

## Risk assessment of *Campylobacter* contamination in Serbia at the farm level

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An understanding of thermophilic *Campylobacter spp* in meat production is important from public health perspective. The purpose of our project was to develop a qualitative risk assessment with attempt to understand that the human exposure to *Campylobacter spp* is influenced by various factors during breeding of animals, processing and distribution of meat. In the estimation of risks, these steps are involved:

1. Hazard identification: termophilic *Campylobacter spp* (*C. jejuni* and *C. coli*) are the leading cause of zoonotic enteric illness in most developed countries. Handling raw poultry and eating poultry products are important risk factors for sporadic campylobacteriosis.
2. Hazard characterization: - dose response analysis- the probability of illness following infection is influenced by immune response of individuals and it is assumed to be dose-independent.
3. Exposure assessment:
  - a. FARM routes contributing to initial introduction of *Campylobacter spp* into poultry flock on the farm still remain poorly understood and the phenomenon may be multi-factorial. Incidence of *Campylobacter spp* at Serbian poultry farms varies from 20 to 80%. Inoculation of chickens with 6.77 log cfu *C. jejuni* ATCC 29428 per chicken in 21<sup>st</sup> day of life leads to 5.26 log cfu/g feces after only 5 days, this number has trend to decrease in next two weeks when 3.02 log cfu/g feces was found.
  - b. PROCESSING: cooling, freezing, adding of chlorine during water chilling, lactic acid, irradiation may significantly reduce *Campylobacter spp.* contamination of carcasses. The prevalence of campylobacter-contaminated chickens from positive flock appears to drop from 100% live birds (with 3.02 log cfu/g feces) to 50% of chicken carcasses according to our experimental results. The influence of production management is great, since in some poultry abattoirs *Campylobacter spp.* was found on 11.43% carcasses and in other even on 90.00% carcasses. Similar situation was found in pig abattoirs where the prevalence of *Campylobacter spp.* varies from 1.83 to 22.22% on pig carcasses.
4. Risk characterization: This step links the probability and magnitude of exposure to *Campylobacter spp* associated with consumption of meat to adverse outcomes that might occur. *Campylobacter spp.* is frequently found in feces of live animals in Serbian farms. Overall *Campylobacter* contamination on carcasses decreased through processing with temporary increases occurring during transport and evisceration. But even high exposure of population to *Campylobacter spp* in Serbia, the incidence of human campylobacteriosis from raw meat is low. *Enteritis Campylobacterialis* is sporadic disease; symptoms usually do not require hospitalisation and many sick people do not go to the doctor and only small number of ill people has laboratory confirmation of campylobacteriosis. Also significant factor of exposure to the decrease are cooking habits in Serbia,
  - c. DISSTRICTION – RETAIL: cooling is the most important factor that prevents increasing number of *Campylobacter spp*
  - d. RESTAURANT AND HOME PREPARATION: undercooked meat and cross contamination from raw meat onto another food that is eaten without further cooking
  - e. HUMAN CAMPILOBACTERIOSIS IN SERBIA: According to report of Public health institute of Serbia »dr Milan Jovanović Batut« in 2009 there were 396 cases of *Enteritis Campylobacterialis* diagnosed with incidence of 5.39, while in EU in 2005 the incidence of 38.2-51.6 cases per 100 000 population was noticed.

meat in our country is usually well cooked or well baked. Undercooking have higher risk than cross-contamination

Conclusion: In order to significantly reduce the bacterial load on processed carcasses, interventions would required addressing the bacterial load, both internally and externally, since efforts directed at only one of these contamination reservoirs can be readily undermined by high levels of contamination from the other.

Keywords: risk, assessment, *Campylobacter spp*