HIGH-PERFORMANCE SIZE EXCLUSION CHROMATOGRAPHIC CHARACTERIZATION OF HUMIC SUBSTANCES AND DISSOLVED ORGANIC MATTER FROM BALTIC AQUATIC ENVIRONMENT

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In the present study the number-average molecular weights $\overline{M}_n$ and weight-average molecular weights $\overline{M}_w$ of dissolved organic matter and humic substances from different aquatic environment were determined by high-performance size exclusion chromatography. Seawater samples from the low-salinity Baltic Sea, Kattegatt and Skagerrak were analyzed by HPSEC with fluorescence detection at excitation/emission wavelengths 350/450 and 310/450 nm. UV detection at 254 nm has been used for characterization of other aquatic HS samples from Estonia. The weight- and number-average molecular weights were calculated using polystyrene sulfonates and proteins as standard substances. Due to the enhanced separation efficiency obtained by experimental conditions used (0.02M phosphate buffer, pH 6.8), defined molecular weight fractions were separated in seawater DOM. The weight-average molecular weight for seawater DOM was in the range 600–1300.

Multivariate classification and comparison by principal component analysis has been carried out on the data including 24 physical-and-chemical parameters of seawater samples. The plot of scores on the first two principal components revealed the clear grouping of samples in dependence on the sea region as well as on the depth of sampling. The plot of loadings allowed estimating the major variables, which are responsible for this grouping and to interpret the results basing on the knowledge of the biochemical processes occurring in the marine ecosystem.