
Extracellular Polysaccharides and Glycolytic Enzyme Activity in Barra Bonita Reservoir, SP, Brazil

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Abstract

Release of extracellular polysaccharides can occur from healthy and active cells and has been demonstrated to be an important carbon source for bacteria. In eutrophic environments where large blooms are formed by efficient extracellular polysaccharide producers such as *Microcystis aeruginosa* and *Anabaena spiroides*, these organic materials (high molecular weight extracellular polysaccharides) may support planktonic bacterial growth. The aim of this study was to evaluate the extracellular glycolytic enzyme activity during a seasonal cycle and a possible regulation of the corresponding enzymes in response to variation of polysaccharides in Barra Bonita Reservoir. The majority of enzymes exhibited a significant decrease during the dry season (April to September). The content of total dissolved carbohydrates varied from 0.5 to 6.83 mg L⁻¹ and was mainly (92%) constituted by polysaccharides. Phytoplanktonic community showed a marked succession with cyanobacteria typically dominating during the rainy season (*Microcystis* sp, *Microcystis aeruginosa* and *Anabaena spiroides*), whereas diatoms (mostly *Aulacoseira granulata*) and cryptophytes (*Cryptomonas* sp) were dominant through the dry season. Four algal blooms were observed during the experimental period, and after each bloom the release of combined carbohydrates was followed by high enzymatic activities, thus the production of extracellular enzymes for microheterotrophic microorganisms was related to the influx of polymeric organic substances. Even the monosaccharides composition of reservoir samples after each bloom roughly revealed the extracellular polysaccharide composition of dominant phytoplanktonic population. Experiments of polysaccharide degradation from Barra Bonita Reservoir and produced by dominant phytoplanktonic organisms (*A. granulata* e *M. aeruginosa*) assayed in laboratory conditions had confirmed the interpretation of data measured in field.

Key-words: extracellular polysaccharides, extracellular glycolytic enzyme activity, Barra Bonita Reservoir, degradation, eutrophic environments, phytoplanktonic community

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