



Distribution, size, and bacterial colonization of pico- and nano-detrital organic particles (DOP) in two lakes of different trophic status

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ABSTRACT: Abundance, size spectra, and bacterial colonization of three types of freshwater pico- and nano-detrital organic particles (DOP), namely transparent exopolymeric particles (TEP), Coomassie-stained proteinaceous particles (CSP), and 4',6-diamidino-2-phenylindole (DAPI) yellow particles (DYP), were examined by epifluorescence microscope equipped with a color camera and a video recorder. The study was conducted during spring in the oligomesotrophic Lake Pavin and the eutrophic Lake Aydat, France. Pico- and nano-DOP were abundant (10^5 - 10^8 particles L^{-1}) and exhibited significant variations in morphometric characteristics and numerical density within and among lakes, which is consistent with comparable studies known mostly from marine systems. Surface area and abundance of pico- and nano-DYP and nano-TEP were significantly higher in Lake Aydat than in Lake Pavin. Both these variables significantly increased with chlorophyll *a* concentration and the abundance of total heterotrophic bacteria. Bacterial colonization of DOP was highly related to the nature of the particle. Attached bacterial counts were on the order of 10^7 - 10^8 bacteria L^{-1} , representing 1-17% of the total bacterial counts. Overall, we conclude that nonliving particulate organic matter are ubiquitous and abundantly occurring components in lakes where, at least, they serve as support for the attachment and as substrate for the metabolism of bacteria, the latter role being likely dependent on the composition of the particles and the trophic status of the milieu.

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