# Algal and Microbial Processes Involved in Particulate Organic Matter Dynamics in the Loire Estuary

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Algal and bacterial biomass and activities have been studied in the Loire estuary (France) by means of particulate organic matter proteins and chlorophyll pigments determination, electron transport system activity measurement, $^{14}C$-bicarbonate incorporation and tritiated thymidine incorporation determination. These data collected throughout the estuary in various hydrological conditions allow to characterize two opposite typical situations: (i) During winter and early spring, when discharge increases beyond 1000 $m^3 s^{-1}$, heterotrophic activity always dominates over primary production but remains moderate because of low temperature and non-biodegradable quality of organic carbon; (ii) at drought situations, phytoplankton production develops in the river causing increases of pH and oxygen concentration. In these situations, accumulation of phytoplanktonic material in the highly turbid inner estuary results in very high heterotrophic activities causing pH decrease and complete depletion of dissolved oxygen.

Budgets of POC show that the anthropogenic inputs contribute only for less than 5% to the organic load of the inner estuary.

## Introduction

Estuaries constitute a major interface between land and ocean. Biogeochemical processes occurring in such environments greatly affect the fate of material originating upstream (Head, 1976; Reuter, 1981). This influence is particularly important for organic material: depending on estuarine conditions, production of autochthonous material or degradation of allochthonous matter will dominate. Major chemical conditions (pH, redox conditions) are directly dependent on this autotrophic/heterotrophic balance. Therefore, studies of primary production and heterotrophic activities in estuaries are important for correctly assessing the river inputs to the ocean as well as for understanding the conditions

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