

VIABILITY ASSESSMENT OF DIATOM ASSEMBLAGES IN BALLAST WATER

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Determination of organism viability is instrumental in answering ecological or physiological questions associated with the survival and succession of phytoplankton. Algae communities, particularly diatoms, are monitored and used as ecological indicators of water quality health. For decades aquatic invasive species, including many algal taxa, have been introduced and established through the discharge of commercial ships' ballast water. These organisms threaten ecological stability, diversity and abundance of native taxa as well as maritime commerce. The success of management systems and ability of ships to meet ballast water discharge standards are adjudicated by the number of viable organisms in treated water. Using land-based and ship-board test facilities, the Great Ships Initiative (GSI – www.greatshipsinitiative.org), is evaluating candidate shipboard treatment systems for their ability to prevent the introduction of freshwater nuisance species.

We present a process of ambient assemblage concentration, staining with fluorescein diacetate (FDA), and microscopic observation as a reliable and efficient method to assess densities of viable freshwater algae. The selected method provides a strong foundation for live/dead algal enumeration of ambient assemblages, particularly diatoms, in ballast water treatment assessments. This process may also be used or adapted for any field of research that examines a broad taxonomic range of autotrophic and heterotrophic plankton.