# Pattern Formation of the Causative Agent of Pierce's Disease within Microfluidic Chambers

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We develop and analyze a model of the dynamics of an important bacterial pathogen, *Xylella fastidiosa* within artificial plant xylem. The bacterium is the causative agent of a variety of diseases that strike fruit bearing plants including Pierce's disease of grapevine. Biofilm colonization within microfluidic chambers was visualized in a laboratory setting, showing robust, regular spatial patterning. The model is based on a multiphase approach that is able to capture the spacing of the pattern and points to the role of the exopolymeric substance as the main source of control of the pattern dynamics. We concentrate on estimating the attachment/detachment processes within the chamber since these are two mechanisms that have the potential to be engineered by applying various chemicals to prevent or treat the disease. The spread of similar patterns are also investigated using marginal stability.