



Growth of the diatom *Chaetoceros calcitrans* in sediment extracts from *Artemia franciscana* ponds at different concentrations of nitrogen and phosphorus

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Abstract

This study was carried out with the aim to optimize the growth of the diatom *Chaetoceros calcitrans* (*C. calcitrans*) to feed *Artemia franciscana*. This is based on management of both quantities and ratios of nutrients dissolved in the water column, especially nitrogen (N) and phosphorus (P). To this end, algae were inoculated in media prepared from the extracts of *Artemia* pond sediments to relate their growth with the availability of N and P present in these extracts. Algal responses to different levels of dissolved inorganic nitrogen (DIN), dissolved reactive phosphorus (DRP) and to widely varying DIN:DRP ratios in the water column were examined by adding inorganic N (6.6–76 mg N L⁻¹) and P (0.01–0.2 mg P L⁻¹) to the media at different combinations. In all media, inoculation of algae at a density of 50 × 10³ cells mL⁻¹ resulted in an exhaustion of DRP after five days. Adding inorganic P to the media stimulated algae to assimilate more N and increased algal densities ($R^2=0.70$, $P<0.001$) and biomass ($R^2=0.68$, $P<0.001$). In contrast, adding inorganic N decreased algal production. The densities of algae decreased logarithmically when DIN:DRP ratios increased from 50 to 910. Below DIN:DRP 150, the densities and biomass of algae were strongly dependent on the initial concentrations of DRP. When DIN:DRP ratios exceed 150, algal densities and biomass were constantly low, regardless the availability of DRP. In these media, supplying DRP to reach concentrations above 0.06 mg P L⁻¹, while maintaining DIN:DRP below 150, is suitable for the growth of *C. calcitrans*.

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1. Introduction

The brine shrimp *Artemia* is used as live food in the aquarium trade and for marine finfish and crustacean larval culture (Treece, 2000). In the late 80s, cultivation of

Artemia was introduced to the coastal areas of the Mekong Delta of Vietnam as a profitable departure from the traditional salt production in this area (Sorgeloos and Tackaert, 1991; Hoa, 2002). To optimize *Artemia* production, nutrient management is of utmost importance, apart from other technical aspects. Since *Artemia* is a continuous, non-selective and obligate filter feeder (Ovjemo and Olsen, 1999), the diatom *C. calcitrans*

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