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Predicting the release of mineral nitrogen from hypersaline pond sediments used for brine shrimp *Artemia franciscana* production in the Mekong Delta

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Abstract

Prediction of soil N availability in highly saline-submerged soils is crucial to optimize the growth of algae and to sustain *Artemia* production in coastal areas of the Mekong Delta. The results show that there are significant relationships between the amounts of N mineralized in both aerobic and submerged conditions and the fractions of labile soil organic N extractable by hot KCl. The effect of high salinity on N mineralization was tested by submerging soils under saline concentrations of 35, 50, 65, and 80 g NaCl L^{-1}. Increasing salinity resulted in lower mineral N accumulation. However, adverse effects of salinity on N mineralization are short-lived, the rate of N mineralization recovered in later stages. Regardless the inhibition by high salinity of mineral N accumulation, the relationship between the amounts of hot KCl-extractable organic N and available N diffusing from soil into the water column was maintained during the early stages of submergence.

Keywords: *Artemia*; Algae; Submerged soils; Labile soil organic N; N mineralization; N accumulation and salinity

1. Introduction

Since the late 1980s, brine shrimp *Artemia* production has been integrated in the artisanal salt fields of the Vinh Chau-Bac Lieu area in the Mekong Delta of Vietnam (Baert et al., 1996, 1997). The production of *Artemia* cysts is critically dependent on optimal density and quality of algae populations that are mainly dependent on the amount of nutrients released from pond bottom sediments or from fertilizers added to the ponds. Among them, nitrogen (N) is one of the most important nutrients. High release rates of available N from pond bottom together with large concentrations of available phosphorus (P) in aquatic soils may lead to algae blooms (Pinckney et al., 2001; Phlips et al., 2002). Too high algae concentrations result in *Artemia* starvation because the retention time of the algae in their digestive tract is too short for effective digestion (Tackaert and Sorgeloos, 1993).

Prediction of N mineralization in *Artemia* ponds is difficult because soil organic matter is a mixture of components, which differ in decomposition rate (Brady and Well, 1996; Herrmann and Witter, 2003). For

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