Single-cell growth kinetic behavior of pathogenic bacteria in the presence of microbial supernatants containing autoinducer-2 signal compounds

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Single-cell studies may elucidate the true heterogeneity of a bacterial population when assessing biological phenomena such as Quorum Sensing (QS). When cells are studied individually, the extreme responses of single cells behaving as "outliers" of a larger population, and masked by adjacent cells showing an "average" behavior, may be revealed. Thus, *in vitro* evaluation of single-cell growth kinetic behavior of *Salmonella enterica* serotypes Enteritidis and Typhimurium, and methicillin-resistant *Staphylococcus aureus* (MRSA) as affected by autoinducer-2 (AI-2) was performed. The single-cell growth behavior of the pathogens was monitored in the absence (0% v/v) and presence (20% v/v) of microbial supernatant (MS), produced by *S.* Typhimurium CDC 6516-60, while a negative control also was used (Heat treated MS, HT). The kinetic parameters of maximum specific growth rate (μ_{max}) and lag phase duration (λ) were estimated from optical density measurements at 600 nm. AI-2 had no considerable effect on μ_{max} of the three tested pathogens' strains, while the λ distributions appeared to depend on the conditions and the organism tested. In particular, the distributions of the estimated λ values for *S.* Enteritidis were similar under all conditions tested. Regarding *S.* Typhimurium, the mean λ values in 0%, 20% MS and HT were 2.26, 1.81 and 3.95 h, respectively, and the corresponding coefficient of variation values were 41.6, 69.8 and 29.1%. For MRSA, the corresponding values for λ were 7.19, 9.99 and 12.74 h, while the corresponding values for the coefficient of variation were 65.2, 60.0 and 49.5%. The findings of this study constitute preliminary data on the role of QS compounds on the single-cell growth behavior of important pathogens, knowledge that maybe useful in understanding the mechanisms underlying their behavior as well as in developing strategies for their control *in situ*.

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