PROFESSIONAL MASTER PROGRAMME IN ENVIRONMENTAL FORENSIC

Evaluation of the adequacy of numeric values defined in the tables of 357/2005 CONAMA Resolution from the technical and scientific point of view, to ensure the preservation of ecosystems.

Maria Flavia Barbosa Xavier[1] and Carlos H. L. Soares[2]
[1]Academic [2] Supervisor

Introduction

Monitoring a water body includes physical, chemical and biological monitoring because the organism presents an integrated response to the environment and it is interesting to keep the biological community healthy (Lobo and Callegaro, 2000).

The use of bioindicators in ecotoxicology allows the detection of substances at concentrations below the limits of detection by chemical analysis methods, since living beings respond in an integrated way to all disturbing agents, including produced effects by new substances in water, formed through water and effluent interactions (Knie and Lopes, 2004).

Toxicological tests enable a very safe assessment of the toxic potential of contaminated substances or media, also allowing indirect deductions of their risk to the environment. Therefore, toxicological tests are great tools to make decisions regarding the preservation of the aquatic biota (Brentano, 2006) and helps in decision making for the formulation of public policies (Azevedo and Chasin, 2003).

Monitoring through physical and chemical parameters when complemented by ecotoxicological monitoring allows a more comprehensive assessment of complex water bodies, as the result of the ecotoxicological test is based on the response of the biota to the set of substances that make up the aquatic environment (Brentano and Lobo, 2003).

In order to evaluate the behavior of organisms against chemical compounds of petrochemical, agricultural and pulp and paper industries, some compounds will be chosen according to the abundance/frequency in their use to trace a comprehensive behavior of the organisms against such evictions.

Objectives

GENERAL OBJECTIVE:

• Evaluate the adequacy and pertinence of the numerical values defined in the tables of Resolution 357/2005 of CONAMA from the technical and scientific point of view, to guarantee the preservation of the diverse ecosystems.

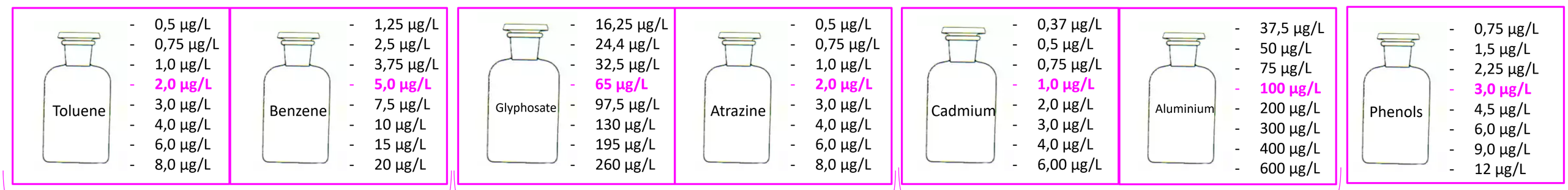
SPECIFIC OBJECTIVES:

• Analyze the need to use biological parameters in the monitoring of water bodies resources.

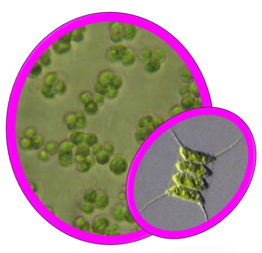
• Evaluate the deleterious effects of petrochemical, agricultural and paper and cellulose compounds from the tables of resolution 357/2005 of CONAMA on algae (*Desmodesmus subspicatus*) microcrustaceans (*Daphnia magna*) and fishes (*Danio rerio*), through acute and chronic toxicity tests.

• Compare the results found with the current legislation, **CONAMA Resolution 357/2005**, confronting the limits stipulated by it.

Methodology



Organisms to be tested | **Protocols** | **Bioassays**



Desmodesmus subspicatus
Producer

OECD 201 (1984)
ISO 8692 (2012)

Inoculum ≅ 105 cell/mm

+ substance

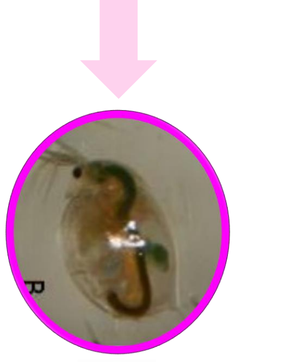
24h-light
2000 LUX

[C1] [C2] [C3] [C4] [C5] [C6] [C7] [C8] Control

48 hours

Read on 720 nm
% of transmittance

Calculate the growth rate between the samples and control



Daphnia magna
Primary Consumer

OECD211 (2012)

Daphnia magna
matrix

Neonates (6h – 24h)

1 per Becker + substance

[C1] [C2] [C3] [C4] [C5] [C6] [C7] [C8] Control

Newborns

1 to 21 days

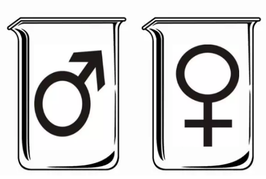
Morphological changes

Presence of males

Neonate numbers

Danio rerio
Secondary Consumer

OECD TG229 (2012)



Acclimation period: 7 days

1 couple per Becker + substance

[C1] [C2] [C3] [C4] [C5] [C6] [C7] [C8] Control

Eggs

1 to 5 days

During 5 days: Observe the development of the fertilized eggs