Project name: IRN AR19678293 "Development of a test for visual diagnosis of uterine diseases in cows".

Relevance: There are a number of problems in the development of the livestock industry, one of which is high morbidity and complications after childbirth, pathologies of the reproductive organs that lead to the development of infertility, a decrease in the reproductive function of cows, production and, in general, the profitability of animal husbandry.

The existing clinical and laboratory methods for diagnosing the pathology of the reproductive organs differ in many characteristics, more or less specificity and reliability. To date, the problem of diagnosing uterine pathology in dairy cows has not been completely resolved, since in the first month after calving, the uterus undergoes involution, which makes it difficult to diagnose clinical forms and the course of diseases. Diagnosis of chronic, subclinical forms of diseases is complicated by the fact that the symptoms of diseases are not clearly visible, and most often are not defined. This problem is relevant today, therefore, the search for simple, affordable and effective methods for diagnosing uterine pathologies in cows is one of the main tasks of animal reproduction.

Objective: To develop a test for the visual diagnosis of uterine diseases on different days after calving cows

Expected results:

- A test for visual diagnosis of uterine diseases in cows will be developed and its effectiveness will be determined. The technology of using a test for visual diagnosis of uterine diseases in cows has been developed. A patent will be obtained for the developed test for the visual diagnosis of uterine diseases in cows. Clinical trials of a test for visual diagnosis of uterine diseases in cows will be carried out. A device for taking mucus and examining it in farm conditions has been developed. Recommendations have been prepared on the use of the developed test for the visual diagnosis of uterine diseases in cows.

Within the framework of the project, training of scientific personnel will be carried out: 1 doctor of PhD, 6 masters of science. 3 seminars were held for specialists in agricultural formations.

2 (two) publications will be published in peer-reviewed foreign scientific journals that are indexed in the Science Citation Index Expanded Web of Science database and (or) have a CiteScore percentile in the Scopus database of at least 65, 3 (three) articles or reviews in a peer-reviewed foreign or domestic publication recommended by the committee for quality assurance of education and science of the mes rk, 2 publications in international conferences.

A monograph "Diagnosis of involution and diseases of the uterus in cows" will be published.

Results obtained for 2023

A patent search was carried out in the databases of the scientific and technical library of the Republic of Kazakhstan, Eurasian patent, Rospatent, Wipo.int, Google patent, Espacenet. 103 literary sources and scientific articles on

methods for diagnosing physiological involution and pathology of the uterus in cows were studied.

When diagnosing uterine diseases in cows using clinical and laboratory methods, it was found that in the period 21-30 days after calving, clinical rectal and vaginal examination were 32% more effective than the laboratory method of Nagorny I.S., Kalinovsky G.N., and 28% more effective than the method Whiteside.

In the period 31-60 days after calving, the effectiveness of vaginal examination was 16% more effective than rectal examination, 40% more effective than the method of Nagorny I.S., Kalinovsky G.N., and 12% more effective than the Whiteside method.

In the period 61-90 days after calving, vaginal examination is 11.8% more effective than rectal examination.

Laboratory research using the Whiteside method is 37.5% more sensitive in comparison with the method of Nagorny I.S., Kalinovsky G.N. and 12.5% clinical vaginal examination

In the period of 120 or more days after calving, Whiteside's laboratory method identified 55.6% more sick cows than the method of Nagorny I.S., Kalinovsky G.N., and by 33.4% than clinical vaginal and rectal examination.

Using IR spectroscopy, it was determined that mucus consists of water (90-95%), mucins (0.2-5.0%), globular proteins (0.5%), salts (0.5%), lipids (1 -2%). The main component responsible for its viscous and elastic gel-like properties is the glycoprotein mucin. The major mucins in the cervix are MUC4 and MUC5B, with smaller amounts of MUC5AC and MUC6.

Mucin glycoprotein belongs to the class of proteins, so qualitative reactions were carried out to detect the protein in 25 samples: a) biuret reaction for a peptide bond; b) xanthoprotein reaction to aromatic amino acids (phenylalanine, tyrosine, tryptophan); c) ninhydrin reaction for the detection of α-amino groups contained in amino acids, peptides, proteins;

c) ninhydrin reaction for the detection of α-amino groups contained in amino acids, peptides, proteins; d) Foll reaction to sulfur-containing amino acids (cysteine and cystine). The research results showed that when carrying out the biuret and xantaprotein reactions, the color of the reaction products of a healthy animal differs from the patient samples. The intensity of coloring is proportional to the number of peptide groups in reaction a) and the number of aromatic amino acids in reaction b).Ph, density, presence of protein, nitrites were determined in mucus from the genital organs in both healthy and sick animals

The activity of catalase and xanthoprotease enzymes in the mucus of healthy and sick animals was determined

An article was published in the journal of the Committee for Quality Assurance in Science and Higher Education

Study group members:

project leader - Doctor of Sciences in veterinary, professor Jakupov Isatay Tusupovich ORCID-0000-0002-9373-2520 ResearcherID: O-6547-2017Scopus Author ID: 57192272412Scopus Author ID: 56406412600

research group:

k.v.s dozent Eszhanova Gulzhan Tursunovna- LR

PhD Zharkimbaeva Zhanargul Zeinollaevna – SR - ResearcherID: R-2609-2017, ORCID: 0000-0003-1664-556X

PhD Abultdinova Aida Bagdatovna – SR - ORCID:0000-0002-0097-0758 Researcher ID: P-2256-2017

m.v.s.Mamytbekova Gulnur Kurbanalievna - Researcher - orcid.org/0000-0002-3866-5003

m.v.s. Turysbayeva Gulzat Bulatovna – Researcher

m.v.s. Kurmangaliev Erasyl Ertisovich - JR

m.v.s. Zabrodin Albert Gennadievich- JR

magistr Azamatova Amina - JR

Information for potential users: The developed test for visual diagnosis of uterine diseases in cows will be offered to veterinarians of laboratories, agricultural units engaged in cattle breeding to determine the norm and pathology of the uterus.