

EXTRACTING DIATOMS FROM INTERTIDAL SEDIMENTS: A COMPARISON OF DIFFERENT METHODS

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Diatom sampling in intertidal coastal and estuarine sediments has always been challenging. Some approaches, like the coverslip and lens-tissue (LT) methods, elegantly use the endogenous migratory rhythms to gather motile diatoms when they surface during low tide. However, these techniques are forcefully selective, as they mainly collect the epipelagic fraction of the diatom assemblages. Contrariwise, direct oxidation of sediment samples is not selective, even to dead and empty frustules, but can be labour-intensive and time-consuming. Finally, the isopycnic separation techniques rely on the differences in density between the sediment and organic matter to separate them, using silica sols (e.g. Ludox®) or others (e.g. nontoxic chemical sodium polytungstate, SPT). They seek a compromise between a satisfactory separation of the diatoms from the different sediment particles (i.e. sands, silts and clays) whilst collecting a representative portion of the diatom assemblages. However, their effectiveness, particularly in sandy sediments, is still subject to debate.

The present study aims to directly compare different extraction methods and determine their effect on the taxonomic structure and diversity of diatom assemblages. Two different sets of samples were studied: 1) Diatom samples extracted using LT and Ludox collected in the Tagus estuary (Portugal), during a two-year survey carried out in 6 stations with different sediment textures; and 2) Diatom samples extracted using three different methods (LT, Ludox and SPT) from freshly collected sandy and muddy sediments from Bourgneuf Bay (France). For both sample sets the correlation between species-abundances matrices was statistically tested in order to determine the level of concordance in taxonomic structure of the assemblages collected by different methods. Their performance in several non-parametric multivariate routines, namely the linkage between biotic and environmental matrices, was further explored in the Tagus LT and Ludox sample set. The Bourgneuf Bay SPT samples also allowed assessing the physiological conditions of diatom cells after extraction, using fluorescence measurements. The SPT method has been rarely used to extract intertidal living diatom material. This preliminary test should allow the development of a simpler way to estimate productivity of natural diatom biofilms in controlled conditions, in particular, in the case of difficult-to-sample epipsammon-dominated communities.