



NITROGEN FORMS REVEAL DISTINCT PHYSIOLOGICAL STRATEGIES IN MICROCYSTIS AERUGINOSA STAINS

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Nitrogen availability influences *Microcystis* bloom dynamics in aquatic systems, and different nitrogen forms induce distinct physiological responses in bloom-forming *Microcystis*. Hence, understanding *Microcystis*' response to nitrogen forms is crucial for predicting bloom occurrence and toxicity risk in aquatic systems. A 7-day experiment was carried out to examine the growth and physiological responses of a toxic and non-toxic strain of *Microcystis aeruginosa*, exposed to different nitrogen forms (nitrate, ammonium, and urea treatments) at mesotrophic and eutrophic concentrations. Optical density, estimated cell density, chlorophyll per cell, and specific growth rate (μ) were measured to distinguish growth from physiological investment. All nitrogen forms sustained growth; however, distinct resource allocation strategies were observed. Optical density suggested higher biomass in the toxic strain, whereas cell density indicated that the non-toxic strain produces more cells. In contrast, the toxic strain showed increased chlorophyll investment per cell, indicating greater pigment allocation and optical biomass per cell. The toxic strain also exhibited higher specific growth rates ($\mu \approx 0.26\text{--}0.29\text{ d}^{-1}$) compared to the non-toxic strain ($\mu \approx 0.15\text{--}0.21\text{ d}^{-1}$) across treatments. The non-toxic strain showed greater variability, including reduced growth under high ammonium concentrations. Urea supported comparable growth to inorganic nitrogen sources, although delayed increases in cell density suggested hydrolysis before assimilation. Generally, strain identity had a stronger influence on physiological responses than nitrogen form, as the toxic strain maintained higher pigment investment and stable growth across nitrogen forms, suggesting greater physiological flexibility.

Palavras-chave: *Bloom dynamics; Toxicity risk; Resource allocation; Pigment investment*