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PIGMENTATION AND COLORS OF KARAKUL SHEEP

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Abstract
The article presents scientific data on the manifestation of the color of sur of karakul lambs of the Bukhara and Karakalpak types, as well as the dependence of the color and coloring of karakul lambs on the pigmentation of the hair coat and the synthesis of the protein melanin (pigment) directly dependent on the enzymes tyrosinase and amino acids that are encoded by genes.

Keywords: Melanogenesis, tyrosinase, melanin, contrast, pigmentation, degree of expression of sura, karakul, colors of Bukhara sur of Karakalpak, diamond, silver, apricot flower, candle flame.

Karakul sheep of sur color, bred in Uzbekistan, are divided into 3 types: - Bukhara sur; - Karakalpak sur; - Surkhandarya sur, which in turn are divided into different colors; - golden, silver, candle flame, apricot flower, platinum, amber and so on. Karakul sur of the Karakalpak type differs significantly from the Bukhara type in its bright expression and sharp contrast of colors. Expression of the sur color is the contrast of the transition of the dark base to the lightened tip of the hair, the intensity of pigmentation, the length of the hair and the degree of lightening, the uniformity and distribution of severity over the area of the karakul.

The degree of expression and contrast of severity in Karakul lambs sur have a hereditary and biochemical basis, and the pigmentation of karakul is determined by the accuracy of selection and technological work. The color of colored Karakul sheep depends on the pigmentation of the hair coat, and the synthesis of the pigment protein melanin directly depends on the enzyme tyrosinase. The synthesis of the protein melanin is a biochemical process based on a genetic program. Pigmentation, although hereditary, occurs under the influence of enzymes. The pigmentation of the wool of Karakul sheep depends on their nutritional (amino acid) provision as follows (diagram 1). (G.A. Aliyev, M.L. Rachkovsky, 1987).

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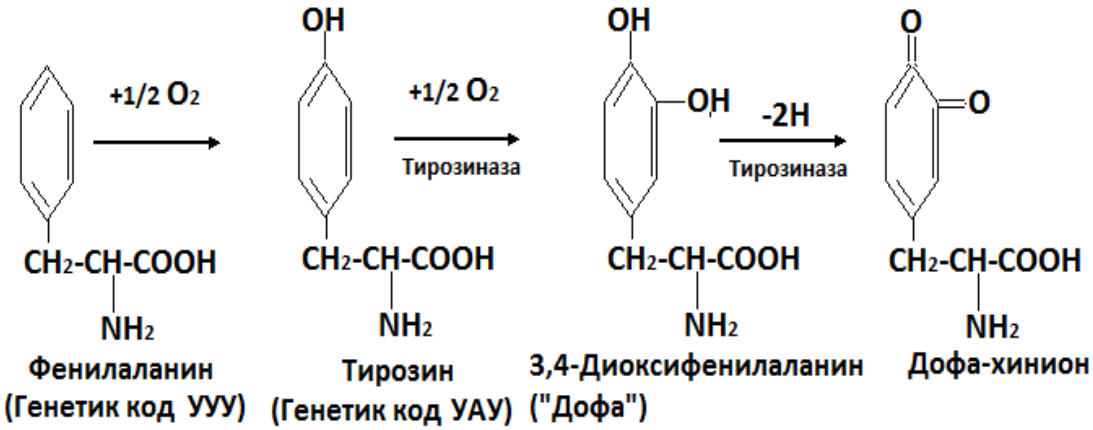

Dofa – leads to the formation of melanins in melanocytes in the form of pigment (melanoprotein). Melanoprotein in pigmented hair is concentrated in the main cortex layer and microelements and metals have been found in it. According to M.R. Rish, M.Makhmudov (1976), black hair contains more sodium (Na), sobalt (Co) and iron (Fe) , and light hair contains calcium (Ca) and red hair contains molybdenum (Mo) . Studies of the pigmentation of the hair of Karakul lambs using EPR spectrometry (electron paramagnetic resonance spectrometry) showed that the melanin content in black hair is 12%, in weak hair – 0.58%, and white hair does not contain melanin. According to R. Turgenbaev (2012), the melanin content in the hair of lambs in the following colors: candle flame - 4.98%, apricot blossom - 3.66%, steel - 3.91% and mainly on the lower part of the hair. The eumelanin content of karakul lambs of the Bukhara sura of diamond color is 28% more than that of silver color (M. Dzhalmenova, 1990).

Tables 1 The degree of expression of coloration of Karakul lambs, in %

Colors	Degree of expression			
	n	Great	Good	Bad
Bukhara Sur				
Diamond sur	163	86.5±2.67	13.5±2.67	-
Golden sur	77	23.7±6.9	55.3±8.1	21±6.6
Silvery sur	38	36.4±5.48	53.2±5.69	10.4±3.48
Karakalpak sur				
Candle flame sur	37	24.3±7.1	59.5±8.1	16.2±6.1
Apricot flower sur	40	22.5±6.6	67.5±7.4	10.0±4.7
Steel – blue sur	41	19.5±6.2	70.7±50.5	9.8±4.6

According to the analysis of the data in Table 1, among the lambs with a strongly expressed severity in Karakul lambs of Bukhara coloring, the number of lambs with a diamond coloring (86.5%) is significantly higher than in lambs of other colors, which is due to uniform crossing by diamond coloring. The average degree of expression (53.2 ; 55.3%) is higher in lambs of silver and golden colors.

Among the lambs of the Karakul breed of the Karakalpak sura, it was found that the lambs with a strong degree of expression were the lambs of the candle flame and apricot flower (24.3%, 22.5%). It was noted that a strong contrast of the hair coat to the candle flame color (shamchirak-gul). And the lambs with an average degree of expression (70.7,6 ; 67.5%) did not notice a strong difference.

The degree of pigmentation in Karakul lambs of the Bukhara and Karakalpak types should be studied at the molecular genetic level, because amino acids (phenylalanine and tyrosine) are encoded by DNA molecules (uracil and adenine). To study the pigmentation of the color of Karakul sheep, Sur U.N. Khakimov and M. Tukhtamyshev used marker genes of sheep. In this case, they conducted a PCR analysis using microsatellite markers developed by molecular geneticists Maddox, Smith and Bishop.

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