Chalermkiat Saengthongpinit 2008: Rapid Detection and Molecular Subtyping of *Campylobacter* in Poultry Samples. Doctor of Philosophy (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Thavajchai Sakpuaram, Ph.D. 121 pages.

Two alternative methods, multiplex PCR (mPCR) and immunomagnetic separation (IMS) followed by plating to CCDA agar, were compared for their suitability to detect *Campylobacter jejuni* and *C. coli* in chicken meat. IMS followed by plating could detect *C. jejuni* and *C. coli* inoculated at 10^0 cfu/g in meat after 12 h of incubation whereas the mPCR method could detect both species at the same inoculation level after 16 h of incubation. However, the total analytical time to identify *C. jejuni* and *C. coli* in chicken meat using IMS followed by plating was 72-96 h while the time used by mPCR was only 22 h. Thus, the mPCR method for the detection of *C. jejuni* and *C. coli* in chicken meat could be performed with less total analytical time than IMS followed by plating.

Additional study was conducted to further investigate *C. jejuni* and *C. coli* isolated from seven commercial poultry farms and two slaughterhouses by molecular epidemiological analysis using high-resolution genotyping method of amplified fragment length polymorphism (AFLP). AFLP analysis of 314 *Campylobacter* isolates revealed 48 AFLP strains of *C. jejuni* and 95 AFLP strains of *C. coli*. The intralinkage homologies of the AFLP patterns among all *C. jejuni* isolates were 65%. The intralinkage homologies of the AFLP patterns among all *C. coli* isolates were 73%. The AFLP banding patterns of *C. coli* strains contained many closely distributed bands, which were more homologous than the patterns for *C. jejuni*. The *C. coli* strains from broilers and slaughtering process seem to be more closely related to each other than *C. jejuni* strains. This finding suggests that *C. coli* strains are more clonal than *C. jejuni* strains.

In most farms, broad diversity of *C. jejuni* and *C. coli* strains were found and AFLP type distribution changed during the slaughter line. Some genotypes of both species were found in chicken intestine and may be the source of contamination of chicken meat during slaughtering and cutting process in slaughterhouse. Contamination of *C. jejuni* and *C. coli* in chicken meat occur directly from intestinal content and feces or indirectly from bird to bird and environment in slaughterhouse. AFLP fingerprint is the effective method to discriminate between *C. jejuni* and *C. coli* strains in which the interlinkage homology of the AFLP pattern is only 35 to 42%. In addition, it can distinguish genetically unrelated- from related-strains. Therefore, AFLP analysis is a suitable epidemiological tool for investigations of *Campylobacter*.

Student's signature

Thesis Advisor's signature

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