**EPibiont Mediated Induction of Cyanopeptides_EPIC**

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## Abstract:

Cyanobacteria are key components of aquatic ecosystems but also form harmful blooms that release cyanopeptides (CNPs), including potent cyanotoxins. While the diversity of CNPs is well documented, the ecological and regulatory mechanisms driving their production remain unresolved. The EPIC project (Epibiont-mediated Induction of Cyanopeptides) will investigate how microbial epibionts and their chemical signals influence cyanobacterial secondary metabolism. Through seasonal sampling of eutrophic ponds, combined with metabolomics, metagenomics, and transcriptomics, we will profile CNP diversity, identify epibiont communities, and characterize quorum sensing molecules such as acyl-homoserine lactones. Laboratory experiments will validate the regulatory role of these signals in activating biosynthetic gene clusters. Preliminary work has shown that exogenous autoinducers enhance microviridin and lipopeptide production, supporting our central hypothesis of epibiont-mediated regulation. EPIC will provide novel insights into bloom dynamics, microbial interactions, and chemical mediation, with direct implications for ecotoxicology, water quality management, and the discovery of new bioactive metabolites.