

## **CAMPYLOBACTER'S PREVALENCE IN ROMANIA – A COMPARISON WITH THE PREVALENCE IN EUROPE**

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### **Abstract**

*Microbial food safety is an increasing public health concern worldwide. Campylobacter is a bacterium that can cause an illness called campylobacteriosis in humans. With over 200000 human cases annually, this disease is the most frequently reported food-borne illness in the European Union (EU). Campylobacter bacteria are a major cause of foodborne diarrheal illness in humans and are the most common bacteria that cause gastroenteritis worldwide. Campylobacteriosis are largely perceived to be food-borne, with poultry meat as a major source.*

*The interest in determinations of Campylobacter in Romania started very recently, the first monitoring recording in 2007. Since then, every year there are tested about 450 samples represented either carcass skin from slaughterhouse or retail raw chicken meat. All samples have been performed accordingly ISO 10272/2006.*

*The highest incidence of Campylobacter (63%) was observed in 2008, whereas in next years it was remarked a decrease. This decrease appeared especially consequently of implementation of hazard analysis of critical control point (HACCP). In the same period the Campylobacter's prevalence in Europe was different, depending on country. The most frequently strains isolated were Campylobacter jejuni and Campylobacter coli, these being the main strains involved in human campylobacteriosis pathology.*

**Key words:** *Campylobacter, foodborne, prevalence.*

### **INTRODUCTION**

In 2011, *Campylobacter* continued to be the most commonly reported gastrointestinal bacterial pathogen in humans in the EU since 2005. The number of reported confirmed cases of human campylobacteriosis in the EU in 2011 was 220,209, which was an increase of 2.2 % compared to 2010. The EU trend in confirmed cases of ampylobacteriosis showed a statistically significant ( $p < 0.001$ ) increase in the last five years (2008–2012) The EU notification rate of confirmed cases of campylobacteriosis showed a slightly fluctuating, but stable, trend in the last five years (EFSA, 2013).

*Campylobacter* is considered to be the most common bacterial cause of human gastroenteritis in the world (Newell and Wagenaar, 2000). An acute infection can have serious long-term consequences, including the peripheral neuropathies, Guillan-Barre syndrome and Miller-Fisher syndrome (Pope et

al., 2004; Poropatich et al., 2010). In many countries, the organism is isolated 3-4 times more frequently from patients with alimentary tract infections than other bacterial enteropathogens (such as *Salmonella* or *Escherichia coli*). Campylobacteriosis is largely perceived to be food-borne, with poultry meat as a major source (Jore et al., 2010). However, it is often difficult to trace sources of exposure to *Campylobacter* because of the sporadic nature of the infection and the important role of cross-contamination. Thermophilic *Campylobacter* species are widespread in nature. The primary reservoirs are the alimentary tract of birds and mammals including food producing animals (poultry, cattle, pigs and sheep). However the most source in *Campylobacter* transmission remains the chicken meat (Waldenstrom et al., 2002). Taking in considerations this aspect, since 2008 have been conducting in Europe different monitoring programs to estimate the *Campylobacter's* prevalence. The aim of this study was to evaluate and compare the

*Campylobacter*'s prevalence recorded in Romania with the *Campylobacter*'s prevalence from other Member States.

## MATERIALS AND METHODS

First monitoring of *Campylobacter* in all States Member was conducted in 2008 accordingly Decision EU 516/2007. During the EU baseline study, the neck and breast skin were also examined for presence of and numbers of *Campylobacter* (Decision EU 516/2007). Since 2008, in Romania there are annually tested about 450 samples represented by carcass skin from slaughterhouse or retail raw chicken meat in order to establish the *Campylobacter*'s prevalence in our country. Initially the monitoring programs were conducted in slaughterhouse and starting from 2010 have been analyzing the chicken meat at retail level. *Campylobacter* detection and isolation methods were based on the ISO 10272 procedure. From each sample were weighed 25 g and placed in stomacher bag. Samples were enriched at 1:9 ratio (w:v) in Bolton broth supplemented with cefoperazone (20 mg per l), vancomycin (20 mg per l), trimethoprim lactate (20 mg per l), amphotericin B (10 mg per l) and 5% sterile lysed defibrinated horse blood. The bags with samples and Bolton broth were incubated for 48 h at 41,5°C under microaerobic conditions (10% CO<sub>2</sub>, 5% O<sub>2</sub> and 85% N<sub>2</sub>) (ISO 10272-1/2006). Enriched samples (broth) were plated on modified charcoal cefoperazone deoxycholate agar (mCCDA) and Preston agar for isolation and identification of *Campylobacter* spp. All agar plates were incubated at 41,5°C under microaerobic conditions for 48 h. Suspected *Campylobacter* colonies were streaked onto Columbia blood agar (sheep blood 5%) and incubated in the same conditions in order to allow the development of well-isolated colonies. After that, the suspected colonies were observed under phase contrast microscopy for their spiraling motility and characteristic morphology (ISO 10272-1/2006). For confirmation of *Campylobacter* presence were observed also the incapability of suspected colonies to grow at 25°C under microaerobic conditions. Detection of oxidase

was another test performed in order to confirm the presence of *Campylobacter*.

Identification of *Campylobacter* species was carried out by biochemical tests as detection of catalase, detection of hippurate hydrolysis and indoxyl acetate hydrolysis (ISO 10272-1/2006). There were used commercial kits to perform these tests.

## RESULTS AND DISCUSSIONS

Table 1 shows the prevalence of *Campylobacter* spp, *Campylobacter jejuni* and *Campylobacter coli* in the samples analyzed in period 2008-2012 in Romania.

Table 1  
The annual incidence of *Campylobacter* spp.,  
*Campylobacter jejuni* and *Campylobacter coli*

Year	No. samples	% positive <i>Campylobacter</i> spp.	<i>C. jejuni</i> (%)	<i>C. coli</i> (%)
2008	400	63	63,5	36,5
2009	225	37,7	43,5	56,5
2010	225	30,2	52,9	47,1
2011	490	23,4	44,3	53,0
2012	490	31,0	43,4	52,6

The highest incidence of *Campylobacter* (63%) in Romania was observed in 2008, whereas in next years it was remarked a decrease. This decrease appeared especially consequently of implementation of hazard analysis of critical control point (HACCP). Since 2009, the annual *Campylobacter*'s incidence has been varied, with an average about 30%. Initially, due to the high incidence recorded in 2008, it could not provide a correlation between the *Campylobacter*'s presence and climate. In next years, it was observed a high incidence of *Campylobacter* in period may-september.

At the Community level the prevalence of *Campylobacter*-contaminated broiler carcasses was 75.8% (EFSA, 2011). The MS-specific prevalence varied markedly. MS prevalence ranged from a minimum of 4.9% to a maximum of 100.0%. Consequently, the incidence of *Campylobacter* in Europe was recorded an decrease; in next years the *Campylobacter*'s incidence did not recorded high variations being situated between 26-32% (EFSA/ECDC, 2013). However, the values of

*Campylobacter*-positive samples in Europe represent a mean of values reported by Member States, between these being high differences. Generally the proportions of *Campylobacter*-positive broiler meat samples (single or batch), at any sampling level, varied widely among Member States, with the prevalence ranging from 3.2 % to 84.6 %. While in the states from Northern Europe (Denmark, Sweden, Finland, Norway) it was recorded a low *Campylobacter*'s prevalence, in other states who has a mild climate, the prevalence was high (Spain) (EFSA, 2011). A possible explanation of this reduction of *Campylobacter*'s incidence in the years after 2008, is the implementation of a lot of programme developed to reduce the *Campylobacter*'s contamination from farm to market.

Both in Romania and Europe, the most frequently strains isolated were *Campylobacter jejuni* and *Campylobacter coli*, these being the main strains involved in human campylobacteriosis pathology. Although in Europe the most met species was *C. jejuni*, in Romania *C. coli* was most frequently isolated. In figure 1 is presented the dynamic of *Campylobacter* prevalence for period between 2008-2012.

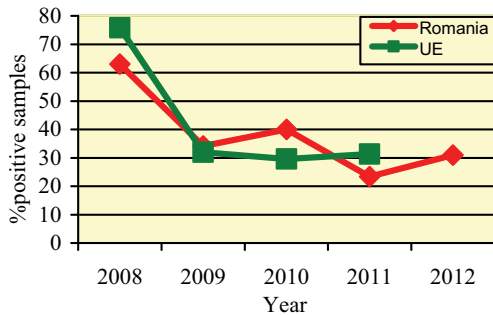


Figure 1 Diagram of *Campylobacter*'s prevalence in Romania and European Union

The *Campylobacter*'s importance was unappreciated for many years, but, since *Campylobacter* is the main bacterial agent involved in occurring of gastroenteritis there are lots of monitoring program over world. The monitoring programs are useful both for the annual incidence establishing and for the estimation of the relative contribution of different sources to the burden of human illness

(Muller, 2012) On the other hand, it is very useful to know the dynamic of *Campylobacter*'s prevalence consequently applying the control measures in order to reduce the incidence of this microorganism both in farms, slaughterhouses and processing units.

## CONCLUSIONS

*Campylobacter*'s incidence is likely to be different in Member States located in the northern of Europe compared to other countries where the climate is milder.

The highest incidence of *Campylobacter* in Romania (63%) was observed in 2008, whereas in next years it was remarked a decrease of this, with a variation of the average about 30%. During the warm months, the *Campylobacter*'s incidence is higher. The *Campylobacter*'s incidence in States Membres in 2008 was 75,8 and in next years was situated between 26-32%.

In order to reduce the *Campylobacter*'s incidence is very important to apply the control measures and the following the effects of these.

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