

## Identification and Prevalence of *Escherichia coli* and *Escherichia coli* O157: H7 in Foods

Ancuța M. ROTAR<sup>1)</sup>, Cristina Anamaria SEMENIUC<sup>1)</sup>, Sorin APOSTU<sup>1)</sup>, Carmen POP<sup>1)</sup>,  
Mihaela DUMA<sup>2)</sup>, Ramona SUHAROSCHI<sup>1)</sup>, Larisa GIURA<sup>1)</sup>

<sup>1)</sup> University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Address - 400372 - Cluj-Napoca, Mănăștur Street, number 3-5, Romania; anca.rotar@usamvcluj.ro

<sup>2)</sup> The Health Sanitary Department, no. 1, Mărăști Square, Cluj-Napoca, Romania

**Abstract.** The objective of this study is to investigate the incidence of *Escherichia coli* in animal and non-animal foods, and mainly the incidence of the serotype O157: H7 producing verotoxin. The identification of common *Escherichia coli* and *Escherichia coli* O157: H7 in various foods (of animal and non animal origin) was studied in Transylvania County. Were analyzed a total of one hundred forty-one samples of minced meat, one hundred twenty-six samples of meat, twenty six samples of meat products, five samples of alcoholic beverages, three samples of seafood, one hundred samples of cheese from pasteurized milk, seventeen samples of butter, four samples of vegetables and one sample of milk powder, using the standard cultural method and Vidas Eco method for *E. coli* O157: H7 strains identification. *E. coli* was identified in 50 samples of minced meat, 55 samples of meat prepared, 4 samples of meat products, 2 samples of alcoholic beverages, 25 samples of cheese from pasteurized milk, 6 samples of butter and 1 sample of vegetables. In this study were not been identified any foods contaminated with the *E. coli* O157: H7 serotype. The results of this reasearch have demostrated that *E. coli* wich represents a hygienic indicator of recent food contamination, can be destroyed with heat treatment and hygienic handling of foods. Our country over the years has been among the few countries where the incidence of the *E. coli* O157: H7 serotype has been minimal.

**Keywords:** O157: H7, fecal, animal and non-animal samples, hemorrhagic colitis, food poisoning

**Introduction:** A majority of foodborne disease is traceable to consumption of contaminated animal products (meat, poultry, seafood), but the epidemiological importance of plant products contaminated pre- or post-harvest (e.g., exposure to manure, sewage effluent, inappropriate handling during processing) is an increasing concern (Crook et al., 2003). *Escherichia coli* is a common inhabitant of intestinal tract of humans and animals and is considered an indicator of fecal contamination in food. *Escherichia coli* can be easily disseminated in different ecosystems through the food chain. *E. coli* has been shown to exchange genetic material with other bacterial species and it is possible that this organism may pass antibiotic resistance genes to transient bacterial pathogens that cause disease in humans. (Alexander et al., 2010, Seung-Hee Ryu et al., 2012).

**Aims:** The purpose of this study is to investigate the incidence of *Escherichia coli* in animal and non-animal foods, and mainly the incidence of the serotype O157: H7 producing verotoxin. This serotype is considered the most dangerous, being involved in food poisoning.

**Materials and methods:** Were analyzed a total of one hundred forty-one samples of minced meat, one hundred twenty-six samples of meat , twenty six samples of meat products, five samples of alcoholic beverages, three samples of seafood, one hundred samples of cheese from pasteurized milk, seventeen samples of butter, four samples of vegetables and one sample of milk powder. The methods used were standard cultural method for common *Escherichia coli* and

Vidas Eco method for *Escherichia coli* O157: H7 strains identification. The methods used were standardized using enrichment medium, isolation and confirmation characteristics of the species investigated- for *E. coli* and Vidas Eco method for *E. coli* O157: H7 strains. The VIDAS ECO *E. coli* O157 method, also known as the *E. coli* Phage Technology (ECPT) method, is an automated assay based on the ELFA technique (Enzyme-Linked Fluorescent Assay). (Warburton, D., and Christensen, D. 2008). 418 samples representing foods of animal and non animal origin were collected in sterile containers.

**Results:** Our study has identified the types of foods contaminated and the prevalence of *E. coli* from Transylvania area, *E. coli* was identified in 50 samples of minced meat: 55 samples of meat prepared, 4 samples of meat products, 2 samples of alcoholic beverages, 25 samples of cheese from pasteurized milk, 6 samples of butter and 1 sample of vegetables (as seen in Tab. 1). In this study there have not been identified any foods contaminated with the O157: H7 serotype.

Tab. 1

Prevalence of *Escherichia coli* in animal and non-animal samples

Samples	Sampled tested, n	<i>E. coli</i> positive samples n(%)	<i>E. coli</i> O157:H7 positive samples n (%)
Minced meat	141	50 (34,46)	-
Meat	120	55 (45,83)	-
Meat products	26	4 (15,38)	-
Drinks	5	2 (40)	-
Seafood	3	-	-
Cheese from pasteurized milk	101	25 (24,75)	-
Butter	17	6 (35,29)	-
Vegetables	4	1 (25)	-
Milk powder	1	-	-
Total samples	418	143 (34,21)	-

**Conclusion:** The presence of *Escherichia coli* (considered as sanitary indicator) means hygiene deficiencies. These can be generated from water or the handling persons, and indicates a very recent fecal contamination and if embodied in protein sublayers and fat can be pasteurization temperature resistant. *Escherichia coli* can be destroyed with heat treatment and hygienic handling of foods. Our country over the years has been among the few countries where the incidence of the O157: H7 serotype has been minimal comparative with EU countries (EU Public Health Advice).

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- Public health advice on prevention of diarrhoeal illness with special focus on Shiga toxin - producing *Escherichia coli* (STEC), also called verotoxin - producing *E. coli* (VTEC) or enterohaemorrhagic *E. coli* (EHEC).