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BLOOD SAMPLING FROM SIMMENTAL CATTLE AND DNA EXTRACTION FROM THE SAMPLES

Erkulov Ulugbek Urol ugli
Trainee-researcher at the Scientific Research Institute of Livestock and Poultry
Sherimbetov Anvar Gulmirzayevich, prof.
Professor at the Institute of Genetics and Experimental Biology of Plants, Academy of Sciences of the Republic of Uzbekistan.

Annotation: Studying changes in important genes that control economically beneficial productivity indicators, traced through the DNA of farm animals, and determining the formation of factors that determine their high productivity is a key task in improving the efficiency of breeding work.
Keywords: Simmental breed, agarose gel, sterile conditions, spectrophotometer, DNA, blood, saliva, smears.
Anotatsiya. Qishloq xo‘jaligi hayvonlari DNKsining takibidagi xo‘jalikka foydali mahsuldorlik ko‘rsatkichlarini boshqaruvchi muhim genlar o‘zgarishini o‘rganish, ularning yuqori mahsuldorlik determinantini shakllanishini aniqlash seleksiya ishlari samaradorligini oshirishning asosiy muammosi hisoblanadi.
Kalit so’zlar. Simmental, agaroz geli, steril sharoit, spektrofotometr DNK, qon, so‘lak, surtmalar.
Аннотация: Изучение изменений в важных генах, контролирующих показатели продуктивности, полезные для экономики, отслеживаемые по ДНК сельскохозяйственных животных, и определение формирования факторов, определяющих их высокую продуктивность, является ключевой задачей повышения эффективности селекционной работы.
Ключевые слова: Симментальская порода, агарозный гель, стерильные условия, спектрофотометр, ДНК, кровь, слюна, мазки.

Introduction. Studying the changes in important genes controlling the indicators of economic productivity in the DNA of agricultural animals, determining the formation of their high productivity determinants is the main problem of increasing the efficiency of selection work. Because the phenotypic differences (economic productivity indicators) of animals raised under the same feeding and housing conditions and whose productivity is being evaluated depend on their molecular-genetic differences, that is, high-yielding animals have more important genes controlling them. However, their descendants may not have high indicators of economic productivity, since the favorable combination of important genes may be disrupted in the gametes formed as a result of mating. Therefore, it is important to study and evaluate their genetic system in the selection and selection of animals and develop a targeted mating plan.

The research work was carried out in 2025 in the laboratory "Animal Genetics" of the Research Institute of Livestock and Poultry and the Institute of Genetics and Experimental Biology of Plants of the Academy of Sciences of the Republic of Uzbekistan. In this study, Simmental cattle from the "Boston Chorvador" farm in the Orta Chirchik district were used as research objects. Biological material - blood samples - were taken from a total of 40 cattle for laboratory analysis (Figure 1).

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During the experiment, the health of all animals was stable, and based on clinical signs, their health status was assessed as satisfactory. This condition served as an important factor in ensuring the reliability of the research results.

For molecular genetic studies, a 10 ml blood sample was taken from each cattle under sterile conditions using a disposable syringe. To prevent clotting of the obtained blood samples, they were collected in vacuum tubes (vacutainers) containing EDTA K_2 as an anticoagulant. EDTA (ethylenediaminetetraacetic acid) forms stable chelate complexes with calcium ions, blocking the biologically active form of Ca^{2+} ions that activate the blood coagulation cascade. This prevents the continuation of biological processes in the sample, in particular coagulation processes, which is important for maintaining the integrity of DNA and its suitability for analysis.

Figure 1. Blood samples from Simmental cattle (Boston Chorvador farm, Orta Chirchik district)

After sampling, the test tubes were labeled and brought to the Laboratory of Animal Genetics of the Institute of Genetics and Experimental Biology of Plants of the Academy of Sciences of the Republic of Uzbekistan in special thermocontainers in accordance with the requirements of the cold chain. During transportation, the samples were stored at around 4 °C, preventing their physicochemical stability and DNA degradation. Upon delivery to the laboratory, further molecular genetic processing was carried out based on appropriate protocols to extract high-quality genomic DNA from the blood samples.

DNA isolation from blood samples. Genomic DNA was isolated from the collected blood samples using the GeneJET Genomic DNA Purification Kit (Thermo Fisher Scientific, USA) according to the manufacturer's instructions. The concentration and purity of the isolated DNA were determined using a NanoDrop Eight spectrophotometer (Thermo Fisher Scientific, USA) (Figure 3.2.1, Table 3.2.1). The obtained DNA samples were stored at –20°C until further

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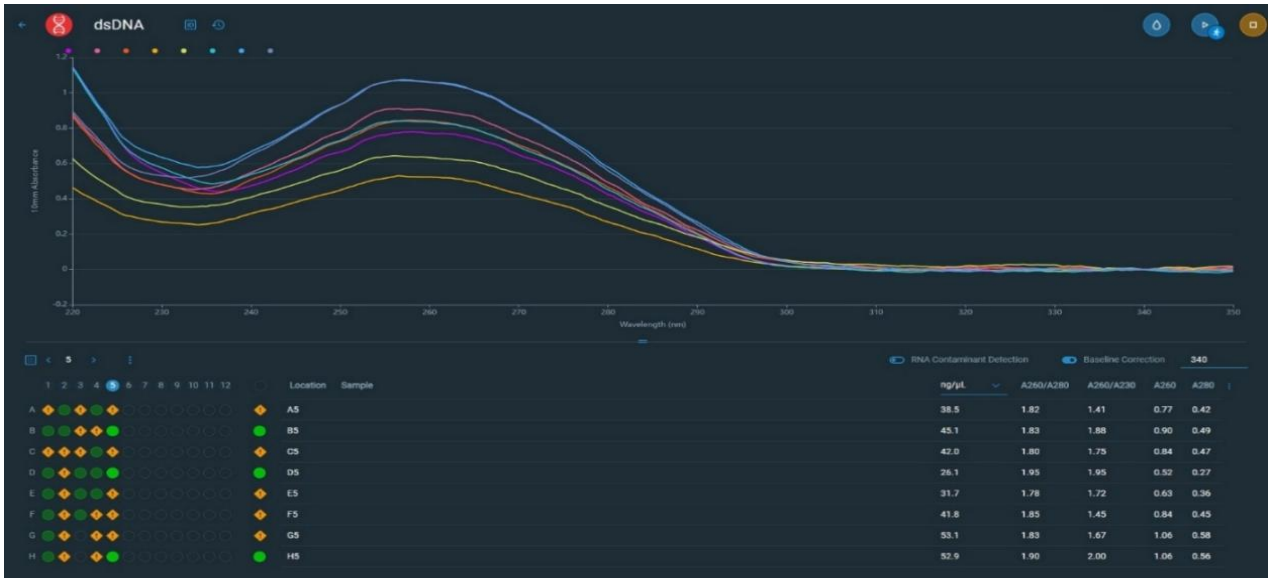

Figure 2. Spectrophotometric analysis of isolated DNA samples

Table 1

Simmental breed from the "Boston Chorvador" farm in the Orta Chirchik district			
№	**Gender**	**ng/µl**	**A260/280**
21	♀	10.7	1.78
22	♂	18.2	1.66
23	♂	16.2	1.72
24	♀	8.4	1.68
25	♂	23.9	1.94
26	♀	5.6	1.65
27	♀	8.9	1.81
28	♀	10.8	1.88
29	♀	14.9	1.78
30	♀	12.1	1.82
31	♀	13.5	1.72
32	♀	13.9	1.66
33	♀	16.2	1.79
34	♀	13.4	1.75
35	♀	8.4	1.59
36	♀	18.4	1.74
37	♀	9.7	2.05
38	♀	18.3	1.75
39	♀	11.3	1.52
40	♀	13.6	1.67

The purity of DNA samples was assessed using the A260/A280 ratio, calculated from the optical absorbance at 260 nm and 280 nm (Table 1). This ratio is an important parameter for determining the presence of proteins or other contaminants in DNA samples. The optimal value of the A260/A280 ratio for pure DNA should be around 1.8. If this ratio is lower than 1.8, this

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indicates the presence of protein or phenolic impurities; conversely, values higher than 2.0 may indicate RNA contamination.

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