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## Association of cyclopropane fatty acid synthesis with thermotolerance of *Campylobacter*

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**Background:** *Campylobacteriosis* is a worldwide zoonotic disease, with the majority of *Campylobacter* species isolated from humans originating from animals, particularly poultry which are the main source of *Campylobacter* spp. Nevertheless, in order to cause disease in humans *Campylobacter* must survive passage through abattoir processing, where it is exposed to heat and cold stress. Little is known about the mechanism which contributes to the ability of thermophilic *Campylobacter* species to grow at 42°C or to heat tolerance of the organism during poultry processing (>50°C). Cyclopropane fatty acid constituents of the cell membrane are known to contribute to enhanced stability and integrity under conditions of acidic and thermal stress. The aims of the work were to: Investigate the possession of cyclopropane fatty acid synthesis (indicated by the presence of the *cfa* gene) in thermotolerant and non-thermotolerant *Campylobacter* species. Examine SNPs in a key gene in the fatty acid synthesis pathway.

**Materials and methods:** *Campylobacter* strains for the non-abattoir group were used from the laboratory culture collection. These had been identified using a multiplex PCR. Abattoir strains had been collected from chicken carcasses either before or after exposure to the scald tank in a poultry processing plant. The presence of the *cfa* gene was determined by PCR on DNA extracted from bacterial cultures using custom-designed primers based on sequences in CampyDB, PCR products were sequenced. To determine maximum growth temperature isolates from before and after exposure to the scald tank were incubated on blood agar at the indicated temperature and growth recorded.

**Results:** The strains of *Campylobacter* isolated from the abattoir possessed the cyclopropane fatty acid synthesis gene *cfa* whereas strains in the non-abattoir group did not, suggesting that *cfa* contributes to the ability of *Campylobacter* to grow at temperatures above 37°C. Strains of *C. jejuni* that survived passage through the abattoir scald tank were more likely to be able to grow at elevated temperatures than strains pre-scald. When SNPs were examined, three variants of the *cfa* gene were seen in isolates pre-scald and only one post scald. The *cfa* gene is associated with thermophilic *Campylobacter* and was not found in non-chicken associated strains.

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