

Spring 2019

# Characterization of *Psychromonas aquimarina*, A New Model Organism for Climate Change

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## Recommended Citation

Carpenter, C. (2019). *Characterization of Psychromonas aquimarina, A New Model Organism for Climate Change*. Retrieved from [https://digitalcommons.harrisburgu.edu/insc\\_experiential-learning/1](https://digitalcommons.harrisburgu.edu/insc_experiential-learning/1)

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# Characterization of *Psychromonas aquimarina*, A New Model

## Organism for Climate Change

Authors: Carrie Carpenter\* and Catherine T. Santai

### Abstract:

The current increase of average global temperature puts 25 to 35 percent of plant and animal species at an increased risk of extinction (Climate Change, 2018). Changing any environmental factor, such as increasing growth temperature, can significantly impact any organisms' ability to survive. Because of the diversity of organisms on the planet, it is not feasible to study how each individually might adapt, but rather it is more efficient to study select organisms. This research focuses on a psychrophilic bacterium, *Psychromonas aquimarina*, which can survive in colder regions where most bacteria would not. This bacterium was chosen because climate change is affecting the poles of Earth two times the rate that it is affecting other parts of Earth. *Psychromonas aquimarina* first needed to be characterized, as little was known about the bacterium. *P. aquimarina* was confirmed to have previous characteristics described, but many characteristics were discovered throughout this research. We report for the first time, the doubling time of *Psychromonas aquimarina*, 21.05 hours, the ability of *P. aquimarina* to form a pellicle biofilm, formed between air-liquid interface, and its potential to aid in adaptation to thermal stress. *Psychromonas aquimarina* in growth and protein expression studies, at various temperatures, was found to exhibit slow but significant tolerance and adaptability. Heat shock protein expression in cold tolerant organisms provide insight to the mechanisms in charge of thermotolerance. *P. aquimarina* is proposed as a model organism for studies of adaptation to thermal stress imposed by climate change.