

Study of Cultural Characteristics of Clostridiosis

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Annotation: clostridiosis, for example, the variety of anatoxins they produce, the fact that they are highly resistant pathogens, the errors and shortcomings in performing each step of the epizootic chain, and the fact that they are widespread in nature. The scientific research work is devoted to the determination of innovative methods of systematic cultural characteristics of clostridia.

Keywords: antigen, antibody, anatoxin, agglutination, neutralization, complement binding, indicator of hydrogen ions, fermentation, anaerobic, aerobic.

We know that infectious diseases cause enormous harm :

- Death, in some diseases up to 90-100%.
- A lot of money, a lot of workers, and a lot of manpower are spent on the struggle and elimination.
- The risk to human health is very high.
- Improving the ecological environment also requires significant financial and labor costs... and, most importantly, great stress on people's emotional state.

WHO and OIE are working tirelessly and continuously to prevent and combat infectious pandemics, epidemics, panzootics, and epizootics worldwide.

It was said above that the development of modern effective methods of clostridiosis, their etiology, epizootology, pathogenesis, clinical-syndromatic treatment, preventive measures is an urgent issue.

Based on these, the goal was to create a systematic, modern, effective method of cultural testing for the diagnosis of clostridia. It is scientifically proven that in most cases, the occurrence of clostridia is due to the fact that the conditions in which newborn calves, lambs, and piglets are

born do not meet the requirements of sanitary-hygienic, micro- and macro-climatic standards.

The following goals and tasks are set in the scientific research work:

- Determining the modern etiological structure of clostridiosis;
- Collecting a set of clinically and syndromatically manifested strains and determining their antigenicity and toxigenicity.
- Determining the nutrient medium, culture cultivation mode, inactivation, antigen concentration-technological conditions;
- Experimental determination of the effective immunizing dose of each monovaccine (in susceptible laboratory farm animals);

In addition to the composition and quality of the nutrient medium, there are a number of factors that affect the development and toxigenic properties of clostridia. For example, the addition of carbohydrates to the nutrient medium provides an optimal pH level, which has a significant effect on the oxidation-reduction potential, the number of bacteria inoculated, the optimal cultural temperature, humidity, inoculation, the number of times the inoculation was re-inoculated before studying the cultural properties, etc.

It was found that the addition of 0.5% glucose solution to the culture medium increased toxin production by 50-60%. The number of times carbohydrates were added to the culture medium is also important; when added once, carbohydrate energy is quickly absorbed, which increases the oxidation of the culture medium, negatively affects the accumulation of starch, and reduces toxigenicity. For example, when 1% glucose is added for the first time, the pH drops to 5.4-5.6, which inhibits the growth and development of bacteria (4,6,10,12,15,19,20).

The quantity and quality of planting also depends on the amount of planting material. The optimal dose of fermenter and nutrient medium for clostridia is 20 ± 2.0 mln.m for 1 dm^3 nutrient medium. The latent period is equal to 1 hour, the active growth phase lasts 4-5 hours. When 1 dm^3 of nutrient medium was reduced to 10 million, the active phase was extended by 8 hours, and the lag phase was equal to 2.0-2.5 hours.

Scientific researchers have explained this phenomenon as a period of adaptation of strains to a new nutritional environment (5,6,9,11,14,18,21).

The growth of cultures begins after optimal adaptation to the nutrient medium. An average of 2.5-3.5 hours passes for the exponential phase of the growth of strains. In this case, cell division intensifies so much that even cells do not have time to separate from each other and form long chains. The stationary phase of growth of clostridia lasts 0.5 hours. After this, a certain part of clostridia dies and metazoans are formed, the pH decreases, and the oxidation-reduction rate increases.

The amount and quality of toxins depend on the number and composition of bacterial strains: the more bacteria, the higher the strength of the toxin. Intensification of culture growth is observed at the end of the exponential phase, the accumulation of toxin slows down, usually after a few minutes (4,5,7,9,14,17,21). Thus, the growth of clostridia in casein pancreatic nutrient media and the dynamics of toxin formation depend on time, pH, glucose addition technology, and the potential for oxidation-reduction processes in the medium. In these cases, the total nitrogen content in the nutrient medium practically does not change.

Thus, the application of the above-mentioned method can provide the necessary amount of toxin, since there are many types of toxins, the toxin we are looking for may not be collected enough (there are 12 types of toxins (4,5,7,11,16,19,21,23)).

The nutrient medium consists of casein hydrolysate, does not contain meat components, the degree of hydrolysis is 0.6-0.7, has a hyaluronidase-like effect, contains x-toxin and collagenases (4,5,7,19,20...). The passage is of great importance. In the cultivation of clostridia cultures, in the

development of vaccines, an enzyme matrix stored in the refrigerator for 2 months is used. After inoculation, the growth period of the culture is extended, since most bacteria are in the spore form. In the primary and secondary passages, the lag phase is shortened, and the culture and toxin production are intensified. No toxin production was observed in newly grown cultures. In the long-stored cultures, the lag phase was extended for 6-8 hours, the concentration reached 12.5 billion $1/\text{cm}^3$ at 18 hours in the intensively grown culture, that is, in the culture adapted to the nutrient environment, the concentration of microbes reached 10.0 billion $1/\text{cm}^3$ at the 6th hour, and 19-20 billion $1/\text{cm}^3$ at the 18th hour. It is not always possible to determine the increase in the mass of strains and the release of toxins. (4,6,7,11,19,23)

The temperature of the nutrient medium has a significant effect on the growth of cultures and toxigenesis. The temperature at which toxins are maximally released is 36°-37°C. A change in temperature by 1°C affects bacterial cell cultures. Low temperatures prolong the lag phase, which reduces toxigenesis and reduces activity. Increasing the temperature accelerates the growth of the culture, but reduces its toxicity. Our conclusion is that when clostridia are grown at a low temperature of 34°C, the culture is formed within 7-11 days, and the accumulated toxins are destroyed, while at low temperatures this process slows down (7,9,11,13,17,20,21). In the cultivation of clostridia cultures, pH concentration is of great importance or is considered an index of anaerobic nutrient environments. In nutrient media fermenters, this indicator should be 18.5-22.5 units, and the optimum for clostridia growth should be 2.0-7.0. At pH values greater than 9.0, growth is very slow. Therefore, the normalization and optimization of oxidation-reduction reactions is of great importance, for example, in the utilization of glucose. Optimization of the components of the culture, changing the composition of the nutrient medium, changing the number of strains, ensures the duration of the growth phase of the culture.

So, after clostridia are planted in the culture, the following processes occur in the lag phase:

- ✓ pH almost unchanged;
- ✓ environmental potential decreases;
- ✓ clostridia adapt to the nutrient environment;
- ✓ reproduction intensifies;
- ✓ The lag phase is equal to pH 5.5-6.0 ;
- ✓ redox potential 550-600 mp;
- ✓ the concentration of bacmass is equal to 1.5 billion $1/\text{cm}^3$;
- ✓ accumulation of toxins increases;
- ✓ the highest titer of toxins occurs 40 minutes after growth stops;
- ✓ pH - the most optimal level is 6.3-6.4;

Conclusion:

1. What is the food ? to the environment fermenters in planting of clostridia active grower cultures selection condition ;
2. For optimal growth of cultures and normal toxogenesis, 0.5 glucose should be added regularly;
3. Protein and peptide supplements must always be added during the growth period;
4. Stabilization of amino and nitrogenous compounds occurs after the growth has stopped.
5. The technology of growing clostridia cultures in various enzymes - pH , temperature, NSB quality, criteria such as the type of bacteria inoculated - high-level toxins 4-6 thousand DLM /

cm³ Cl . perfringens 10-12 thousand DLM /cm³ Cl . oedematiens 100 thousand DLM /cm³ Cl . tetanus 100 thousand DLM /cm³ provides receiving.

Literature

1. Salimov, X.S., A.A. Qambarov, and I.X. Salimov. "Epizootology and Infectious Diseases." *Textbook Tashkent- 2020* .
2. Khakimov, Shorasul , etc Inspiration Salimov . "Epizootology infectious-necrotic hepatitis ovets ." *Perspektive razvitiya veterinarnoy nauki i eyo rol v obespechenii pishchevoy bezopasnosti* 1.1 (2022): 195-198.
3. Hakimov , Sh., and I.Kh. Salimov . " CLINICAL SYMPTOMS OF INFECTIOUS NECROTIC HEPATITIS DISEASE" *SCIENTIFIC JOURNAL OF AGROBIOTHLOGY AND VETERINARY MEDICINE* 2.5 (2023): 62-64.
4. Salimov , Ilkhom Khaitovich . "EPISOOTOLOGY OF SHEEP INFECTIOUS NECROTIC HEPATITIS DISEASE Hakimov Shorasul ." *PROSPECTS OF VETERINARY SCIENCE AND ITS ROLE IN ENSURING FOOD SECURITY Part 1* (2022): 195.
5. Salimov , Ilkhom , et al. "Specific prevention of emphysematous carbuncle of cattle and sheep." *BIO Web of Conferences* . Vol. 95. EDP Sciences, 2024.
6. Ilkhomovich, Klichov Odil, and Salimov Ilkhom Khaitovich. "Infectious Anaerobic Enterotoxemia Disease of Sheep." *Central Asian Journal of Medical oath Natural Science* 4.3 (2023): 99-105.
7. Turaev, Sh. K., and I. Kh. Salimov . "DIAGNOSING KORASON DISEASE IN CATTLE." *SCIENTIFIC JOURNAL OF AGROBIOTHLOGY AND VETERINARY MEDICINE* 2.11 (2023): 5-8.
8. Ilkhomovich Klichov Odil, Khakimov Shorasul and Salimov Ilkhom Khaitovich. "Infectious Enterotoxemia Disease of Sheep Epizootology ." *Web of Scholars: Journal of Multidimensional Research* 1.7 (2022): 70-73.
9. Salimov , I. H., D. I. Salimova , and R. M. Urakova . "IZUCHENIE KLINICHESKIX PRIZNAKOV I PATOLOGOANATOMICHESKIX IZMENENIY PRI EKSPERIMENTALNOM BRADZOTE OVETS ."
10. Ergashev1 NB, Mengliyev G'A., Salimov IX “ Comparative study of the immunogenicity of similar vaccines against sheep's brucellosis in laboratory conditions ” “Food Safety: International Scientific and Practical Conference on Global and National Problems, February 22-23, Samarkand-2024. Journal of Veterinary Medicine . Special Issue 1 . Pages 161-163.
11. Kapustin A.V. Epizootology and prevention of clostridiosis crs. Matr.mejd.vet.konf 2017. S. 106-110
12. Kaplunova O.P. Express diagnostics clostridiozov v zzyvaemyx S. perfrengens . Author .d iss.k.m.n. M. 2010 g.
13. Kapustin A.V. Opredelenie koncentratsii i kratnosti vvvedenie komponenta S. chauvoei pri razrabotke assotsirovannyx vaccine. 95th anniversary of Armavir. Biocomb 2016. S. 229-234.
14. Kapustin A.V. pituitary medium, which ensures stable accumulation of toxins during cultivation necrotyx strain clostridium 80th anniversary of the organization VGNKI 2011.s. 54-56.
15. Kapustin A.V. Development vaccine against emphysematous carbuncle krs. Kapustin A.V.//Russian Journal of Agricultural and Socio-Economic Sciences, 5(53)-2016 c.97-102.
16. Manteca CA Role for the Clostridium perfrengens beta 2 toxin in bovine enterotoxemia.veterinary . Microbiology. 2012., 86.p. 191-202.

17. Popoff MR Clostridial pore-forming toxins: Powerful virulence factors. MRpopovf /Anaerobe. 2014.P.30 : 220-238 .
18. Stiles BG Clostridium and Bacillus binary toxin: Bad for the bowels and eukaryotic being// BGStiles / Toxins. 2014. P. 2626.
19. Uzal FA Resistance of ovine, caprine and bovine and bovine endothelial cells to clostridium perfrengens type D epsilon toxin in vitro. Veterinary Research Communications 2009. 23.p. 275-284.