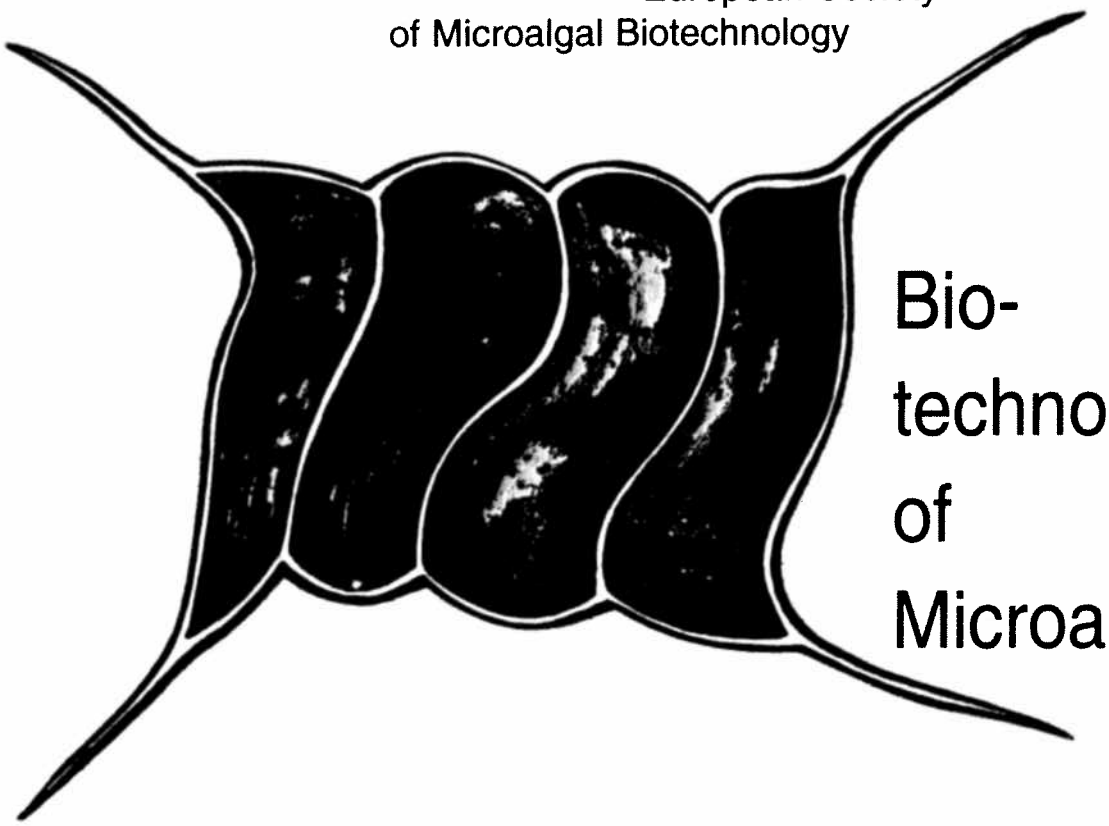
European Society
of Microalgal Biotechnology



Bio-technology of Microalgae

5 th European Workshop

June 23rd and 24th, 2003

ABSTRACTS

5th European Workshop „Biotechnology of Microalgae"

June 23rd and 24th, 2003.
Bergholz-Rehbrücke, Germany

Organized by

IGV GmbH

IGV Institute for Cereal Processing, Ltd.
Bergholz-Rehbrücke
Germany

and

University of West-Hungary
Faculty of Agricultural and Food Sciences
Mosonmagyaróvár
Hungary

and

University of Applied Sciences Lausitz
Senftenberg
Germany

Edited by:

Otto Pulz, Germany
Vince Ördög, Hungary
Mario Tredici, Italy
Sammy Boussiba, Israel
Miroslav Strnad, Czech Republic
Günther H. Schulz Germany

COLD PRESERVATION AND USE OF MICROALGAE AQUACULTURE FEEDS

Graziella Chini Zittelli[1], Liliana Rodolfi[2], Emanuele Ponis[3] and Mario R. Tredici[2]

[1]Istituto per lo Studio degli Ecosistemi - CNR, p.le delle Cascine 28, 50144 Firenze, Italy; [2]Dipartimento di Biotecnologie Agrarie - Università degli Studi di Firenze, p.le delle Cascine 24, 50144 Firenze, Italy; [3]Dipartimento di Scienze Zootecniche - Università degli Studi di Firenze, Via delle Cascine 5, 50144 Firenze, Italy.

Microalgae are an essential food source for many marine animals (bivalve molluscs, crustaceans, zooplankton and finfish), and their production represents a major cost in commercial hatcheries (1). The use of efficient culture systems for microalgal production together with the adoption of suitable methods to store algal biomass, could simplify hatchery-nursery procedures and significantly improve the economy of the process. Many preservation techniques for microalgae biomass have been proposed and experimented with, among which lyophilization, and freezing or refrigeration of algal concentrates (5, 6, 10). Although promising these methods have not led to any commercial application for molluscs, while preserved microalgae are being successfully used as partial or complete diets for live preys and fish larvae (2, 6).

This presentation describes the preservation of viable suspensions of three marine microalgae commonly used in hatcheries (*Tetraselmis suecica*, *Nannochloropsis* sp. and *Pavlova lutheri*) through refrigeration at +4 °C in the darkness. The microalgae were grown in alveolar (9) or annular (3) photobioreactors. *T. suecica* and *Nannochloropsis* sp. were harvested by centrifugation and stored at three different cell concentrations [4, 20 and 60 g (d. wt) L^{-1}]. Since *P. lutheri* is severely damaged by centrifugation, only suspensions at 4 g (d. wt) L^{-1} obtained without centrifugation were tested. The loss of viability and the change of fatty acid content and profile of the three microalgae during storage were investigated. The suitability of preserved microalgal biomass as food for rotifers, *Crassostrea gigas* and seabream larvae was also evaluated.

Changes in viability and fatty acid profile during preservation at +4 °C

In *T. suecica* the loss of viability during storage was inversely correlated with cell concentration. Suspensions at 4 g (d. wt) L^{-1} showed maximum survival rates (100% viability) for about two months, and still retained 50% viability after three months of storage. At higher cell concentrations [20 and 60 g (d. wt) L^{-1}] 50% viability was lost in about 40 days. Preservation experiments carried out with suspensions at 4 g (d. wt) L^{-1} of a second strain of *T. suecica* (*T. suecica* OR), showed a faster decline of viability (50% after one month).

The survival rate of *Nannochloropsis* sp. suspensions was not influenced significantly by cell concentration, and viability remained almost unaltered (80-90% of the initial level) during the first two months of storage. Viability declined to 50% of the initial level only after eight months, and was still 12-35% after one year. When larger volumes of suspensions were stored (as required for practical applications) a much faster decline of viability was observed (50% after two months). Viability of *Nannochloropsis* sp. during storage was greatly influenced by the physiological conditions of the starting culture.

The fatty acid profile of preserved *T. suecica* and *Nannochloropsis* sp. did not change significantly during storage. This indicates that generally, fatty acids were not used as energy