CELL DENSITY-DEPENDENT ACCUMULATION OF QUORUM SENSING SIGNALS IN *AGROBACTERIUM VITIS*.

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Agrobacterium vitis, the causal agent of crown gall disease on grape, employs a mechanism called bacterial quorum sensing (QS) to regulate necrosis on grape and a hypersensitive response in tobacco. QS in Gram-negative bacteria, such as *A. vitis*, is a gene regulatory mechanism that acts by measuring the concentration of diffusible *N*-acyl-homoserine lactone (acyl-HSL) signal molecules. Acyl-HSLs contain a homoserine lactone moiety ligated to an acyl chain. The specificity determinants of acyl-HSLs include length of the acyl side chain (4 to 18 carbons) and substitutions on the acyl chain. Acyl-HSLs with greater than eight carbons are known as long-chain and those with eight or less are referred to as short-chain. In previous studies, we screened a collection of 111 *A. vitis* strains for acyl-HSL production. All but two strains produced acyl-HSLs. Thirty-seven were characterized in detail and all produced a long-chain signal while thirty-one strains produced at least one additional shorter-chain signal, with some strains producing up to five. In current work, cell density-dependent patterns of acyl-HSL production have been followed in two tumorigenic and two non-tumorigenic *A. vitis* strains that produce two or more acyl-HSL signals. This work has revealed that three strains appear to decrease abundance of their long-chain signal while still increasing abundance of a short-chain signal upon moving into death phase. The specificity of this disappearance for the long-chain signal suggests an enzymatic catalyst, although alkaline pH in vitro is also suspect. Additionally, selected strains were screened for their ability to utilize grape carbon source tartrate. Two of four strains had that metabolic capability. The reproducibility of these results will allow for further experimentation concerning 1) environmental factors that influence QS and, 2) possible production hierarchy among multiple acyl-HSLs. Continuation of this research may provide insights to the role of long-chain signal production, disappearance, and hierarchy in regulating genes responsible for saprophytic and pathogenic behaviors of *A. vitis*.