosul de cătină din rație pare să aibă efecte benefice asupra puilor.

Cuvinte cheie: broiler, cătină, furaj

Although antibiotics can lead to an increase in productivity of birds, their utilization by means of feed has been forbidden. Scientists were thus forced to come up with a viable alternative. During the past years, one of the most promising approaches consisted in the exploitation of nature by using grasses, bushes and trees as medicine. Plant-based medicine implies the use of these plants as medicine for the treatment of illnesses and in order to ensure good health and overall well-being. The properties of plants and their extracts were exploited and they began to be used as aromas, preservatives, digestive enhancers as well as ancient remedies in people and animals. During the past years, very few studies were performed on feed supplementation with sea buckthorn in broiler chickens (4, 6, 12).

Sea buckthorn (*Hippophae rhamnoides)* is a type of bush, native from Eastern Europe and Asia, being found even at high altitudes in the Himalayas (5). The name is of Latin origin derived form the terms „hippo" which means horse, and „phaos" which means brightness. The translation would be horse with a shiny coat (7, 9, 14). Sea buckthorn is used on a wide scale in medicine for the treatment of cardiovascular diseases, lesions of mucosae, skin lesions, liver disorders and hypoglycaemia. It has a positive impact on metabolic disorders, having the capacity to slow down aging and to protect against damage caused by radiations. It accelerates the healing process of burns and frostbites and it decreases the loss of feathers (1, 13). Few studies on sea buckthorn have described its efficacy in achieving performance in the productions of domestic fowl (2, 4). The sea buckthorn (*Hippophae rhamnoides)* is a branched bush that grows in Romania starting with the sea regions and up into the mountain regions.

Sea buckthorn is used in the food industry, in forestry, pharmacy and it is also considered an ornamental plant. Sea buckthorn fruits consist of a pulp (68%), seeds (23%) and peel (7,75%) (10). The sea buckthorn fruit contains dry matter (15–20%), sugars (0,05 – 0,5%), organic acids (1,5 – 4%), pectin (0,14 – 0,5%), cellulose (0,9%), proteins (1,2%), complex oils (8 – 12%), β-carotene (3,5 – 10%), and microelements such as: phosphor (194,4 mg%), calcium (211,8 mg%), magnesium (186,1 mg%), potassium (165,1 mg%), sodium (2,8 mg%), iron (13,84 mg%), liposoluble vitamins (vitamin A 380 mg%, vitamin E 16 mg%, vitamin K, vitamin D 20 mg%), hydrosoluble vitamins (vitamin C, vitamin P, vitamin F 8 mg%, vitamin B1 – B9 360 – 2500 mg/100g fruit and essential fatty acids (80 – 90%) (3).

Biswas et al. (2010) have suggested that the sea buckthorn seeds, fruit and stems can be administered in the feed of broiler chickens (2).

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Ma et al. (2015) have reported a significant improvement in the performance of broiler chicks after supplementing the feed with sea buckthorn fruit (8).

The global fowl production has increased largely throughout the past decades and the success of domestic fowl farming is widely appraised for its scientific approach in terms of gene reserves, populations, nutrition, product processing, packaging, chicken health and the use of state-of-the-art equipment (11).

Up to this point there haven't been any studies based on the evaluation of the potential of feeding broiler chickens with feed supplements based on sea buckthorn in our country

The aim of this study was to identify the effects that the feed supplemented with sea buckthorn had on broiler chickens.

MATERIALS AND METHODS

Two groups of broilers, aged 5 days, Ross 308 hybrids were bred until the age of slaughter.

The chickens were separated into two groups counting 25 individuals each and they were fed *ad libitum.* They were bred in compartments with soil-breeding systems and water was offered at their discretion. Thus, the control group (the one without added sea buckthorn) and the experimental group (with added sea buckthorn) were formed.

The administered feed and the evolution of the body weight of chickens were monitored in order to calculate the productive performances.

The chickens have received the same type of feed, according to their age and category; the differences consisted in the adding of 1 % sea buckthorn powder.

The combined feed contained: corn, soybean meal - GMO, wheat, sunflower meal, vitamins and minerals.

The combined feed did not contain: meat meal, fish meal, bones and remains of animals, hormones or other feed ingredients that are prohibited to be used in the food of people and animals.

Fig. 1. Cards for analysis

Five blood samples were taken from each group in order to obtain the serum which was analysed with an automated biochemistry analyser (Fuji Dri-Chem 4000I, Tokyo, Japan) by using colorimetry (Fig. 1, 2, 3, 4).

The following biochemical parameters were determined: total cholesterol-mg/dl, HDLC-mg/dl, LDLC-mg/dl, triglycerides-mg/dl, total proteins-g/dl, creatinine-mg/dl, uric acid -mg/dl, GOT-U/I, GPT-U/I, amylase-U/I, lipase-U/I.

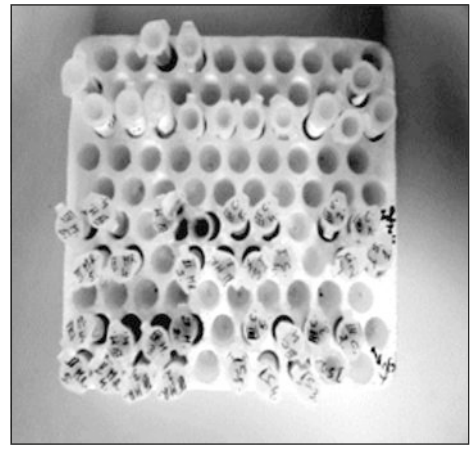

Fig. 2. Serum samples used for the analysis

Fig. 3. Card colour alteration

Fig. 4. Result issuing

RESULTS AND DISCUSSIONS

The main difference between feeds is a decrease in the proportion of raw protein from 20.44% in the starter type feed to 18.89%. The same tendency has been noticed in the inclusion proportions of lysine and methionine. The energetic level of the feed (E.M.-Mj/kg) increases from 11.3 to 12.62, allowing a maintenance of the energy-protein ratio that is adequate for the growth period.

The recorded body weight gain values were similar between the two groups and for the specific consump-

tion, the difference between groups was 6.92% in favour of the group that received sea buckthorn in feed.

The sea buckthorn powder obtained through fine grinding of dried sea buckthorn fruits are detailed in the Table 1.

Table 1

Nutritional values for sea buckthorn powder - mean values / 100 g

No. Art.	Nutritional Parameter	Measuring unit	Nutritional value
1	Energetic value	kcal/100g	437.90
2	Protein	g/100g	11.83
3	Sugars	g/100g	55.93
4	Fats	g/100g	18.54

The amount of protein in sea buckthorn powder was 11.83% representing a value below the limit recommended for broilers (19-21% RP). Having this aspect in view and the fact that the proportion of inclusion of sea buckthorn in the structure of the feed was of only 1%, it can be considered that the addition of sea buckthorn has not influenced the raw chemical composition of the administered feed.

The level of blood cholesterol and triglycerides from the serum of chickens belonging to the both groups (with sea buckthorn addition and without) was analysed comparatively. They are shown in Fig. 5.

From the analysis of the presented data, we can observe a significant increase in the level of total cholesterol in the group that received sea buckthorn compared the control group. Though this situation might appear concerning, it is due to the fact that HDLC levels have increased (level of "good" cholesterol). Compared to the control group, the level of HDLC has increased with 53.33%. Other parameters were determined as well using the automated biochemical analyser. The obtained data are shown in Table 2.

Table 2

Other biochemical analyses

Biochemical parameter	Control group	Sea buckthorn group
Total protein g/dl	1.60	2.45
Creatinine mg/dl	0.14	0.11
Uric acid mg/dl	1.85	4.35
GOT U/l	151.00	205.00
GPT U/l	5.00	3.50
Amylase U/l	203.50	302.50
Lipase U/l	87.00	107.50

Data presented in the Table highlight an increase in the value of blood biochemical parameters for the majority of evaluated parameters for the sea buckthorn group. The total proteins, uric acid, GOT, amylase and lipase are sensibly higher in value. The only exceptions are the level of creatinine which decreased from 0.14 mg/dl to 0.11 mg/dl and of GBT which decreased from 5 U/l to 3.50 U/l. These biochemical modifications seem to be the substrate that led to a higher speed in the growth of the chickens coming from the sea buckthorn group.

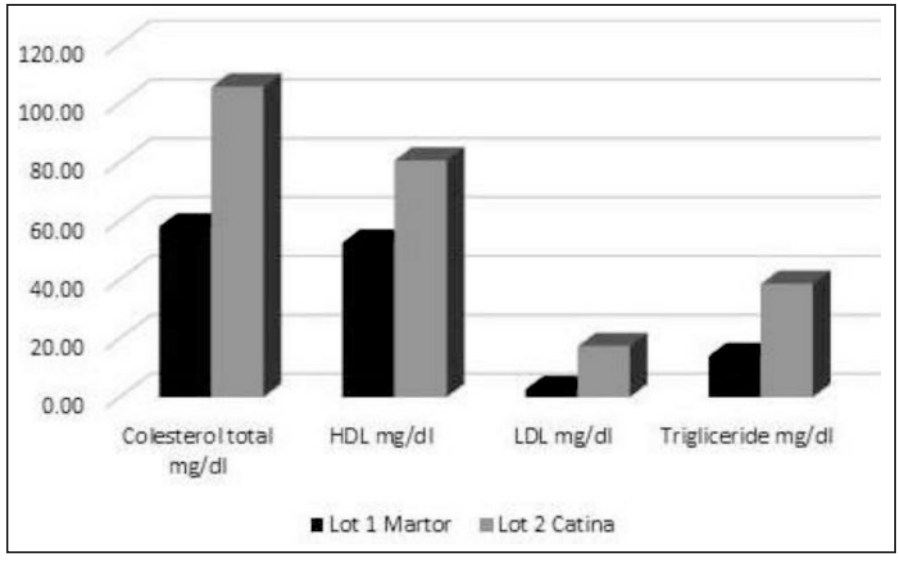

Fig 5. The level of blood cholesterol and triglycerides from chicken serum

CONCLUSIONS

Due to the fact that the percentage of protein in sea buckthorn powder is 11.83% and that the amount of inclusion of sea buckthorn in the structure of feed was of only 1% we might consider that the addition of sea buckthorn has not influenced the raw chemical composition of the feed. The level of HDLC (level of "good" cholesterol) has increased significantly compared to the control group, by 53.33% a fact which can positively influence the composition of the meat.

The increase in the value of the majority of analysed biochemical parameters (total proteins,uric acid, GOT, amylase and lipase) is correlated with an improved production performance of the chicken coming from the sea buckthorn group. The complexity of the biologically active substances found in sea buckthorn seems to be beneficial for chicken.

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