The results of this project provided valuable information about the prevalence, source and control of *Listeria monocytogenes* in crab meat and at crab processing plants. These findings assist the crab processing plants to develop sanitation protocols that better target sources of this bacterium.

Prevalence, Growth, Survival, and Control of *Listeria monocytogenes* in Blue Crab (*Callinectes sapidus*) Meat

Who cares and why?

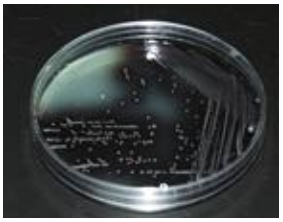
Listeria monocytogenes is a food borne pathogen that can cause the disease listeriosis when food contaminated with *L. monocytogenes* is consumed. Listeriosis has a high human fatality rate and is the second leading bacterial illness in terms of mortality. Especially vulnerable are those who are pregnant, elderly, infants or have a suppressed immune system. Various food products have been associated with both epidemic and sporadic cases of listeriosis. To assist in the control of this disease, the National Food Products Association of the U.S. Department of Agriculture (USDA) and the U.S. Food and Drug Administration (FDA) have published a risk assessment for *L. monocytogenes*. In these assessments, they have identified important data gaps that increase the uncertainty of the risk assessments, namely lack of information on growth, survival and control of *L. monocytogenes* in ready-to-eat (RTE) foods including crab meat. There is a need for improved science based control strategies for *L. monocytogenes* in RTE foods. The overall objective of this study was to develop and communicate improved control strategies in the crab meat industry for the human food borne pathogen *L. monocytogenes*.

What has the project done so far?

A total of 488 raw crabs, 624 crab meat samples and 624 environmental samples were tested by standard methods to determine the prevalence of this bacterium in crab meat and crab processing plants. More than 100 L. monocytogenes isolates were characterized by phenotypic and genotypic methods to track the sources of contamination in seven blue crab processing plants. A predictive model was developed for the growth and survival of L. monocytogenes in crab meat to understand the behavior of this pathogen.

Participating plants were assisted with *Listeria* control strategies, including sanitation protocols and cross contamination prevention. Investigators of this project trained 16 educators/scientists, more than 20 graduate and undergraduate students, one research specialist, and several crab processors in the prevalence, growth, source, and control of *L. monocytogenes* in crab meat and crab processing plants. Findings of the project were also shared with undergraduate and graduate students at UMES, the seafood industry, the Chesapeake Bay Seafood Industries Association, the Maryland Department of

Agriculture Seafood Marketing Program, the Maryland Health Department, and the scientific community through classroom discussion, personal communication, bi-weekly reports, workshops, published papers, and poster and oral presentations. Collaborative research has increased among UMES, the USDA, Cornell University, the University of Tasmania, Virginia Tech, the FDA, and the seafood industry.



L. monocytogenes on selective medium

One Ph.D. dissertation, two manuscripts in peer-reviewed journals, and 15 abstracts were published. Several oral and poster presentations were made at regional, national, and international professional meetings.

Impact Statement

The results of this project indicate that raw live crabs and associated surfaces are potentially important initial sources of *L. monocytogenes* contamination in blue crab meat and crab processing plants. These findings assist the crab processing plants to develop sanitation protocols that better target sources of L. *monocytogenes*.

Comparison of rapid and traditional methods for detection of *L. monocytogenes* in blue crab meat and crab processing plants allows the seafood industry and regulatory agencies to refine their methods for rapid detection of this bacterium in crab meat and crab processing environments.

The predictive model will assist the seafood industry and regulatory agencies in designing and implementing food safety plans which minimize the risk associated with this pathogen in crab meat.

What research is needed?

Future research is needed to determine the influence of other factors, such as antibiotic resistant genes, genetic transfer, self-transferable plasmids, transposons and additional contamination sources that may contribute to antimicrobial resistance and its persistence in crab meat and crab processing plants. It is important to evaluate the role of virulence properties of specific serotypes associated with human illness.

Want to know more?

Salina Parveen, Ph.D.
sparveen@umes.edu, 410-651-8339

Strategic Priority: Safe, secure and abundant food supply
Additional Links: http://www.umes.edu/ard/Default.aspx?id=46285
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