Variation in chlorophyll $a$ concentrations and Margalef’s index of pigment diversity in two solar salt ponds, Aveiro, Portugal

N. Vieira$^1$ and F. Amat$^2$

$^1$Instituto de Zoologia 'Dr. Augusto Nobre', Faculdade de Ciências, 4000 Porto, Portugal.
$^2$Instituto de Acuicultura de torre de la Sal, Ribera de Cabannes, 1295 Castellon, Spain.

Key Words: chlorophyll $a$, Margalef’s index of pigment diversity, solar salt ponds

Abstract

Variations of chlorophyll $a$ and Margalef’s pigment diversity index were studied in two solar salt ponds at Aveiro (Esmolas and Tanoeiras), Portugal. In the Esmolas ponds, mean chlorophyll $a$ values varied between 2.49 and 13.33 mg m$^{-3}$ in the non-growing season, and between 5.43 and 40.55 mg m$^{-3}$ in the growing season. In the Tanoeiras ponds, mean chlorophyll $a$ values were between 8.12 and 14.85 mg m$^{-3}$ in the non-growing season, and 8.65 and 21.19 mg m$^{-3}$ in the growing season. Fluctuations of Margalef’s pigment diversity index were more irregular.

Introduction

Information on the physiological and morphological characteristics of hypersaline phytoplankton is restricted (Hammer et al., 1983). In part, this is because many factors affect algal morphology, making identification difficult. In the present study, algal biomass in solar salt ponds was determined by chlorophyll $a$ concentrations and the physiological state of the algal community was assessed using Margalef’s pigment diversity index (Margalef, 1960).

Materials and Methods

The Aveiro salt ponds lie 60 km south of Oporto, Portugal. Two series of ponds were studied: the Esmolas salt ponds, a series of ponds of area
4.5 ha, and the Tanoeras salt ponds, of area 6.5 ha (Fig. 1). Samples were taken from feeding, evaporation and crystallizing ponds and from seawater inlet channels. They were collected at the surface, biweekly from November 1983 to October 1985.

Pigment extraction was in 90 per cent acetone and extracts were refrigerated and kept in the dark for 12–20 hours. Concentrations of chlorophyll a were determined according to the method of Strickland and Parsons (1972) and spectrophotometer (Spectronic-70) readings at 430, 665 and 750 nm. Margalef's pigment diversity index (Margalef, 1960) was determined by the ratio of values at 430 and 665 nm.

Results

Fluctuations in chlorophyll a concentrations are shown in Fig. 2, and minimum, maximum and average values in Table 1. Fluctuations in Margalef's pigment diversity index are shown in Fig. 3, and minimum, maximum and average values in Table 2.