

Flow Cytometric Analysis of Phytoplankton Viability in Elkhorn Slough, California

Sarah Smith

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The phytoplankton community structure of Elkhorn Slough was characterized flow cytometrically and found to be dominated in the upper reaches by small cryptophytes ($< 5 \mu\text{m}$) and picoeukaryotic phytoplankton ($< 3 \mu\text{m}$). Cell-specific viability of the small cryptophyte population was quantified along a 5 km transect from the mouth to the shallow upper reaches of Elkhorn Slough using fluorescein diacetate (FDA). Corroborative viability techniques, including SYTOX Green stain and cell digestion assay, were determined to be inappropriate for use in Elkhorn Slough due to indiscriminate staining of suspended particulates and incompatibility with cell target material. Viability analysis with FDA revealed a higher fraction of active cryptophyte cells in the upper reaches, the area of their dominance, and a lower fraction of active cells in the lower slough. It was concluded that cell death (as defined by a lack of FDA-linked esterase enzyme activity) is an important force structuring the phytoplankton community of Elkhorn Slough.