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Dynamics of Change in the Amount of Moisture, Ash and Total Organic Substances in the Content of Chicken Femuras During Postnatal Ontogenesis

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Abstract The dynamics of changes in the relative indicators of natural moisture, ash and total organic matter in the femur of egg-laying chickens during postnatal ontogeny were studied. matter It was found that the relative amount of natural moisture content of the femur bone is slightly higher on the first day of postnatal ontogenesis, it gradually decreases until 570 days, the ash content increases rapidly from the first day to 120 days of postnatal ontogenesis, it continues this state without noticeable changes from 168 days to 570 days, the relative amount of total organic matter index is higher in one-day-old chicks, it decreases until 168 days of postnatal ontogeny, and does not change significantly from 280 to 570 days.

Key words: chickens, femur, natural moisture, ash matter, total organic matter, relative index, postnatal ontogeny, growth coefficient.

INTRODUCTION

The strength of bones is related to the amount of the above elements, they are formed during the postnatal development of organisms under the influence of external and internal factors and have certain morphofunctional properties.

The body of laying hens has its own morpho-physiological characteristics, and taking into account that during the egg formation process, the rapid release of the main mineral substances in the bones into the blood, which in turn affects the morphofunctional indicators of the bones, it is important to optimize their diet on a scientific basis. Therefore, it is of great scientific and practical importance to determine the chemical changes that occur in the bones of egg-laying chickens at various physiological stages of postnatal ontogenesis.

The results of scientific studies on the development of the skeleton of poultry show that the active growth and development of chickens takes place up to 60 days, and the skeletal apparatus increases by 65-70% compared to the weight of chickens, so the total body weight increase is 40%. At the age of 4 months, the active growth of the skeleton is completed, the internal reconstruction is preserved, and as the chickens age, the weight of the skeleton decreases by 2 times [1].

When the characteristics of bone formation during the embryonic development of chicks were studied, it was noted that the femur grows 5 times between the thirteenth and twentieth days of incubation, and the maximum bone length is 31.6 mm on average on the twentieth day [5].

Many scientific studies have been conducted on the effect of veterinary and medical drugs on the development of chicken embryos, and it was found that when chicks of the "Broiler-6" cross were sprinkled with magnetized water, it stimulated an increase in the weight of the muscles until the

age of 62, and there was no statistically reliable change in the bones compared to those in the control group [7, 8].

As a result of the research, it was found that the increase in body weight of chickens belonging to the Hysex brown cross corresponds to the period of growth, the increase in body length corresponds to the initial period, and the index of maturity corresponds to the period of the first laying of eggs. In the development of these cross-bred chickens, biologically productive, transitional, sexual maturity, morphofunctional maturity, pubertant, gerontological, and reproductive stages have been noted [4].

Mineral substances or supporting tissues (calcium) or energy-rich compounds (sulfur, phosphorus) are included in the composition. Minerals also affect the enzymatic activity and functions of living organisms. In this, calcium, magnesium, phosphorus and a number of trace elements, which are the main components of bones, play an important role [2].

According to some researchers, poultry growth, feed conversion, bone system development, leg health, and immune system health are related to the availability of calcium in poultry. High levels of phytases in poultry diets have a negative effect on calcium absorption. Also, an increase in the amount of fat kilos in the diet makes calcium absorption difficult [6].

The researcher stated that the intake of phosphorus-enriched food by poultry is important for the initial development of bones in young organisms [11].

Productivity, effective use of feed, egg weight, egg shell quality, skeletal condition, i.e., the ratio of bone weight to body weight, are defined as the main criteria for complete mineral nutrition for laying hens. For young chickens, the index of growth of body weight, efficiency of food utilization, the ratio of bone weight to body weight, and preservation of ash in the defatted tibia are important [3, 9, 10].

The purpose of the study: is to study the characteristics of changes in the chemical composition of stylopod bones at different physiological stages of postnatal ontogeny of egg-laying chickens.

Research materials and methods. Scientific research work was carried out in the laboratory of the department of animal anatomy, histology and pathological anatomy of SamSTUVMAHB. 1, 16, 35, 85, 120, 168, 280, 420 and 570-day-old hens belonging to the "Dekarb" cross were taken as research objects. The chickens were slaughtered, bled, and the wing (front leg) and hind leg bones were removed from the body and weighed on an analytical scale.

To determine the natural moisture content of the bones, the bones were first weighed, then dried at room temperature for 10 days and weighed again. The amount of evaporated moisture was determined and calculated as a percentage of bone weight.

To determine the amount of ash content in the bone, the dried bones were ground to a powder in a small electric mill. Bone powder was placed in large crucibles brought to a constant weight and burned in a MP-2UM muffle furnace at a temperature of 500-6000C for 4-5 hours. After the cremated bone powder (ash material) was cooled in a desiccator together with the crucibles, their weights were measured on a KERN.PBJ-N scale, and the percentage of air dry state and absolute dry state was calculated relative to the weight of the bones.

Numerical data of the indicators obtained as a result of research were processed using the methods of variation statistics using Microsoft Excel computer programs.

To determine the dynamics of changes depending on the age of the indicators, the growth coefficient was calculated. The growth factor was determined by dividing the indicators of the bones of older chickens by the corresponding indicators of younger chickens, and the entire examined period of postnatal ontogeny was determined by the formula developed by K.B. Svechin.

The obtained results and its discussion. It was observed that the amount of natural moisture, ash and total organic matter in the femur of egg-laying chickens changes in connection with the physiological processes taking place in their organism at different stages of postnatal ontogenesis.

The relative index of the natural moisture content of the femur was equal to 45.78±0.77% on the first day of postnatal development of chickens, and gradually decreased until the next 120 days, i.e. at 16 days - 44.59±0.58% (K =0.97; r<0.02), in 35 days - 41.75±0.49% (K=0.94; r<0.02), in 85 days - 38.74±0.39% (K=0.93), and in 120 days - 35.08±0.55% (K=0.91). This indicator of the femur remained almost unchanged in the stages of development after 168 days, at 168 days - 34.98±0.85%, at 280 days - 34.84±0.42% (K=1.0; r<0.02). , in 420 days - 33.89±0.37% (K=0.97), in 570 days - 34.12±0.52%. From one day to 570 days of postnatal ontogeny of chickens, it was observed that the growth coefficient of the relative index of the natural moisture content of the femur bone decreased to 0.75 times.

The relative index of the amount of gray matter in the femur increased rapidly from 1 day to 16 days of postnatal ontogeny of chickens, from 20.61±0.38% to 33.38±0.42%, or its growth coefficient increased to 1.62 times during this period, and to continue this state until the 120-day stage, that is, at 35 days - by 40.73±0.45% (K=1.22), at 85 days - by 47.48±0.55% (K=1.16; r<0 .03), and in 120 days - 54.99±0.74% (K=1.15; r<0.02). This indicator of the femur almost does not change from 168 days of postnatal development, that is, at 168 days - 55.18±0.65% (K=1.0; p<0.02), at 280 days - 55.64±0.7% (K=1.0; p<0.02), at 420 days - 56.43±0.64% (K=1.01; p<0.03), at 570 days - 56.56±0.62 % (K=1.01; p<0.02) was observed. From one day to 570 days of the postnatal ontogeny of chickens, the growth coefficient of the relative index of the amount of gray matter in the femur was found to increase up to 2.74 times.

The relative index of the amount of total organic matter in the femur is slightly higher (79.39±0.25%) than that of adults on the first day of postnatal ontogeny of chickens, and this index is 66.62±0.21% in the next 16 days (K=0, 83; p<0.01), at 35 days – 59.27±0.28% (K=0.89; p<0.01), at 85 days – 52.52±0.23% (K= 0.88; r<0.02), in 120 days - 45.01±0.22% (K=0.85; r<0.01), in 168 days - 44.82±0.16% (K=0.99; r<0.01) was noted to decrease. This indicator of the femur remained almost unchanged in the young after 168 days, at 280 days - by 44.36±0.37% (K=0.99; p<0.01), at 420 days - by 43.57±0.34% (K =0.98; r<0.02), and in 570 days - 43.44±0.19% (K=0.97). It was observed that the coefficient of growth of the relative index of total organic substance content of the femur decreased to 0.54 times during the period from the first day of postnatal ontogeny of chickens to the 570th day.

Summary:

1. The relative amount of natural moisture content of the femur of egg-laying chickens is somewhat higher on the first day of postnatal ontogenesis, and this indicator gradually decreases up to 570 days.

2. It is observed that the relative index of femur ash content of hens in the egg direction increases rapidly from the first day to the 120th day of postnatal ontogenesis, and continues this state without noticeable changes from the 168th day to the next 570th day.

3. The relative index of total organic substance content of the femur was high in one-day-old chicks, it decreased until 168 days of postnatal ontogeny and did not change significantly from 280 days to 570 days.

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