

# THE IMPACT OF THE 1999 SPRING BLOOMS ON CARBOHYDRATE LEVELS IN THE NORTHERN ADRIATIC

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## Abstract

Dissolved (DTCHO) and particulate (PTCHO) carbohydrates were measured in the Northern Adriatic in the period from February to June 1999 in order to determine their relationship with the phytoplankton dynamics during typical spring blooms. A concurrent correlation of PTCHO with fucoxanthin and chlorophyllide *a* indicated that senescent diatom blooms were an important source of carbohydrates in the basin. The maximum concentration of DTCHO was observed in May, suggesting a gradual transition of PTCHO into DTCHO after the diatom bloom.

*Key words:* carbohydrates, organic matter, Adriatic Sea, phytoplankton bloom

## Introduction

During the last two decades organic macroaggregates in the northern Adriatic seemed to occur more often than in the past [1]. Carbohydrates represent the major constituents of the northern Adriatic mucilage. Consequently, to understand the mucilage phenomenon, it is necessary elucidate seasonal and spatial patterns of carbohydrates. Several studies were reported addressing the distribution of carbohydrates in the northern Adriatic [2-3], but only one [4] provided some insight into the seasonal variability of PTCHO and DTCHO over the entire annual cycle and indicated the possible impact of major phytoplankton blooms on the carbohydrate levels.

## Methods

**Study area and sampling:** Samples were collected in the central part of the northern Adriatic at several stations along the transect Po River mouth – Rovinj.

**Determination of carbohydrates:** Dissolved and particulate carbohydrates were determined by MBTH method [5], which was modified by including a hydrolysis step with 1.7 M HCl.

## Results and discussion

The hydrological regime of the Po River during 1999 was rather regular with two characteristic maxima in spring and autumn. As a consequence of spring freshets, two major phytoplankton blooms occurred in April and June (Fig. 1A). Both blooms were confined to the surface layer, while the concentration in the bottom layer remained low. The bloom in April was strongly dominated by diatoms (fucoxanthin, Fig. 1B), whereas the bloom in June was rather mixed with predominance of primnesiophytes. A significantly enhanced concentration of chlorophyllide *a* during the diatom bloom (Fig. 1B) indicated that this bloom was in the senescent phase. In contrast, the pheopigment levels in June were relatively low. The temporal distribution of PTCHO (Fig. 1C) was closely related to the described phytoplankton dynamics, showing maximum during the April bloom. Despite the fact that the concentration of phytoplankton biomass in June was very similar to that in April, the concentration of PTCHO was several times lower. This suggested that senescent diatoms should be regarded as an important source of carbohydrates. The temporal distribution of DTCHO shows a different pattern from PTCHO (Fig. 1C). The maximum of DTCHO occurred in May (596 mg C/L), indicating a gradual transition of PTCHO into DTCHO after the diatom bloom.

## References

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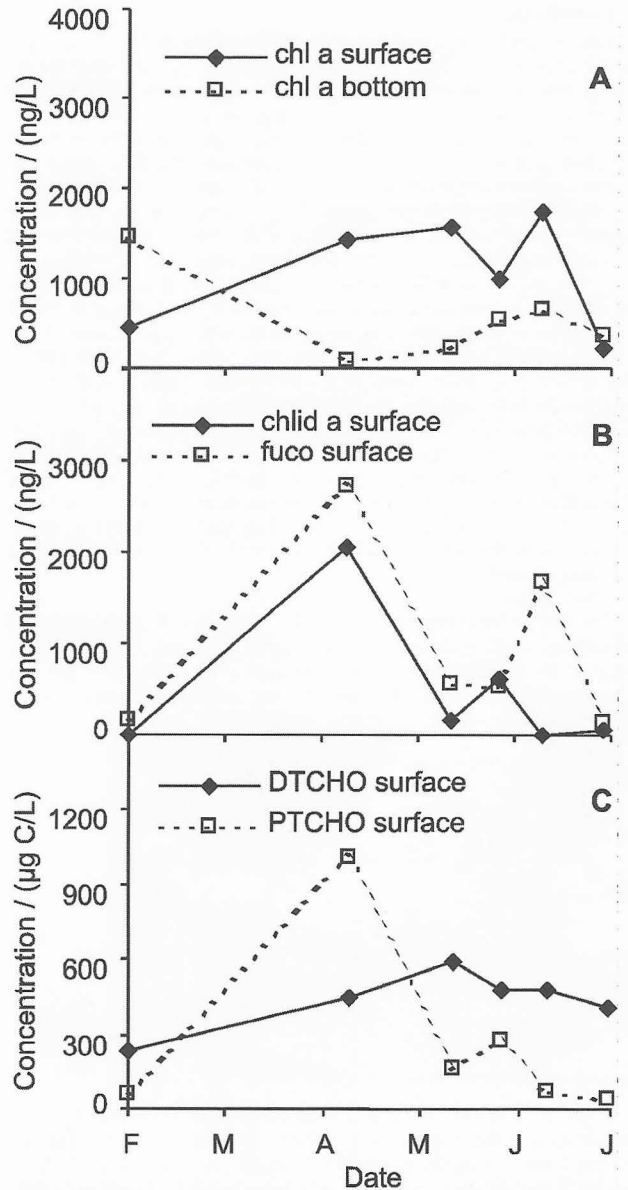


Fig. 1. Temporal distribution of (A) chlorophyll *a* (chl *a*), (B) fucoxanthin (fuco) and chlorophyllide *a* (chlid *a*) and (C) particulate (PTCHO) and dissolved (DTCHO) carbohydrates in the surface (0 m) and bottom (30 m) layers of the station SJ108 during the period February-July 1999.