

Detection of Foodborne Pathogens by Micro-filtration using a Continuous Cell Concentrator Device

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Protecting consumers from foodborne illness is an important health concern facing the food industry today. An important deficiency exposed by foodborne illness is the inability to track contaminated food back to the source in a timely manner. Although there are established methods that detect bacterial pathogen contamination, they are limited in distinguishing viable bacteria reliably and quickly. Currently, food pathogen testing requires lengthy culture steps, which many times are delayed even longer due to the lack of in-house testing labs. Typically, two to three days elapses between when the food is sampled and the test results are available. This study uses a Cell Continuous Concentration Device (C³D) to recover cells using microfiltration that have been cultured in water and food related solutions. The results of the experiment allow us to see how much we recovered from the original sample. We created a pretreatment that consisted of a surfactant (TWEEN 80) and Sodium hexametaphosphate (SHMP) which will efficiently recover cells depending on the solution being concentrated. This pretreatment recovered 60-70% of the microorganisms (Escherichia coli and Salmonella) when recovering with DI water, PBS, and chicken. The recovery rates were 20% or below before this pretreatment was put into place. The end goal is to detect a single pathogenic cell. This pretreatment will continue to be used on the vegetable wash and chicken to produce results that are more useful to the end goal. These recovery rates are increasing as new pretreatments are being discovered.