

SEROPREVALENCE OF *YERSINIA ENTEROCOLITICA* SEROVAR O:9 IN FARM ANIMALS

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Summary. Intestinal yersiniosis is a dangerous infectious disease of farm animals caused by *Yersinia enterocolitica*. In young animals the disease occurs with symptoms of gastro-intestinal tract lesions. The subclinical form of the disease is detected in adult animals. Infected animals remain agents during the whole period of the life and there are a threat for livestock and human health. Such animals are identified by serological studies. Nowadays the research on the distribution of intestinal yersiniosis in Ukraine has been conducted insufficiently.

The results of the conducted serological screening of intestinal yersiniosis causative agent of *Yersinia enterocolitica* serovar O:9 on the animal-breeding farms of the different regions of Ukraine. Serological screening was done on the 15 farms in 7 regions of Ukraine, 213 blood serum samples from cattle, sheep, pigs were examined.

Keywords: *Yersinia enterocolitica*, serovar O:9, serological screening, seroprevalence, farm animals

Introduction. Intestinal yersiniosis is an acute contagious disease of many species of animals and human. The disease is characterized by lesions of gastro-intestinal tract, organs of respiratory system, arthritis, pyo septicemia. The course of the disease in adult animals is mainly chronic, resulting in a depletion and inhibition of body weight augmentation. The acute course of the disease causes abortions, the birth of non-viable young animals, infertility. The long duration bacteriocarrier is widely spread. The intestinal forms of the disease is detected young animal. This form of disease has an acute and subacute stages with the symptoms with diarrhea and the suppression of nervous system. The mortality can be 50%. This disease occurs worldwide (Jamali, Radmehr, and Ismail, 2014; Laukkanen-Ninios et al., 2014; Liang et al., 2012). Infection has been identified in animals in Europe, the USA, South America and Asia (Capita et al., 2002; Schaake et al., 2013). As in our country, as abroad intestinal yersiniosis is widely spread and takes an important role in animal and human pathology (Liang et al., 2012; MacDonald et al., 2011). The problem of Yersiniosis became topical because morbidity rate among people had increased (Rahman et al., 2011). According to data of the World Health Organization, Yersiniosis is registered in more than 30 countries around the World and it occupies the 4th place in the structure of zoonotic infections, about which would be reported. In European Union intestinal yersiniosis spread is 1.92 cases per 100,000 population (EFSA and ECDC, 2015). In spite of epizootological and epidemiological significance of Yersiniosis today in

Ukraine research on the spread of intestinal yersiniosis held at insufficient.

The non-correspondence to sanitary rules during provision, transport and storage of foodstuff causes their contamination with pathogen and leads to infection of animals (Bolton, Ivory, and McDowell, 2013). The disease manifests itself in some animals sporadically or as enzootic outbreak. The economic importance of this disease is arise not only from the death of young animals, and above all of the losses related to the inhibition of body weight augmentation, decreased reproductive efficiency and growth retardation (Rahman, et al., 2011). Infected animals remain lifelong carriers and pose a threat for livestock and human health (Liang et al., 2012). Clinical examination of animals and serological investigation of blood sera samples conduct to establish the preliminary diagnosis.

The goal of the researcher work is conduction of serological screening for *Yersinia enterocolitica* serovar O:9 in ruminants and pigs in Ukraine.

Materials and methods. For conduction of serological screening there were collected blood sera of adult mature animals and examined its by serum agglutination test in tube.

Blood serum samples were examined in adult mature animals (cattle, sheep and pigs) from productive and breeding farms. All observed animals had no clinical signs of disease.

There were collected 213 blood serum samples from cattle, 86 blood serum samples from sheep, 36 blood serum samples from pigs. Total number of examined blood serum samples was 335.

Serological examination was used by SAT (serum agglutination test in tube). Blood serum samples were examined by using the tube agglutination test with antigen *Yersinia enterocolitica* serovar O:9 (TC U 46.15.091-95). Serum dilution varied from 1:50 to 1:600.

Results. Serological monitoring of intestinal yersiniosis was conducted from 15 farms in Central, Eastern and Southern regions of Ukraine. There were examined 335 samples of blood serum of farm animals. Blood serum samples were collected from 6 cattle, 2 sheep, 7 pig farms (Table 1).

Table 1 — Results of study of blood serum samples by SAT with *Yersinia enterocolitica* diagnosticum

№	Farms	Number of blood serum samples	Assessment of results		
			positive	doubtful	negative
Cattle					
1	Farm № 1, Kirovograd region	10	1	2	7
2	Farm № 2, Cherkasy region	10	8	1	1
3	Farm № 3, Kharkiv region	11	1	3	7
4	Farm № 4, Kharkiv region	113	20	29	64
5	Farm № 5, Kharkiv region	67	7	23	37
6	Farm № 6, Kharkiv region	2	—	2	—
Total		213	37	60	116
Sheep					
1	Farm № 1, Kharkiv region	52	3	9	40
2	Farm № 2, Kharkiv region	34	—	—	34
Total		86	3	9	74
Swine					
1	Farm № 1, Dnipropetrovsk region	5	2	1	2
2	Farm № 2, Odessa region	6	—	—	6
3	Farm № 3, Kharkiv region	5	—	—	5
4	Farm № 4, Donetsk region	4	—	—	4
5	Farm № 5, Kirovograd region	6	—	—	6
6	Farm № 6, Sumy region	2	—	—	2
7	Farm № 7, Odessa region	8	—	—	8
Total		36	2	1	36

High level of seroprevalence from 70% to 90% was detected in all examined groups of ruminants animals. When examining animals the high level of seroprevalence was registered in 92.02% of the cattle and in 75.86% of sheep. However, most of them had the titers that were lower than the diagnostic level. Such results are taken into consideration as doubtful positive once.

During study high seroprevalence were found in 6 cattle farms. Thus, 71.83% of samples was positive. 17.37% of samples had high diagnostic titers (1:200 and above), the other 54.46% of samples had 1:50 and 1:100 titers, what means 'doubtful positive' result (Fig. 1).

Similar trend was seen after examining of 86 sera samples of 2 sheep farms of Kharkiv region.

Seroprevalence rate reached 89.54%. However, diagnostic titers were detected only in 3.49% of animals, the other 86.05% was 'doubtful positive' results (Fig. 2).

As for the pigs 36 animals were examined and small numbers of seropositive animals were revealed — 8.32%. When examining the pigs, diagnostic titers were in 5.5% of animals, 2.77% showed 'doubtful positive' results (Fig. 3).

One sample showed the result for ++++ in the titers 1:400, that can testify the acute course of the disease. The conducted serological screening of intestinal yersiniosis had proved high level of seroprevalence in farm animals (Fig. 4).

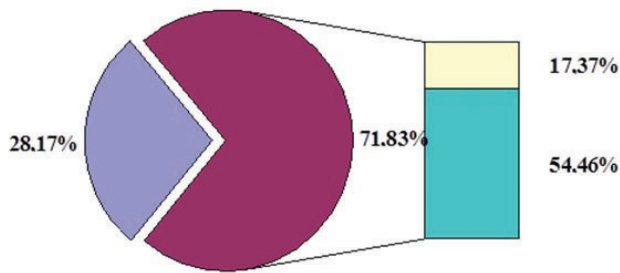


Figure 1. Seroprevalence of *Yersinia enterocolitica* serovar O:9 in cattle

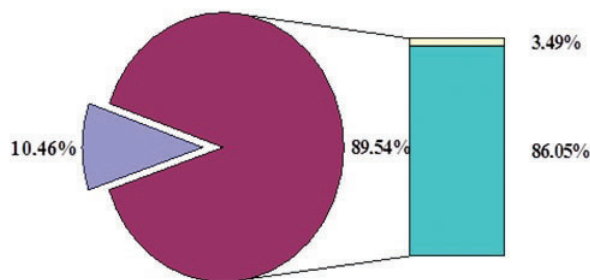


Figure 2. Seroprevalence of *Yersinia enterocolitica* serovar O:9 in sheep

The conducted serological investigation of intestinal yersiniosis has proved high level of seroprevalence in farm animals.

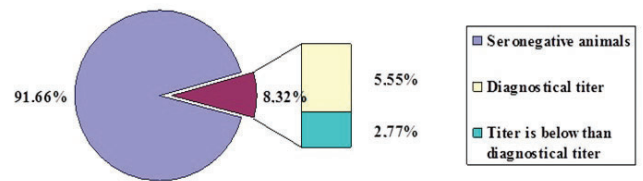


Figure 3. Seroprevalence of *Yersinia enterocolitica* serovar O:9 in pigs

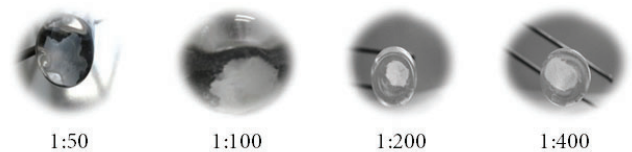


Figure 4. The investigated sample of blood serum pig

Conclusions. According to the results of the research the presence of high level of seroprevalence of *Yersinia enterocolitica* in farm animals confirms asymptomatic bacterial carrier status in industrial herds of cattle, sheep and pigs.

The presence of 'doubtful positive' reactions talk about circulation of low virulence *Yersinia* isolates, which in case of reversion may pose a threat for animals and people health.

Thus results of our research demonstrate topicality of intestinal yersiniosis monitoring for realization of control and prevention of the disease in agricultural farms of Ukraine.

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