From bacterial antagonism to co-existence: the chemical interplay and adaptative strategies between *Pseudomonas* and *Bacillus*

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Bacterial communities are continuously adapting and evolving for survival. They produce and secrete a broad range of molecules that kill, defend, or mediate communication between cells of different lineages, thus shaping the final structure of the microbial community. In this work, with the combination of -omics approaches, molecular biology and microscopic techniques, we expand our knowledge on the chemical interplay and specific mutations that modulate the transition from antagonism to co-existence between two plant-beneficial bacteria, *Pseudomonas chlororaphis* and *Bacillus amyloliquefaciens*. We demonstrate that bacillaene, a secondary metabolite with bacteriostatic activity produced by *Bacillus,* interacts with the protein elongation factor FusA of *P. chlororaphis* to arrest its growth and population advancement. Point mutations in this protein lead to tolerance to bacillaene and other inhibitors of protein translation. Additionally, we describe the key role of the glycerol kinase GlpK from *B. amyloliquefaciens* in its unspecific tolerance against *P. chlororaphis*. Mutations in GlpK provoked by a decrease of *Bacillus* cell membrane permeability among other pleiotropic responses. We conclude that nutrient specialization and mutations in basic

biological functions are bacterial adaptive dynamics that lead to the coexistence of two primary competitive bacterial species rather than their mutual eradication.