

## **Title of the project:** "Express test for the diagnosis of trichinosis"

**Relevance:** Timely detection of animals infected with trichinosis, or identification of meat infected with domestic or wild cattle, allows to eradicate this disease among the population of the country. In this regard, the creation of a fast, very specific and accurate method for assessing the safety of meat for trichinosis is of great importance for the prevention of infection of people from this disease. Currently, in addition to the direct method of veterinary and sanitary examination of meat (detection of trichinella larvae in muscles), a number of indirect immunological methods have been proposed that determine the contamination of meat based on the detection of specific antibodies. LFA, being a modern test, has many advantages over traditional immunological methods, such as low cost, easy feasibility with immediate results, independence from specialized equipment and qualified specialists. In addition, this test can be used in field or household conditions.

**Aim of the project:** to develop an immunochromatographic test (LFA test) for the lifetime and post-slaughter diagnosis of animal trichinosis.

### **Achieved results:**

The results obtained:

- optimal design parameters of the "LFA test for assessing the safety of meat for trichinosis" have been worked out and factors affecting the sensitivity and specificity of the analysis have been determined;
- a laboratory regulation has been developed for the production and use of the "LFA-test for assessing the safety of meat for trichinosis", which allows for a short time (10-15 minutes) to determine the presence or absence of specific *Trichinella* spp antibodies. in animal blood serum;
- a prototype of the test system, "LFA-test for assessing the safety of meat for trichinosis" has been made ready for commercialization;
- 2 (two) articles and (or) reviews have been published in peer-reviewed scientific publications in the scientific direction of the project, indexed in the Science Citation Index Expanded of the Web of Science database and (or) having a CiteScore percentile in the Scopus database of at least 50 (fifty) as well as at least 1 (one) article or review in a peer-reviewed foreign or domestic publication recommended by CQASHE;
- three reports were made at scientific forums, including two at international conferences of non-CIS countries with the publication of abstracts;
- defended two dissertations for the academic degree "Master of Technical Sciences" in the specialty "Biotechnology" (direction Veterinary biotechnology) and two theses in the same specialty;
- a copyright certificate for the research results has been obtained.

### **Achievements in 2023:**

Parameters for the conjugation of G protein, monoclonal antibodies (mAb), and/or polyclonal antibodies (pAb) to trichinella with colloidal gold nanoparticles have been established. Parameters for the development of lateral flow assay (LFA) for the effective detection of antibodies to *Trichinella* spp. have been refined.

Construction of an LFA test for the detection of antibodies to *Trichinella* spp. in animals under field conditions has been conducted.

A laboratory protocol for the preparation and application of the LFA test for the ante-mortem and post-mortem diagnosis of animal trichinellosis has been developed. Excerpt from Protocol No. 13 from September 25<sup>th</sup>, 2023.

The effectiveness of the developed LFA test has been validated on samples of meat serum and blood sera from experimentally and spontaneously trichinosis-infected animals.

An article has been published in the peer-reviewed journal *Veterinary World*, indexed in the Science Citation Index Expanded of the Web of Science, with a CiteScore percentile of 80 in the Scopus database.

Participation in the international congress on trichinellosis in Belgrade, Serbia, including the preparation and publication of a poster presentation and abstract.

Obtained 2 copyright certificates for research results.

An experimental sample of the LFA test for the diagnosis of animal trichinellosis has been manufactured, along with an instruction manual.

### **Publications in 2023:**

Zhumat A.S., Zhumalin A.K., Akibekov O.S. Optimization of parameters for the conjugation of polyclonal antibodies and colloidal gold during the development of LFA // Proceedings of the International Scientific and Practical Conference "Seifullin Readings-19," dedicated to the 110th anniversary of M.A. Gendelman. – Astana, March 2023. – Vol. I, Part II. - P.215-217.

Akibekov Orken S., Zhagipar Fariza S., Syzdykova Alfiya S., Zhumalin Aibek Kh., Gajimuradova Aissarat M. Comparative analysis of early diagnosis of invasion by species *Trichinella nativa* and *Trichinella spiralis* by serological and biochemical parameters // 16th International Conference on Trichinellosis. – Belgrade, 2023. – P. 123-125.

Akibekov O.S., Syzdykova A.S., Lider L.A., Zhumalin A.K., Zhagipar F.S., Gajimuradova A.M., Borovikov S.N., Suranshiyev Z.A., and Ashimov S.A. Trichinellosis dissemination among wild carnivores in the Republic of Kazakhstan: A 10-year study // *Veterinary World*. – 2023. – Vol.16(9). – P. 1840-1848. doi: 10.14202/vetworld.2023.1840-1848.

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**Information for potential users:** An experimental sample of the LFA test for the ante-mortem and post-mortem diagnosis of animal trichinellosis has been developed, which is fast and practical to use.