INTERACTIVE EFFECTS OF DOMOIC ACID ALLELOPATHY, SALINITY, AND EUTROPHICATION ON ESTUARINE PHYTOPLANKTON COMMUNITY STRUCTURE

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Coastal regions and estuaries are particularly sensitive to the increase in nutrient loading and river runoff, threatening the ecosystems with possible occurrences of harmful algal blooms (HABs). As an example, blooms of toxic *Pseudo-nitzschia* species can release acute concentrations of the neurotoxin domoic acid (DA) in the water column with possible intoxications through shellfish. The main objectives of this research were to determine how salinity and nutrients influenced *Pseudo-nitzschia* abundance, DA production, and allelopathy (i.e. the effect of DA on phytoplankton). The impact of moderate loadings of nitrate and phosphate on the entire phytoplankton community composition was also examined. First, we observed the important role played by salinity on the abundance of *Pseudo-nitzschia* spp. and its toxicity with a significant correlation at both sites. We also detected an increase in dDA allelopathy on phytoplankton and particularly on cryptophytes and diatoms at higher salinities in North Inlet (i.e. the high salinity site) and lower salinities in Winyah Bay (i.e. the low salinity site). Then, we demonstrated not only an increase in the *Pseudo-nitzschia* abundance but also an increase in the abundance of all phytoplankton groups with the addition of nutrients. We also observed a shift in the phytoplankton community composition even though the total concentration of chl *a* was lower than the regulatory limit of 40 $\mu g\ l^{-1}$ (i.e. limit set by governmental agencies). Finally, our study established that the addition of nutrients increased the abundance of *Pseudo-nitzschia* but neutralized the influence of salinity on dDA allelopathy. These results highlight how monitoring changes in salinity and nutrients is essential to understand their interactions with the biota and to better predict the outcome of these alterations on the phytoplankton community structure, particularly on HABs.