



Production of organic matter by *Trichodesmium* IMS101 as a function of phosphorus source

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ABSTRACT: Herein we present the results of a series of laboratory experiments conducted to delineate the relationship between dissolved organic phosphorus (DOP) utilization and organic matter production by the model diazotroph *Trichodesmium* IMS101. The rate and ratio of *Trichodesmium* carbon (C) and nitrogen (N) production driven by phosphorus (P) derived from select phosphonates and P monoesters were not found to be significantly different than growth rates based on dissolved inorganic phosphorus (DIP). Conversely, despite the observed similarities in C and N fixation rates between parallel DIP and DOP incubations, cultures grown solely on methylphosphonate (MPn) had reduced maximal P content per unit chlorophyll a or C relative to cultures grown on P monoesters or DIP. So while *Trichodesmium* IMS101 appears to be able to maintain similar rates of growth on DIP and select DOP substrates, the P uptake efficiency and, hence, the P content per cell is greater for growth on DIP or tested P monoesters relative to growth on the phosphonate MPn. The primary conclusion arising from these results is that neither the observation of P monoester hydrolysis nor highly P-deficient organic matter or expression of phosphonate hydrolyzing genes can be interpreted to indicate P limitation of C or N fixation of *Trichodesmium* spp. under light-saturated, DIP-deficient conditions.

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