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High local nutrient input influence on oligotrophic phytoplankton production and lipid biogeochemistry

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Marine phytoplankton are crucial for ecosystem function and responsible for almost half of world's primary production. In order to grow and reproduce phytoplankton need sufficient amount of macro and micro nutrients. Nutrient concentrations are changeable in different water masses and dependable on different natural and anthropogenic sources such as terrestrial water inputs, recycling by sloppy feeding, remineralization with bacteria and atmospheric deposition. High nutrient input to oligotrophic regions raises phytoplankton biomass that leads to higher organic matter production and heterotrophs' development. Anthropogenic nutrient inputs are considered as the main cause of coastal eutrophication. Marine lipids, dominantly produced by phytoplankton, are good biogeochemical traces of organic matter origin and processing in marine environment and phytoplankton adaptation to environmental perturbations. They are important for multiple cell mechanisms functioning.

The goal of this research was to investigate the influence of a point source of nutrients on organic matter production and lipid composition as a consequence of phytoplankton acclimation to different nutrient loads. We sampled at two geographically close stations in the Krka River Estuary mouth, oligo- to mesotrophic Martinska station and station in vicinity of the town of Šibenik that is under high anthropogenic influence. Samples were taken from three depths (above, on and below halocline) and in four different seasons covering annual cycle. Lipid classes were characterized by thin-layer chromatography-flame ionization detection. Data are supported by hydrographic, dissolved organic carbon and particulate organic carbon parameters. We will discuss the changes of organic matter accumulation and estuarine lipid biogeochemistry caused by human activity.

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