

THE ELEMENTAL COMPOSITION OF SHEEP'S WOOL IN CONDITION OF MINERAL STARVATION

A. V. Pikhtirova, PhD in veterinary sciences, associate professor,

V. D. Ivchenko, PhD in technical sciences, associate professor
alinca.sumy@gmail.com Sumy National Agrarian University, Sumy, Ukraine

Mineral elements included in the animal's organism, mainly as a structural material, are involved in the digestion of feed nutrients, their absorption, synthesis, decomposition, and separation of metabolic products from the body. They create the necessary conditions for the normal functioning of enzymes, hormones, vitamins, they stabilize the acid-base balance and an osmotic pressure. Underestimation of the mineral elements role in animal nutrition leads to economic losses in livestock production. The most active role of the mineral elements is in the processes of respiration, hematopoiesis, digestion, absorption, synthesis, and allocation of metabolic products in the body. They create the necessary conditions for the normal functions of vitamins, enzymes, hormones, maintaining the colloid state of proteins, acid-base balance, osmotic pressure at the required level and protection of the body's functions. Mineral elements are involved in the processes of neutralizing toxic substances and synthesizing antibodies. The purpose of the work was to investigate the elemental composition of sheep's wool under the condition of insufficient mineral nutrition.

The research was carried out in the laboratory of electron microscopy faculty of veterinary medicine of the Sumy National Agrarian University using a scanning electron microscope with the function of X-ray energy-dispersive micro-analysis REM-106I (Selmi, Ukraine). For the study, wool samples of 2–3-years-old sheep of Precos (4 heads) and Hissar (4 heads) breeds were selected. The mass fraction of elements in the local sample sections and averaged from the field of view were determined by X-ray microanalysis by the values of the energies of the characteristic X-ray peaks of the chemical elements in the range Na-U.

As a result of the research, it was found that the following mineral substances — Sulfur, Potassium, and Calcium — are determined in the keratin of the wool fiber. The amount of Silver used to cover the samples was neglected in the calculations. The Sulfur content appeared to be the highest one among the studied elements since it is a member of the main sulfur-containing amino acids of wool — cystine, cysteine, and methionine. In the wool fiber, obtained from sheep of the Precos breed, the content of the Sulfur varied within the range of 2.53–5.56 % and was in 1.23 times ($P \geq 0.05$) higher than that of sheep's wool of Hissar breed

(2.44–4.83 %). Such indicators are related to that fact that the higher content of the Sulfur in the sheep of thin-fleece breed (Precos) increases its durability and gives it the best spinning properties. Instead, in the sheep's wool of the Hissar breed Potassium content was in 40 times higher — on the level of 0.42–1.22 % — compared to the sheep's wool of the Precos breed, which we associate with the less elasticity of the wool fibers of rough-wool sheep breeds (Hissar breed). The Calcium content in the sheep's wool of Hissar breed was 0.40–1.30 %. In the wool of Precos breed sheep, this figure varied within the range of 0.35–0.58 %, which is in 1.93 times ($P \geq 0.05$) less than that of Hissar breed sheep. The higher Calcium content in the wool fiber of rough-wool sheep breeds (Hissar breed) is due to their greater fragility, which causes bad spinning properties.

According to the results of the research, it has been established that the elemental wool composition of the Precos and Hissar breeds sheep, in conditions of insufficient mineral nutrition, remains on average within the normal range, but significantly different depending on the direction of animal productivity.