

## COMPETITIVE EXCLUSION BACTERIA

### APPLICATION OF COMPETITIVE EXCLUSION BACTERIA FOR CONTROL OF *LISTERIA* IN FLOOR DRAINS IN A READY-TO-EAT POULTRY PROCESSING PLANT

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Controlling the widely occurring *Listeria monocytogenes* in food processing facilities has been a formidable challenge for the entire food industry. Floor drains in particular are an important harborage for *Listeria*. Drains are difficult to clean because listeriae can become entrapped on drain surfaces in a slimy, protective covering known as biofilms.

We have obtained from floor drains some bacteria, including *Lactococcus lactis* subsp. *lactis* (#C-1-92) and *Enterococcus durans* (#152) (competitive exclusion bacteria; CE), that are inhibitory to the growth of *L. monocytogenes* in biofilms at 4 to 37°C. In a previous fresh poultry plant trial, we combined these two isolates as a treatment in floor drains to determine their effect in reducing *Listeria* in drains that were located in rooms at different temperatures. Results indicated that these two CE can greatly reduce *Listeria* numbers in floor drains at 2 to 30°C.

With the collaboration of two industry partners (Gold Kist and Ecolab), a ready-to-eat processing plant was selected for further study to verify the usefulness of this CE treatment to reduce/eliminate *Listeria* in floor drains. Seventeen floor drains in four different locations within the plant were selected for initial screening, and four sites were sampled in each drain. These included: #1, inside surface of the drain's cover; #2, outer surface of the drain basket; #3, sides at top of the drain; and #4, sides at ca. 5 inches within the drain.

Each floor drain was sampled three times before CE treatment to determine which drains were consistently *Listeria*-positive. Results revealed that seven were positive at all three samplings and two were positive at two samplings. *Listeria* counts in all positive floor drains were low, with a maximum of 100 *Listeria*/cm<sup>2</sup> and most were *Listeria*-positive only by selective enrichment culture (<50 *Listeria*/cm<sup>2</sup>).

Six of seven floor drains (one in a construction area) that were consistently *Listeria*-positive were selected for CE treatment and the two drains that were *Listeria*-positive 2 out of the 3 samplings were used as the controls (no CE treatment). The CE preparation included 25 ml of two bacteria, *L. lactis* subsp. *lactis* (#C-1-92) and *E. durans* (#152), at ca. 10<sup>9</sup> CFU/ml, 20 ml of Dy-gest, 20 ml of Dy-gest II, and 1 gallon of water. CE treatment was applied as a foam a total of 10 times, with the first, second, third and fourth treatments introduced daily during the first week, then twice a week during the following three weeks.

Results revealed that the CE treatment substantially reduced or eliminated *Listeria* from all of the CE-treated floor drains, but not the untreated control drains (Table 1). The CE treatment appears to effectively control *Listeria* in most drains (5 of 6) for up to 8 weeks following the last CE application. Results suggest the CE treatment should be applied to drains every 2 months for optimal *Listeria* control.