

***Campylobacter* in broilers: detection, characterization and dynamics of colonization - Vaz C.S.L.^{1*}, Voss-Rech D.¹, Pozza J.S.², Mattos G.L.M.¹, Santos F.B.O.¹, Coldebella A.¹, Silva V.S.¹, Lauria-Filgueiras A.L.³**

1 - Embrapa Suínos e Aves, Concórdia, SC - Brazil

2 - PIBIC/CNPq, Fundação Universidade do Contestado, Concórdia, SC - Brazil

3 - Laboratório de Zoonoses Bacterianas, Instituto Oswaldo Cruz, FIOCRUZ, Rio de Janeiro, RJ - Brazil

*poster presenter: clarissa.vaz@embrapa.br

Campylobacter is an emerging bacterial agent of foodborne disease for which broilers are a primary reservoir. Despite its relevance to the broiler industry, there is little information about *Campylobacter* in Brazilian broiler flocks. Our studies aimed to optimize protocols for *Campylobacter* isolation in broiler samples, characterize strains isolated from commercial farms in Southern Brazil and analyze the dynamics of *Campylobacter* colonization in broilers. To optimize isolation methods, cloacal swabs (CS), drag swabs (DS), feces and litter were collected from commercial broilers farms. Strains isolated from three companies were selected for PFGE and antimicrobial resistance analysis. A longitudinal study was performed on an experimental broiler farm where three consecutive flocks were reared and they were weekly sampled from 1 to 6 weeks of age. Direct plating onto different selective media resulted in the highest *Campylobacter* detection in CS (72.2%), DS (69.4%), feces (88.9%) and litter (63.9%). Genotypic and phenotypic patterns of strains analyzed showed the circulation of multiple *Campylobacter* subtypes, each individually related to the given company sampled. The longitudinal study showed that broiler flocks became *Campylobacter*-positive at three to four weeks, when positive environmental samples were also detected. *Campylobacter* spreaded quickly among broilers as soon as they became colonized. However, cleaning and disinfection between flocks reduce residual *Campylobacter* contamination in poultry houses. As an ongoing activity of this study, Embrapa Swine & Poultry is going to promote a meeting for technical discussion and laboratory training of Brazilian technicians in November 2012 to enhance capabilities on understanding and diagnosing *Campylobacter*.

Key-words: *Campylobacter*, poultry, food safety

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Campylobacter IN BROILERS: DETECTION, CHARACTERIZATION AND DYNAMICS OF COLONIZATION

C.S.L. Vaz^{1*}, D. Voss-Rech¹, J.S. Pozza², G.L.M. Mattos¹, F.B.O. Santos¹, A. Coldebella¹, V.S. Silva¹, A.L. Lauria-Filgueiras³

¹Embrapa Suínos e Aves, Concordia/SC, Brazil

²PIBIC/CNPq, Fundação Universidade do Contestado, Concordia, SC, Brazil

³Laboratório de Zoonoses Bacterianas, Instituto Oswaldo Cruz, FIOCRUZ, Rio de Janeiro, RJ, Brazil *clarissa.vaz@embrapa.br

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Introduction

Campylobacter is an emerging bacterial agent of foodborne disease for which broilers are a primary reservoir. Despite its relevance to the broiler industry, the epidemiology of *Campylobacter* remains poorly understood and there is little information about *Campylobacter* in Brazilian broiler flocks. Our studies aimed to optimize protocols for *Campylobacter* isolation in broiler samples, characterize strains isolated from commercial farms in Southern Brazil and analyze the dynamics of *Campylobacter* colonization in broilers flocks.

Materials & Methods

Campylobacter isolation procedures

A total of 36 cloacal swabs (CS), 36 feces samples, 36 drag swabs (DS), and 36 litter samples were taken from 18 commercial broiler flocks with 3 to 5 weeks of age in Southern Brazil from 2010 up to 2011. Samples were direct plated onto three different selective media or enriched in selective broth following plating onto each selective media for 24-48h.

Phenotypic and genotypic characterization

A total of 33 strains isolated from three broiler companies were analyzed. PFGE patterns were compared by BioNumerics, while similarity was calculated by the Dice coefficient. A dendrogram was obtained by cluster analysis using the UPGMA. Antimicrobial resistance analysis was determined by the agar disk diffusion method.

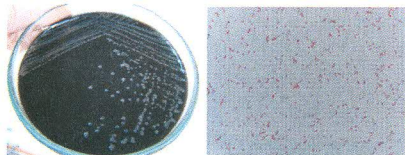


Figure 1. Gram negative stained *Campylobacter* colonies onto selective media.

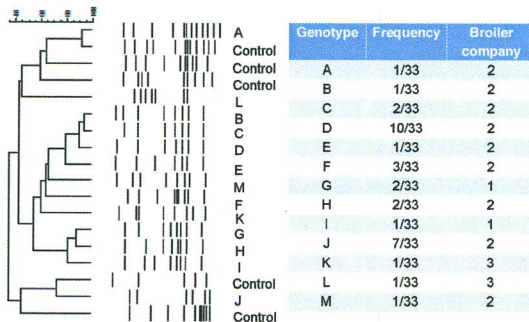


Figure 2. Frequency of genotypes identified in *Campylobacter* strains.

Dynamics of Campylobacter colonization

A longitudinal study was performed on an experimental broiler farm where three consecutive flocks were reared. Studied flocks consisted of 180 *Campylobacter*-negative chicks obtained from the same hatchery. Depopulation occurred at 42-day, and cleaning, disinfection and fermentative litter treatment were performed during 14 days between flocks. Cloacal swabs, litter and darkling beetles (*Alphitobius diaperinus*) were sampled once a week from 7 up to 42-day of age.

Results

Direct plating onto different selective media (Figure 1) resulted in the highest *Campylobacter* detection in feces (88.9%), CS (72.2%), DS (69.4%), and litter (63.9%), showing a high frequency of *Campylobacter* in the broiler flocks sampled at pre-harvest age.

A total of 4 antimicrobial resistance patterns were identified (data not shown). However, it may not be related to the use of antibiotics in the broiler production. Genotypic profiles of strains analyzed showed the circulation of multiple *Campylobacter* subtypes, each individually related to the given company sampled (Figure 2). It may help to identifying potential sources of *Campylobacter* and to determining routes of transmission to more accurately limit the spread of *Campylobacter* infection in broiler flocks.

The longitudinal study showed that cloacal swabs from broiler flock 2 became *Campylobacter*-positive sooner than flocks 1 and 3 (Figure 3). Positive broilers were detected at 3 to 4 weeks, when positive environmental samples were also identified. *Campylobacter* contamination spreaded quickly among broilers as soon as they became colonized. However, cleaning and disinfection between flocks reduce residual *Campylobacter* contamination in poultry houses.

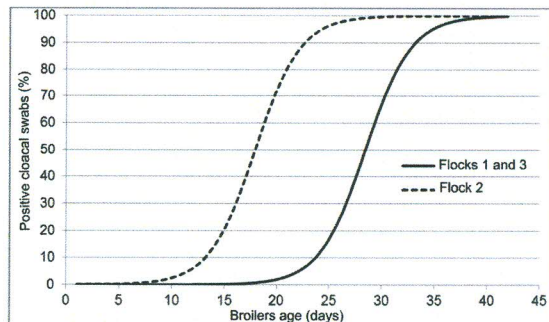


Figure 3. *Campylobacter*-positive cloacal swabs (%) according to adjusted logistic model.

Perspectives

As ongoing activities of this study, Embrapa Swine & Poultry is drawing up a new research project and is going to promote a meeting for technical discussion and laboratory training of Brazilian technicians in November 2012 to enhance capabilities on understanding and diagnosing *Campylobacter*.