BIOLOGICAL HAZARDS IN FOOD – AN ONGOING CONCERN OF EUROPEAN FOOD SAFTEY AUTHORITY(EFSA)

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Abstract: *Among the tasks of EFSA, according to Regulation (EC) No 178/2002, there is the establishment of a system of Networks of organisations operating in the EFSA fields. The Scientific Network on Microbiological Risk Assessment (MRA Network) and the EFSA Panel on Biological Hazards (BIOHAZ) are implicated in food safety. Romania is represented in the MRA Network by the National Sanitary Veterinary and Food Safety Authority. Biological hazards for human health are represented by: bacteria, viruses and parasites. The paper presents essential aspects regarding the biological hazards in food by analyzing the MRA Network and BIOHAZ publications.*

Key words: *biological hazards, food safety, protection of consumers*

INTRODUCTION

Biological hazards, refer to "biological substances that pose a threat to the health of living organisms, primarily that of humans. This can include medical waste or samples of a microorganism, virus or toxin (from a biological source) that can affect human health. It can also include substances harmful to other animals"[10].

Biohazards in food can be defined pathogen (bacteria, viruses, parasites) that cause diseases that occur after ingestion of contaminated food or beverages. Some dangerous organisms live animals, in the environment. They arrive food from the workers' hands, the utensils, work surfaces, equipment, water, pests, cleaning equipment, packaging or other products. Many microorganisms are developed during production, storage or transport, especially when not observed proper temperature. Although heat processing destroys most vegetative forms of microorganisms, product HT may be subject to contamination due to handling errors later. The favorable conditions for environment, certain bacterial species can double their number every 20-30 minutes. Depending on the body, the number of bacteria required to cause disease in a healthy adult may exceed 1 million. Food business operators and consumers should take precautions, which include among others maintain the temperature and keeping food preservation raw and heat-treated separately from products other food ready to be consumed.

Foods traditionally associated with foodborne illness include raw meat or insufficiently heat treated poultry meat, fish and seafood and unpasteurized milk. Quite recently and other foods were considered responsible for the transmission of diseases such as: eggs, juice, fruit and vegetables.

Many of the species of bacteria have the ability to grow in extreme environmental conditions (composition, pH, temperature, oxygen concentration, etc.). Bacteria present thermostable at different temperature and mentioning an ability to survive in extreme conditions spores. On the other, although it does not develop viruses and parasites in the feed, these agents have the ability to survive in a sufficient to produce disease [8].

Biological hazards for human health are represented by:

- bacteria: Bacillus species, Campylobacter, Clostridium botulinum, Clostridium difficile, Clostridium perfringens, Cronobacter, Escherichia coli, Listeria monocytogenes

Salmonella, Shigella, Staphylococcus aureus, Vibrio parahaemolyticus Vibrio vulnificus, Yersinia enterocolitica,

- viruses: Hepatitis A, Norovirus and
- parasites: Anisakids, Cryptosporidium, Cyclospora, Entamoeba, Giardia, Toxoplasma, Trichinella [9].

Establishing a network of organizations operating in the fields within EFSA's mission is among the tasks of EFSA, in accordance with its founding Regulation No 178/2002. To facilitate a scientific cooperation framework by coordinating activities, sharing information, the development and implementation of joint projects, exchange of expertise and best practices.

In addition, EFSA's Science Strategy 2012-2016 has set a target to develop, with the competent authorities of the Member States, the multiannual work programs focused on filling data gaps and prioritizing data collection. To implement the above objectives have been established various networks. Scientific network on Microbiological Risk Assessment (MRA Network) had its first meeting in 2007 and, as a result, were held one or two meetings per year. At present, 24 Member States of the European Union, two observer countries (Switzerland and Norway) are members of the network MRA. Estonia joined MRA network in 2015. During the biannual meetings of a wide range of topics were discussed in relation to microbiological risk assessment. Among other topics, it discussed Campylobacter risk assessment, antimicrobial resistance, eating insects, risks related to the consumption of raw dairy products, hepatitis E, Listeria monocytogenes, Salmonella Stanley and S. infantis [5].

The EFSA Panel on Biological Hazards (BIOHAZ) provides scientific advice on biological hazards in food.This covers animal diseases transmissible to humans; food microbiology and food hygiene[4].

MATERIALS AND METHODS

Documenting the work consisted in using data from the activity reports for 2015 submitted by the Scientific Network on Microbiological Risk Assessment (MRA Network) and the EFSA Panel on Biological Hazards (BIOHAZ) and legislation.

RESEARCH RESULTS

The scientific report for 2015 from EFSA and the European Center for Disease Prevention and Control shows the results of the monitoring of zoonoses in 32 European countries: 28 Member States and Iceland, Liechtenstein, Norway and Switzerland. Campylobacteriosis has been the most frequently reported for human cases of zoonosis, followed by Salmonella (figure 1).

In 2015, in food, Campylobacter was most common in chicken. The downward trend of salmonellosis cases in humans decreased, but the proportion of Salmonella human Enteritidiscases increased. The food ready for consumption Listeria monocytogenes rarely exceeded the limit European food safety. Yersinia cases were reported mainly in pork and products. The number of cases of infections caused by Escherichia coli toxin, Shiga followed by infections in humans was similar to 2014. Bacteria were detected most frequently causative agents, followed by bacterial toxins, viruses, parasites and other causative agents. The report further summarizes the trends and sources of tuberculosis due to Mycobacterium bovis, Brucella, Trichinella, Echinococcus, Toxoplasma, rabies, Coxiella burnetii (Q fever), West Nile virus and tularemia.

The distribution of food-borne and waterborne outbreaks per causative agent in the EU Member States in 2015, is presented in figure 2.

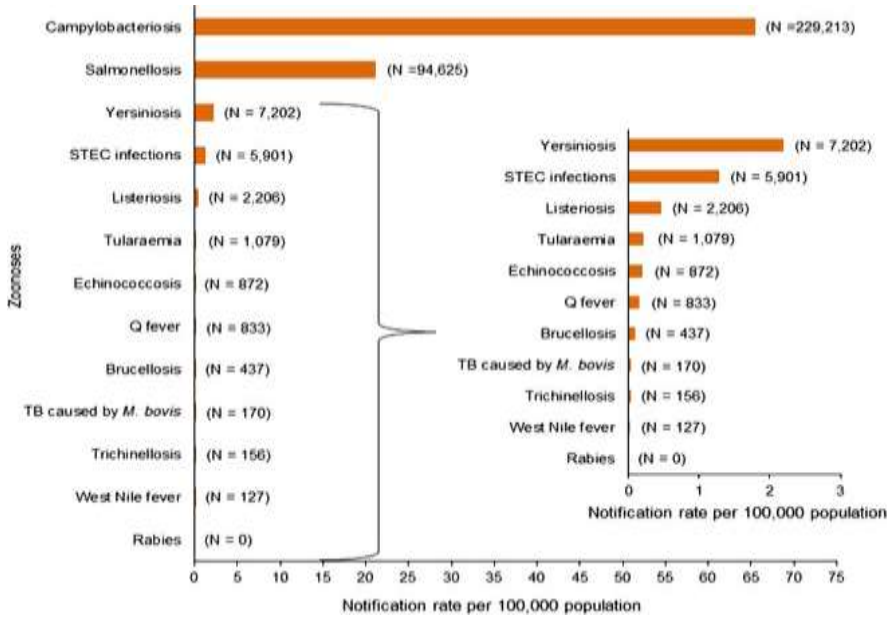

Fig.1.Reported numbers and notification rates of confirmed human zoonoses cases in the EU, 2015 [7]

Legend: *Total number of confirmed cases is indicated in parenthesis at the end each bar. Exception is made for West Nile fever where total number of cases was used*

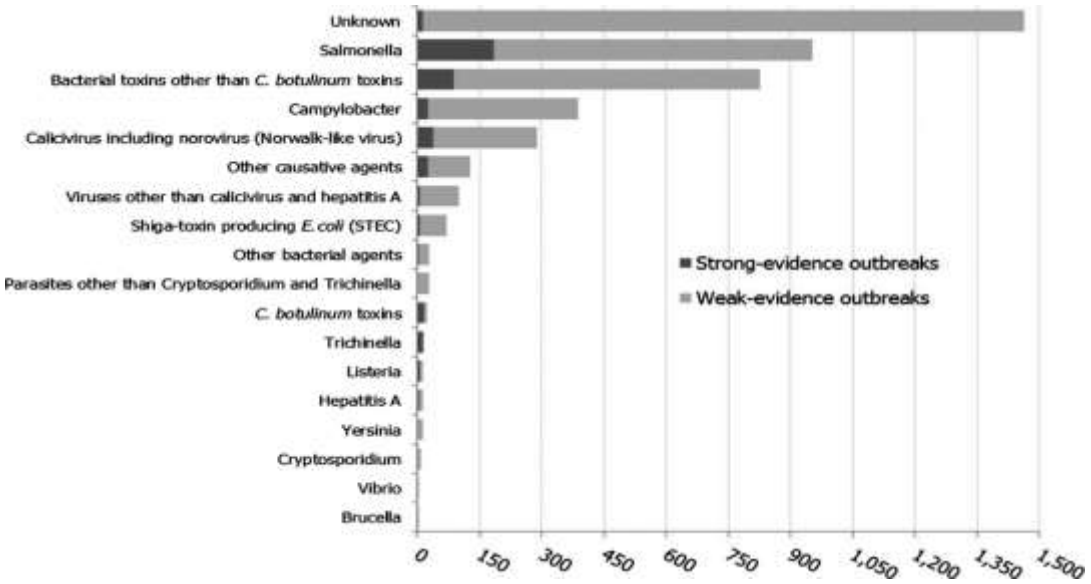

Fig.2.Distribution of food-borne and waterborne outbreaks per causative agent in the EU Member States, 2015[7]

Legend: *Other bacterial agents include Francisella, Shigella, pathogenic E. coli other than shiga toxin-producing E. coli, and other unspecified bacteria.*

The causative agent remained unknown in 33.5% of all outbreaks. As in previous years, Salmonella in eggs continued to be the highest risk combination agent - food.

CONCLUSIONS

Biohazards in food are pathogens (bacteria, viruses, parasites) that cause diseases that occur after ingestion of contaminated food or beverages. Some dangerous organisms live animals, in the environment. They arrive food from the workers' hands, the utensils, work surfaces, equipment, water, pests, cleaning equipment, packaging or other products. Many microorganisms are developed during production, storage or transport, especially when not observed proper temperature.

The scientific report for 2015 from EFSA and the European Center for Disease Prevention and Control shows the results of the monitoring of zoonoses in 32 European countries. Campylobacteriosis has been the most frequently reported for human cases of zoonosis, followed by Salmonella. In food, Campylobacter was most common in chicken. The downward trend of salmonellosis cases in humans decreased, but the proportion of Salmonella human Enteritidiscases increased. Yersinia cases were reported mainly in pork and products. The number of cases of infections caused by Escherichia coli toxin, Shiga followed by infections in humans was similar to 2014. Bacteria were detected most frequently causative agents, followed by bacterial toxins, viruses, parasites and other causative agents.

A current problem is the human health impact of antimicrobial resistance (AMR) and antibiotics use in animals across the EU. Concern on the emergence and spread of resistance to humans through the nontherapeutic use of antimicrobials has led to practices conflicting and differing opinions.

All the efforts made by the EU institutions in consumer protection have highlighted the need to continue to improve the legislation and informing and educating consumers and protect their economic interests.

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