Effects of the atmospheric environment on ice nucleating strains of *Pseudomonas syringae*

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The bacterium *Pseudomonas syringae*, commonly found on leaf surfaces, produces the most efficient biological ice nuclei (IN) known. The role of its IN activity on the environment extends from contributing to phytopathogenesis to possible impacts on atmospheric processes. In certain situations, bioaerosols containing these cells may promote the freezing of cloud droplets, an important process in the origin of rain and other forms of precipitation. Indeed, this species presence has been reported on rain, snow, and cloud water samples. How these organisms can survive and remain active during their suspension on the atmosphere is still poorly understood. Bacterial cells must endure harsh conditions at high altitudes where pressure drops, leading to desiccation, while solar ultraviolet irradiance increases. This study aim to better understand the different impacts caused by this type of environment on *P. syringae*, assaying both its viability and IN activity. Two strains were tested, and both were found to be very sensitive to monochromatic UV-C and UV-B radiation, similarly to *E. coli*. However, their IN activity remained seemingly unaffected by the UV treatments. Exposure to "environmental" UV, UV-A+UV-B from a solar simulator, was also significantly lethal. *P. syringae* cells were able to moderately tolerate desiccation at different relative humidities while maintaining most of their nucleation efficiency. Therefore, IN bacteria may suffer serious damage while exposed to the atmospheric environment but can still maintain the potential to impact cloud dynamics.