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Biofilm formation by *Campylobacter jejuni* in controlled mixed-microbial
populations

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Table of Content

Figure	i
Table	iii
Abstract	v
Acknowledgement	vi
Chapter 1 Background to <i>Campylobacter jejuni</i> in poultry industry and New Zealand ..	1
Chapter 2 Literature review – <i>Campylobacter jejuni</i> in the poultry industry	5
2.1 General introduction	5
2.2 History.....	6
2.3 Taxonomy and pathogenicity.....	6
2.4 Source of Campylobacter in poultry	12
2.5 Role of Campylobacter jejuni in biofilm in the poultry industry.....	13
2.6 Transmission of Campylobacter in poultry industry	14
2.6.1 Poultry farm	15
2.6.1.1 General environment.....	15
2.6.1.2 Air	15
2.6.1.3 Feed and Litter	15
2.6.1.4 Water.....	16
2.6.1.5 Pests	16
2.6.1.6 Animals.....	17
2.6.1.7 Birds.....	17
2.6.1.8 Insects	17
2.6.1.9 Human Activities	18
2.6.2 Processing Plant.....	18
2.6.2.1 Transporting and Holdings	19
2.6.2.2 Scalding.....	19
2.6.2.3 Defeathering.....	19
2.6.2.4 Chilling	20
2.6.2.5 Evisceration.....	20
2.6.2.6 Airborne	20
2.6.2.7 Packing.....	20
Chapter 3 Introduction to Biofilms.....	21
3.1 Introduction.....	21
3.2 Structure of biofilm.....	22
3.3 Biofilm formation	24
3.3.1 Characteristic of surface	24
3.3.2 Surrounding environment	25
3.3.3 Flow velocity of environment.....	25
3.3.4 Presence of flagella and fimbriae.....	26
3.3.5 Quorum Sensing.....	26
3.4 Summary	27
Chapter 4 Introduction to specific microorganisms used in this study.....	28
4.1 Introduction.....	28
4.2 Escherichia coli.....	29
4.3 Enterococcus faecalis.....	30
4.4 Pseudomonas species.....	33

4.5	Salmonella species	34
4.6	Staphylococcus species	38
4.7	Aims and Objective	41
Chapter 5	Materials and Methods	43
5.1	Bacterial strains	43
5.2	Methods	47
5.2.1	Culture preparation	47
5.2.2	Biofilm formation	48
5.2.3	Cell recovery	50
5.2.3.1	Swabbing	50
5.2.3.2	Scraping	50
5.2.3.3	Vortex mixing	50
5.2.3.4	Sonication	50
5.2.4	Enumeration of detached cells	51
5.2.5	Biofilm formation index	51
5.2.6	Statistical Analysis	52
5.3	Limitations	52
5.4	Advantages	52
Chapter 6	Results and discussion	54
6.1	Biofilm formation by <i>Campylobacter jejuni</i>	54
6.1.1	Initial inoculums	54
6.1.2	Biofilm formation by <i>Campylobacter jejuni</i>	55
6.2	Methods of cell recovery and enumeration cells from biofilms	57
6.2.1	Initial inoculums	57
6.2.2	Comparison of cell recoveries	58
6.3	Biofilm formation by <i>Campylobacter jejuni</i> in a controlled mixed-microbial populations	60
6.3.1	Initial inoculums	61
6.3.2	Overall comparison	61
6.3.3	Combination with and without <i>Pseudomonas aeruginosa</i>	66
6.3.4	Combination with and without <i>Escherichia coli</i>	69
6.3.5	Combination with and without <i>Enterococcus faecalis</i>	73
6.3.6	Combination with and without <i>Salmonella Agona</i>	76
6.3.7	Combination with and without <i>Staphylococcus simulans</i>	80
6.3.8	Comparison of overall biofilm formation by specific types of microorganisms	84
6.3.9	Enumeration and cell recovery of <i>C. jejuni</i> from biofilm	86
Chapter 7	General discussion and Conclusion	89
Reference	93
Appendix 1	111

Figure 1 The percentage of total meat consumed, year ending September 2006.....	1
Figure 2 Biofilm formation on polystyrene microtitre plates by <i>C. jejuni</i> strains with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. The letter from the MLST represents the source of the strains, (H) is from clinical human, and (P) is from poultry. Trials were performed on four separate occasions, and error bars represent one standard deviation from the mean. ...	55
Figure 3 Biofilm formation on polystyrene microtitre plates by different combination with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 31 combinations with <i>Campylobacter jejuni</i> . A pure culture of <i>C. jejuni</i> was used as positive control. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.	62
Figure 4 Biofilm formation on polystyrene microtitre plates by different combinations with <i>Pseudomonas aeruginosa</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	66
Figure 5 Biofilm formation on polystyrene microtitre plates by different combinations without <i>Pseudomonas aeruginosa</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	67
Figure 6 Biofilm formation on polystyrene microtitre plates by different combinations with <i>Escherichia coli</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.	69
Figure 7 Biofilm formation on polystyrene microtitre plates by different combinations without <i>Escherichia coli</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Experiments were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	70
Figure 8 Biofilm formation on polystyrene microtitre plates by different combinations with <i>Enterococcus faecalis</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	73

Figure 9 Biofilm formation on polystyrene microtitre plates by different combinations without <i>Enterococcus faecalis</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	74
Figure 10 Biofilm formation on polystyrene microtitre plates by different combinations with <i>Salmonella Agona</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.	76
Figure 11 Biofilm formation on polystyrene microtitre plates by different combinations without <i>Salmonella Agona</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.	77
Figure 12 Biofilm formation on polystyrene microtitre plates by different combinations with <i>Staphylococcus simulans</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	80
Figure 13 Biofilm formation on polystyrene microtitre plates by different combinations without <i>Staphylococcus simulans</i> with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. In total, there were 16 combinations. Trials were performed on two separate occasions, and error bars represent one standard deviation from the mean.....	81
Figure 14 Comparison of total BFI on polystyrene microtitre plates for test combinations with the specific microorganisms listed on the X-axis, with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. Trials were performed on two separate occasions. P <0.05 (Tukey's test).....	84
Figure 15 Comparison of total BFI on polystyrene microtitre plates for test combinations without the specific microorganisms listed on the X-axis, with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. Trials were performed on two separate occasions. P <0.05 (Tukey's test)	84

Table 1 The 16 species of <i>Campylobacter</i> and its subspecies and biovar	7
Table 2 <i>C. jejuni</i> (21 MLST sequence types) screened for the ability to form biofilm.	43
Table 3 The two bacterial strains used in the enumeration of cell recovery from biofilm.....	44
Table 4 Six different bacteria strains used in studying the effect on biofilm formation by <i>C. jejuni</i> in a controlled mix-microbial population study	44
Table 5 Combinations of microorganisms used in studying biofilm formation by <i>C. jejuni</i> in a controlled mixed-microbial population study	46
Table 6 Semi quantitative classification of biofilm production (P.Naves et al., 2008)	51
Table 7 Biofilm formation on polystyrene microtitre plates by <i>C. jejuni</i> strains with gentle swirling (30 rpm) at 37°C for 72 h under microaerophilic conditions. Trials were performed on four separate occasions. Means of the trials were calculated.	56
Table 8 The average number of cells recovered from the biofilm with different methods of removal.	58
Table 9 The mean initial inoculum used (2 Replicates).....	61
Table 10 Biofilm formations by controlled mix-microbial populations. Experiments were performed on two separate occasions. Means of the trials were calculated.	63
Table 11 Biofilm formation index (BFI) of combinations with <i>Pseudomonas aeruginosa</i>	66
Table 12 Biofilm formation index (BFI) of combinations without <i>Pseudomonas aeruginosa</i>	67
Table 13 Biofilm formation index (BFI) of combinations with <i>Escherichia coli</i>	69
Table 14 Biofilm formation index (BFI) of combinations without <i>Escherichia coli</i>	70
Table 15 Biofilm formation index (BFI) of combinations with <i>Enterococcus faecalis</i>	73
Table 16 Biofilm formation index (BFI) of combinations without <i>Enterococcus faecalis</i>	74
Table 17 Biofilm formation index (BFI) of combinations with <i>Salmonella Agona</i>	76
Table 18 Biofilm formation index (BFI) of combinations without <i>Salmonella Agona</i>	77

Table 19 Biofilm formation index (BFI) of combinations with <i>Staphylococcus simulans</i>	80
Table 20 Biofilm formation index (BFI) of combination without <i>Staphylococcus simulans</i>	81
Table 21 Enumeration of <i>C. jejuni</i> from biofilm	86

Abstract

Poultry meat consumption in New Zealand has been increasing since 1975 with the highest peak reported in 2006. The total poultry meat consumption was 36.5 kg per capita in the year ending September 2006. Consumption of contaminated food with raw poultry can lead to campylobacteriosis, which is a food-borne disease that causes gastroenteritis in humans and it is a major problem in New Zealand. There were 12,776 reported cases of campylobacteriosis in 2007, which accounts for 65.9% of the overall notified diseases. Campylobacteriosis can lead to Guillain-Barré syndrome in some patients, an autoimmune disorder of the peripheral nervous system. Campylobacteriosis is caused by consumption of either *Campylobacter jejuni* or *Campylobacter coli*. *Campylobacter* spp. have been found in commercially raised poultry being infected predominantly by *C. jejuni*. *C. jejuni* has been found associated with biofilms of other bacterial species in the watering supplies and plumbing systems of animal husbandry facilities and animal-processing plants. A biofilm is an assemblage of microbial cells that is associated with a surface and the cells are enclosed in a matrix of polysaccharides, which provides a survival advantage to the bacteria in the film. In this study, the ability to form biofilm was measured in a laboratory assay using microtitre plates. *C. jejuni* strains in monoculture were shown to attach to the abiotic surface and form biofilms to various degrees, thus potentially enhancing their survivability in the poultry environment. *C. jejuni* was also shown to have the ability to attach and survive in mixed-microbial populations. Biofilm formation may play a role in the epidemiology of *C. jejuni* infections. *Enterococcus faecalis* and *Staphylococcus simulans* may play a role in the biofilm formation in the poultry environment as both of these microorganisms were able to form, and harbour *C. jejuni* in their biofilms. *Pseudomonas aeruginosa* seemed to inhibit biofilm formation and *C. jejuni* in the mixed-microbial population. Further studies are required to establish control measures against the formation of biofilms containing *C. jejuni* in poultry processing plants and farms in New Zealand to reduce the reservoir of contamination and thus reduce the incidence of campylobacteriosis.

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