

Phytoplankton biomass versus chlorophyll *a*: do they show the same water quality?

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The national water quality monitoring in the Lithuanian Baltic Sea waters has started fifty years ago. Recently, four seasonal surveys are performed annually in the four water bodies classified according to water quality bioindicators phytoplankton composition, biomass and chlorophyll *a*, concentration of nutrients, salinity range, types of bottom sediments and wave exposure: 1) sandy and 2) stony coastal waters: above 20 m depth; 3) plume of the Curonian Lagoon in the coastal waters: an nutrient enriched area with the annual average salinity below 5 psu; 4) open Baltic Sea: below 20 m depth [1]. However, relationship between phytoplankton biomass and concentration of chlorophyll *a* has been poorly studied in the local scale of the Baltic Sea. In case of Lithuanian national coastal monitoring some differences were found in the results of assessment of ecological status using both indicators. Therefore it is important to evaluate the correlation between phytoplankton biomass and concentration of chlorophyll *a*, and to determine the factors that could influence the patterns of relationships among them.

The analysis was based on the data of the national Lithuanian monitoring in the Baltic Sea during 2001-2007. Detailed analysis of interactions between chlorophyll *a* and phytoplankton biomass were performed according to sampling site (transitional and coastal waters), time (seasonal and diurnal) and different algae groups (cyanobacteria, diatoms and dinoflagellates). Additionally three methods of investigation of microalgae productivity were compared: standard spectrophotometry [2] and fluorometry for chlorophyll *a*, and determination of phytoplankton biomass by the Utermöhl [3] inverted microscope method. Satellite-derived optical information maybe also applicable in the future for the classification of pelagic ecosystems and typology of water masses since it is expensive and time consuming using classical water sampling by ships. Analysis of calibration between composition of phytoplankton populations and simultaneously satellite-derived pictures should take the first steps. The relationship between composition of phytoplankton and proxy such as concentration of chlorophyll should be also tested in order to automate the monitoring of the water quality which is very variable in time.

References

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