#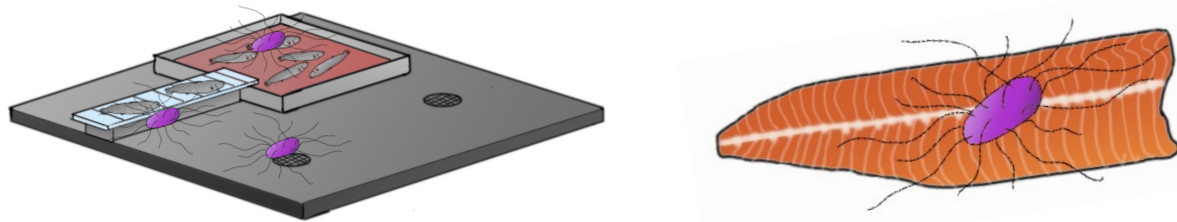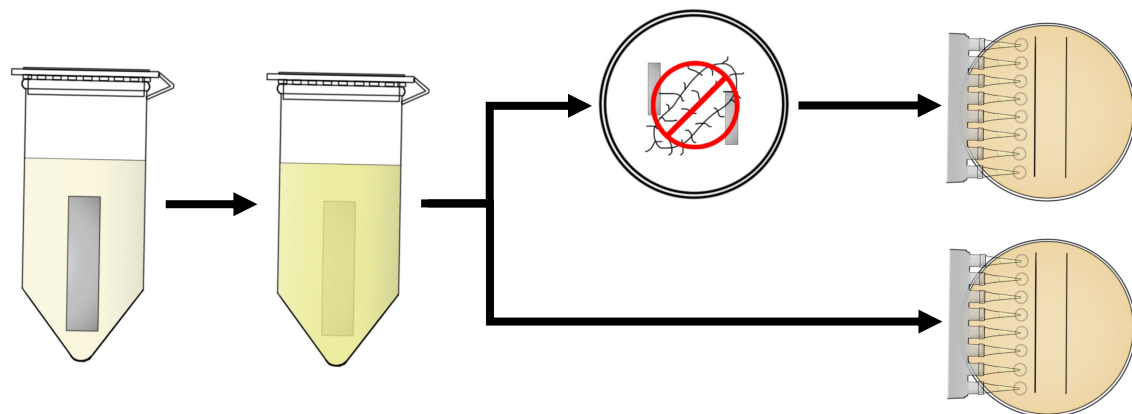 Biofilm disinfection survival and growth dynamics of *Listeria monocytogenes* and *Pseudomonas spp.* from a Norwegian salmon processing facility

NTNU

Objective: Investigating the disinfection survival and growth dynamics of a *L. monocytogenes* isolate and a mix of *Pseudomonas spp.* isolates from a Norwegian salmon processing facility.
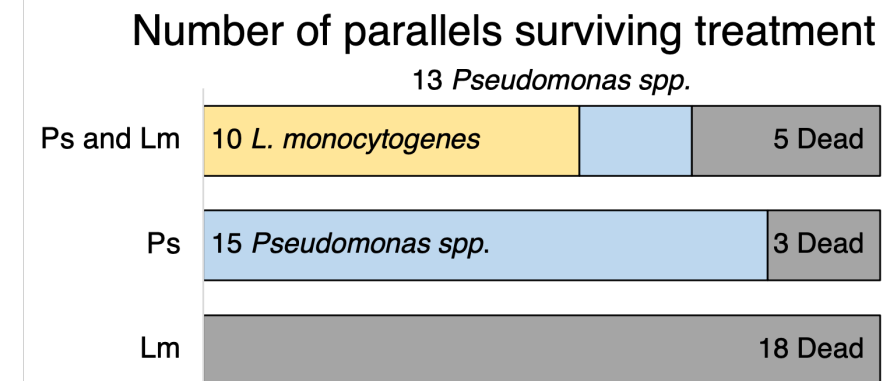

Method: *L. monocytogenes* and a mix of five *Pseudomonas spp.* were grown on stainless steel coupons separately and together. Cultures were incubated at 12 °C with shaking (70 rpm) for two consecutive cycles of 72 h, with new growth media each cycle. Growth in suspension and biofilm was measured at 72 and 144 h. Some coupons were disinfected by submersion into a 1 % solution of a peracetic acid based disinfectant for 10 min after 72 h growth.

Simplified flowchart of the biofilm growth/disinfection survival experiment.

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Background: *L. monocytogenes* is a foodborne pathogen that causes the highly fatal disease listeriosis. It can colonize food processing environments in biofilm and survive disinfection treatments over several years. Interactions with the background microflora, especially *Pseudomonas spp.,* are increasingly viewed as playing a crucial role in the survival of *L. monocytogenes* in this environment.

Number of parallels surviving treatment

Results: *Pseudomonas spp.* dominated growth in both biofilm and suspension. The *L. monocytogenes* subpopulation in co-culture constituted 2 % of the population at 72 h and less than 1 % at 144 h. *L. monocytogenes* increased as a function of time in biofilm, from between 1 and 2 % at 72 h to 4 % at 144 h. *L. monocytogenes* survived disinfection **only** when co-cultured with *Pseudomonas spp.,* surviving cultures grew back in 2-4 days.

Conclusion: *L. monocytogenes* gained a decisive survival advantage when grown in biofilm with *Pseudomonas spp.* These results demonstrate the importance of thorough and frequent disinfection of the food processing environment to supress the growth and spread of *L. monocytogenes*.