
**Occurrence of *Campylobacter* spp. in carcasses of pigs slaughtered for consumption in Portugal.**

Morais, L. ¹, Resende, H. ¹, Fraqueza, M. J. ² & Vieira-Pinto, M. ¹ *

¹ Dept. Ciências Veterinárias. Lab. Inspeção Sanitária. CECAV. Universidade de Trás-os-Montes e Alto Douro. Apartado 1013. 5001-911 Vila Real. Portugal. mmvpinto@utad.pt

*Corresponding author: mmvpinto@utad.pt

**Abstract**

The present study was designed to determine the prevalence of *Campylobacter* spp. in pig's carcasses slaughtered for consumption in Portugal.

The present study showed that 86% of the carcasses swab samples collected at a pig slaughterhouse were contaminated with *Campylobacter* spp. From those, 45 colonies were isolated: 96,83% were identified as *Campylobacter coli* and 2,17% as *Campylobacter jejuni*.

This result underlines the significance of pork carcasses contamination with *Campylobacter* spp., and emphasises the importance of implementing measures in order to reduce this food borne pathogen from the pork production chain.

Further studies, using molecular tools, are being developed by the authors in order to evaluate the level of faecal contamination.

*Corresponding author: mmvpinto@utad.pt

**Introduction**

In 2007, Campylobacteriosis was again the most frequently reported zoonotic disease in humans in the European Union (200,507 reported confirmed cases) with the most Member States reporting an increased number of cases. Pathogenic species that cause human enteritis includes *Campylobacter jejuni, Campylobacter coli* and *Campylobacter lari*, the so-called thermotolerant campylobacters (Pearce et al., 2003)

*Campylobacter* spp. is widely distributed in environment and is frequently found in the intestinal tracts of a wide range of domestic and wild animals (Malakauskas et al., 2006). According to the EFSA report from 2007, *Campylobacter* spp. was commonly detected from live animals raised for human consumption, such as poultry, pigs and cattle (EFSA 2009).

Although it is well established that poultry meat are an important vehicle for foodborne campylobacteriosis, the involvement of pork in this foodborne disease is not well known (Pearce et al., 2003). With respect to Portugal, until the present, and according to our knowledge, no information about this subject was reported or published.

*Campylobacter* spp. can be often found in the intestinal tract of pigs, and here *C. coli* is the more common specie identified (Nesbakken et al., 2003; Malakauskas et al., 2006). At the slaughterhouse, swine carcass can be commonly contaminated with feces that can remain associated to the carcass as it progresses through the slaughter process. In addition, fecal material can also leak from the intestines during the evisceration process and contaminate carcass. Thus, the pathogen may be transported on contaminated carcasses from the slaughtering operation to the food-processing operation and
ultimately onto the final product and to the consumer. Carcass breaking and fabrication can also provide opportunities for fecal contamination of the final product (Pearce et al., 2003) Considering:
- the importance of Campylobacter spp. as an important foodborne pathogen;
- the fact that Campylobacter spp. can be often found in the intestinal tract of pigs and, consequently, can be carried to the slaughterhouse and spread to the edible products during the slaughter process, and
- the inexistence of data in Portugal about the Campylobacter spp. prevalence in pork,

it was established as the major goal of this study the evaluation of Campylobacter spp. prevalence in pig’s carcasses slaughtered for consumption.

Material and Methods

Several visits were done to an abattoir in the North of Portugal. In each visit, 10 pig carcasses were randomly selected, after meat inspection and before chilling, to perform an internal surface swab (all half carcasses – 600 cm²), with sterilised cotton gauze. A total of 50 samples were collected. At the laboratory all the samples were analysed by standard culture methods according to ISO norm 10272 -1 applied to detection of Campylobacter spp. in food and animal feeding stuffs. The swabs where placed in sterilized plastic bags, and added a 100 ml volume of Preston broth (Nutrient Broth N. 2® - CM0067B - Oxoid, Campylobacter selective supplements SR0204E® - Oxoid and SR0232E® - Oxoid and 5% of ovine blood). After homogenization the samples where incubated at 42+/−2oC for 48 hours, under microaerophilic conditions, obtained by using Campygen CN025A or CN035A, Oxoid). The following step was plating using the selective medium Campyfood® (Biomerieux) and mCCDA (Modified Charcoal Deoxycholate Agar Lab 112-A® and Supplement Lab X112®, Lab M). The plates where incubated at 42+/−2oC for 48 hours, under microaerophilic conditions. Five suspect colonies from each one of the selective medium where plated in Columbia Agar with 5% ovine blood, and incubated at 42+/−2oC for 48 hours, under microaerophilic conditions. Presumptive Campylobacter spp. colonies were confirmed by microscopic observation of Gram stained preparations, and Campylobacter coli and C. jejuni were identified using the biochemical tests: Catalase, Hipurate and Indoxyl Acetate hydrolysis. For Hipurate hydrolysis test, C. jejuni NCTC 11392 was used as positive control, C. coli NCTC 11353 as negative control and C. jejuni NCTC 11168 as week positive control.

Results

The study showed that 43 (86 %) of the 50 samples collected at a pig slaughterhouse were contaminated with Campylobacter spp: 83% identified as Campylobacter coli and 17% as Campylobacter jejuni.

Discussion

Campylobacter is the leading cause of bacterial foodborne illness in Europe. The significant involvement of poultry in this process is well known but, with respect to pork, little research on the incidence and distribution of Campylobacter spp. has been conducted. The present study represents the first report of Campylobacter spp. pig’s carcasses slaughtered for consumption in Portugal. In this study, 86% of the sampled pig’s carcasses were contaminated with Campylobacter spp. Even taken under consideration that the methodology used in some similar studies was not the same; which impose a carefully direct comparison of the results, it is possible to state that the prevalence (86 %) reached in this study represents a high value when compared with the one reported in some scientific
manuscripts: 17% (Ghafir et al., 2007); 33% (Pearce et al., 2003) and 62% (Malakauskas et al., 2006).

*C. coli* represented 83% of the total isolates while *C. jejuni* represented 17%. No other thermophilic strains were isolated. This result it is in accordance with other previous studies reported by several author, like Malakauskas et al., (2006).

The high prevalence (86%) observed in our study underlines the significance of pork carcases contamination with *Campylobacter* spp. in Portugal which may contribute to alert the Competent Authorities and all the interventen in the pork production chain to the importance of its vigilance, monitoring and control.

About this subject, the authors also would like to state that, at the present, in all slaughterhouses of all Member States, *Salmonella* spp. must be monitored in pig carcases under mandatory application of European Regulation (EC) No 1744/2007). But, according to the authors’ studies, the prevalence (83%) of *Campylobacter* spp. in pig’s carcases, reached in the present study study, is considerably higher than the prevalence (13 %) of *Salmonella* spp. observed in a similar and study developed previously by the same authors (Vieira-Pinto et al., 2005). This fact was also previously referred by Pearce et al. (2003). Thus must allow us to place the following question under consideration: What should be the most important micrograms that should be mandatory controlled in pig’s carcass during slaughter process?

In spite of some author’s opinion that my minor the importance of the contamination of pig’s carcases with *Campylobacter* spp. during slaughter process, since they considered that:

- carcases contaminated by *Campylobacter*, as they enter the cooler, the drying effect of the ventilation and the sensitivity of the organisms to oxygen may result in the elimination of *Campylobacter* from the carcase surface before it leaves the cooler;
- there is a close relationship between human and chicken strains of *C. jejuni*, the same relationship does not exist between human and pig strains;

the authors believe that the high percentage of contaminated pig’s carcases with *Campylobacter* spp. observed in this study must be at least enough to put under attention this situation that might constitute a potential problem to human health.

Also, the authors would like to underline that although *C. coli* (the most important *Campylobacter* specie found in pigs and pork) is less frequently associated with the human cases of campylobacteriosis, it’s generally more resistant to antibiotics than *C. jejuni* (Pezzotti et al., 2003), therefore it can be useful to focus our attention in this specie of *Campylobacter*

**Conclusions**

As the main conclusion of this study, the authors would like to state that the high prevalence reached in this study underlines the significance of pork carcases contamination with *Campylobacter* spp., and emphasises the importance of implementing measures in order to reduce and control this food borne pathogen from the pork production chain.

Further studies, using molecular tools, are being developed by the authors in order to evaluate the level of faecal contamination.

**References**

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