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IDENTIFICATION OF SALMONELLA SEROVARS ISOLATED DURING 2009-2016 IN TERNOPIL REGION, UKRAINE

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Introduction

The burden of foodborne diseases is substantial: every year almost 1 in 10 people fall ill and 33 million of healthy life years are lost. Diarrhoeal diseases are the most common illnesses resulting from unsafe food, 550 million people falling ill each year. Salmonella is 1 of the 4 key global causes of diarrhoeal diseases [1]. Salmonellosis is registered in all regions of the world. Relevance of salmonellosis is due its global distribution, increasing incidence, even in developed countries, frequent outbreaks.

The most reports in different countries demonstrated that one of the common Salmonella serotypes isolated from food and environmental samples had been serovars *Salmonella Enterica*, *Typhimurium* [2, 3, 4, 5, 6]. In Colombian outbreak areas serotypes *S. Newport*, *S. Anatum*, *S. Sinstorf* identified from stool and gallbladder bile samples of human carriers [7]. The Moroccan report about microbiological analysis of food samples (2010-2012 years) showed that the samples were contaminated with *Salmonella* serotypes, such as: *Kentucky*, *Agona*, *Reading*, *Corvallis*, *Saintpaul*, *Typhimurium*, *Montevideo*, *Enteritidis*, *Israel*, *Hadar*, and *Branderup* [8]. Germany has reported an increase in the number of *Salmonella Stourbridge* cases during 2016. [9]. In Ukraine 7.3% of all acute diarrheal infections have been cases of salmonellosis [10].

Although large *Salmonella* outbreaks usually attract media attention, 60–80% of all salmonellosis cases are not recognized as part of a known outbreak and are classified as sporadic cases, or are not diagnosed as such at all [1].

Material & methods

The samples from cultured stool, bile samples, food and environment were inoculated in the Tryptic Soya Broth (TSB) for the enrichment and detection of the bacteria. After 24 hours incubation, microorganisms were cultured on the MacConkey agar plates. Then biochemical and serological tests were performed to identify the serovars of the isolated *Salmonella* in Ternopil regional laboratory center, Ukraine.

Results & discussion

Over the past 8 years the incidence of salmonellosis has varied between 8.41 3.3 cases per 100 thousand of population (35 - 90 cases). During this period, the lowest rate recorded in 2015 (3.3 cases per 100 thousand of population), the highest – in 2014. Analysis of morbidity has been shown that elevated levels of infection were due to outbreaks registered in 2011 (the number of infected

people was 23), in 2013 (53 infected people), in 2014 (67 infected people) and in 2016 (16 infected people).

In Ternopil region the dominant serovar of *Salmonella spp.* isolated from patients are *S. enteritidis* (56.8 - 93.5% of all cases of diseases) and *S. typhimurium* (7.8 - 43.8%) in last 8 years. Among the carriers circulate *S. enteritidis*, *S. typhimurium* – mainly (64,8% and 35.2% respectively).

Particular attention was paid to the appearance of *Salmonella spp.* which were new and not typical for Ternopil region. *S. soncord* (in 2009), *S. vraenderup* (in 2015) were isolated from sick persons' samples; *S. soncord* and *S. wippra* (in 2009), *S. give* (in 2010), *S. braenderup* (in 2015), *S. haifa* (in 2016) - from carriers' samples.

Annually causative agents of salmonellosis (4 – 15) were isolated from the external environment. Serological examination demonstrated usual *Salmonella spp.* circulating in Ternopil region *S. interitidis*, *S. typhimurium*. They were isolated from food products (meat, culinary and confectionery, dairy products, eggs) – 72.4% of taken samples, from drinking water – 6.9% of samples, from environmental samples – 18.9%. Serotype *S. isangi* which is not typical for Ternopil region was isolated from the soil in 2010.

Conclusion

Stabilization of the salmonellosis morbidity in the country supported by the absence of improvements epidemiological conditions. To prevent of outbreaks of salmonellosis among the population, the monitor the environment, of food raw materials and active conduction of the sanitary educational work among the population are required.

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Introduction. Salmonellosis is registered in all regions of the world. Relevance of salmonellosis is due its global distribution, increasing incidence, even in developed countries, frequent outbreaks. The most reports in different countries demonstrated that one of the common Salmonella serotypes isolated from food and environmental samples had been serovars *Salmonella Enterica*, *Typhimurium*. In Ukraine 7.3% of all acute diarrheal infections have been cases of salmonellosis. Although large *Salmonella* outbreaks usually attract media attention, 60–80% of all salmonellosis cases are not recognized as part of a known outbreak and are classified as sporadic cases, or are not diagnosed as such at all. Material & methods. The samples from cultured stool, bile samples, food and environment were inoculated in the Tryptic Soya Broth (TSB) for the enrichment and detection of the bacteria. After 24 hours incubation, microorganisms were cultured on the MacConkey agar plates. Then biochemical and serological tests were performed to identify the serovars of the isolated *Salmonella* in Ternopil regional laboratory center, Ukraine. Results & discussion. Over the past 8 years the incidence of salmonellosis has varied between 8.41 3.3

cases per 100 thousand of population (35 - 90 cases). During this period, the lowest rate recorded in 2015 (3.3 cases per 100 thousand of population), the highest – in 2014. Analysis of morbidity has been shown that elevated levels of infection were due to outbreaks registered in 2011 (the number of infected people was 23), in 2013 (53 infected people), in 2014 (67 infected people) and in 2016 (16 infected people). In Ternopil region the dominant serovar of *Salmonella spp.* isolated from patients are *S. enteritidis* (56.8 - 93.5% of all cases of diseases) and *S. typhimurium* (7.8 - 43.8%) in last 8 years. Among the carriers circulate *S. enteritidis*, *S. typhimurium* – mainly (64,8% and 35.2% respectively). Not typical for Ternopil region serotypes, such as: *S. soncord* (in 2009), *S. vraenderup* (in 2015) were isolated from sick persons' samples; *S. soncord* and *S. wippra* (in 2009), *S. give* (in 2010), *S. braenderup* (in 2015), *S. haifa* (in 2016) - from carriers' samples. Serotypes *S. interitidis*, *S. typhimurium* were isolated from food products (meat, culinary and confectionery, dairy products, eggs) – 72.4% of taken samples, from drinking water – 6.9% of samples, from environmental samples – 18.9%. Serotype *S. isangi* which is not typical for Ternopil region was isolated from the soil in 2010. **Conclusion.** Stabilization of the salmonellosis morbidity in the region supported by the absence of improvements epidemiological conditions. To prevent of outbreaks of salmonellosis among the population, the monitor the environment, of food raw materials and active conduction of the sanitary educational work among the population are required.

Keyword: Salmonella infection, serotype.