



Apresentações Internas do CIIMAR

Data: 19/09/2005

Horário: 14:00 – 15:00

Local: Auditório CIIMAR, Rua dos Bragas 289

Coordenador: Dr. Rodrigo Ozorio

Programa:

14:00 - 14:15 : Effects of dietary conjugated linoleic acid in growth, nutrient utilization, body composition and hepatic lipogenesis in rainbow trout juveniles (*Oncorhynchus mykiss*).

Claudia Figueiredo-Silva - Laboratorio de Nutrição, Crescimento e Qualidade de Peixes - LANUCE

14:20 - 14:35 : Biological early warning systems for water quality management: oxygen consumption rate of *Danio rerio*.

Fatima Jesus – Laboratorio de Ecotoxicologia Augusto Nobre - LEAN

14:40 - 14:55 : DIVERSITY - STABILITY RELATIONSHIPS: Role of functional diversity and identity in the resistance to invasion of algal assemblages.

Francisco Arenas – Laboratório de Biodiversidade Costeira

Resumos:

Effects of dietary conjugated linoleic acid in growth, nutrient utilization, body composition and hepatic lipogenesis in rainbow trout juveniles (*Oncorhynchus mykiss*).

Claudia Figueiredo-Silva

Dietary conjugated linoleic acids (CLA) have been shown to alter growth rates and reduce body fat storage by altering the activity of key enzymes involved in lipid metabolism, in several species, but have not been evaluated in rainbow trout. A 12-week growth trial was conducted with rainbow trout juveniles, having an initial weight of 5.3 ± 0.03 g (Mean \pm S.D). Fish were fed to satiation, twice a day, with diets containing graded amounts of CLA (0, 0.5, 0.75, 1.0 or 2.0%). At the end of the experiment the daily growth index, feed intake, efficiency and whole body composition were determined. The lipogenic activity of some enzymes (glucose-6-phosphate dehydrogenase, G6PD, EC 1.1.1.49, malic enzyme, ME, EC 1.1.1.40, and fatty acid synthetase, FAS, EC 2.3.1.38) was also measured in the liver. Further, digestibility of the diets was determined, using chromic acid as a marker, and an automatic system for the faecal collection. No significant differences were detected ($P > 0.05$) in growth parameters, feed conversion, nutrient or energy utilization, body composition or lipogenic enzymes activity among treatments. The muscle concentrations of CLA reflected the increasing levels of these fatty acids in the diet, with fish fed diets supplemented with 2.0% of CLA showing the highest values. This study clearly showed that

feeding CLA to rainbow trout elevate muscle concentrations of these fatty acids isomers, without any adverse effects on fish performance or feed efficiency.

Biological early warning systems for water quality management: oxygen consumption rate of *Danio rerio*

Maria de Fátima T. Jesus

Recently, growing attention has been dedicated to continuous monitoring of water quality because it allows the detection of pollution episodes that may have adverse effects on the aquatic environment and public health. A biological early warning system, by continuously monitoring a certain biomarker, allows the continuous monitoring of water quality, specially useful for quality management of drinking water.

The main goal of this work was to assess the adequacy of the biomarker oxygen consumption of zebrafish regarding its application on a biological early warning system for water quality management. Thus, we studied the oxygen consumption rate of zebrafish (*Danio rerio*) exposed, separately, to ten toxic compounds: benzo(b)fluoranthene (540 µg/l), mercuric chloride (30 µg/l), dimethoate (1500 µg/l), lindane (25 µg/l), linuron (3000 µg/l), TBTO (5,6 µg/l), carbon tetrachloride (24300 µg/l), thiram (9 µg/l), 2,4,6-trichlorophenol (730 µg/l) and arsenic trioxide (15000 µg/l), in semi-static conditions. The variation of dissolved oxygen in the water was recorded 15 minutes, 210 minutes and 24 hours after the beginning of toxic exposure. The evaluation of the effects of toxics on zebrafish oxygen consumption rate was done through analysis of multifactorial linear regression.

The effects of toxics were found to be statistically significant for seven of the tested compounds, i.e., seven of the toxics were detected in the conditions of this work. A considerable part of the toxics was detected after 15 minutes of exposure: mercuric chloride, linuron, 2,4,6-trichlorophenol, carbon tetrachloride, thiram and arsenic trioxide. In the first three cases, the fish exposed to the toxic revealed a significant increase in oxygen consumption, whereas in the last two, fish revealed a significant decrease in oxygen consumption when compared to the control fish. The mercuric chloride was detected after 210 minutes from the beginning of the exposure due to increase in oxygen consumption rate, and TBTO was detected 24 hours after the beginning of the exposure due to decrease in oxygen consumption rate when compared with the control fish. Only the toxics benzo(b)fluoranthene, dimethoate and lindane were not detected.

Although more investigation is necessary, these results suggest that the biomarker oxygen consumption in zebrafish has potential to be applied in the development of biological early warning systems for water quality management.

Key words: zebrafish; *Danio rerio*; biomarker; oxygen consumption; biological early warning systems.

DIVERSITY - STABILITY RELATIONSHIPS: Role of functional diversity and identity in the resistance to invasion of algal assemblages

Francisco Arenas

The emergence of the biodiversity-ecosystem functioning debate in the last decade has renewed interest in understanding why some communities are more easily invaded than others and how the impact of invasion on recipient communities and ecosystems varies. Although coastal marine

habitats are among the most heavily invaded ecosystems, studies in community invasibility and vulnerability on these habitats are scarce.

The overall aim of our experiment was to explore how functional diversity in marine algal assemblages influences one metric of stability in ecosystems: resistance to invasion. Our initial hypothesis was that increasing functional richness reduces the susceptibility of communities to invasion.

On the basis of the previous knowledge of the local species characteristics and their abundances in the rockpools, we selected *a priori* four functional groups: a) Crustose species, b) Turf species, c) Subcanopy species and d) Canopy-species.

We created synthetic assemblages containing one, two, three or four different functional groups of seaweeds. As model invaders we used native species.

Our results showed that identity of functional groups seems to be more important than functional richness in the ability of macroalgal communities to prevent invasions. This control was resource-mediated.

Results also suggested that diversity reduced variability on invasibility (i.e., increased ecosystem predictability). However this reduction on variability could be consequence of the higher degree of similarity between plots of higher diversity treatments.