# MILIEUMONITORING MET BIOASSAYS

## Praktisch aan de slag met Microbiotests Toxkits & BioLight

MICROBIOTESTS

AQUA SCIENCE

- The number of chemicals encountered in water, soil and sediment is increasing worldwide. (> 350.OOO compounds )

- Chemical measurements provide information about the presence of chemicals in water, when it is not yet clear whether these might be harmful to human and environmental health.

- Effect-based monitoring with bioassays answers this concern.

# EXAMPLES OF WATER POLLUTION

Industrial Waste

MARINE DUMPING

AGRICULTURAL RUNOFF

RADIOACTIVE CONTAMINATION

HOUSEHOLD WASTE

THERMAL POLLUTION

OIL SPILLS

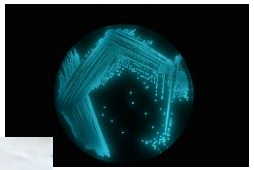
MINING ACTIVITIES

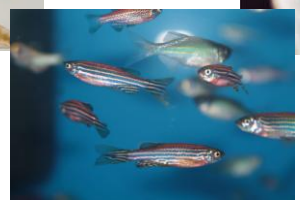
SEWAGE AND WASTEWATER

PLASTIC WASTE

CHEMICAL ANALYSIS

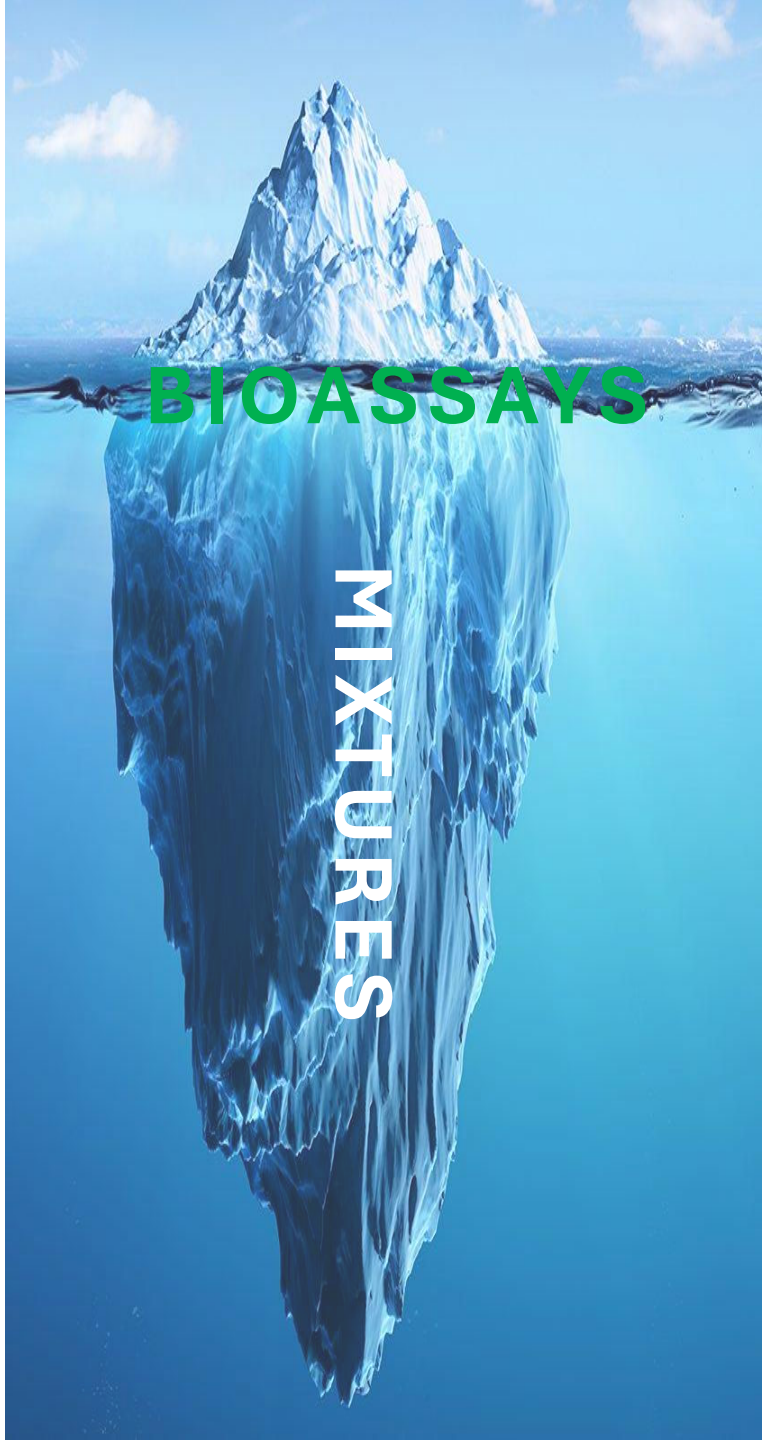
BIOASSAYS





KNOWN

UNKNOWN



# BIOASSAYS

- Bioassays make use of organisms, cells and bacteria, and are an effective instrument in investigating the effects of chemicals on humans and the environment (ecotoxicity).

- Bioassays measure the combined effect of chemicals present in chemical mixtures, without the need of having information about which chemicals are present and in which concentrations.

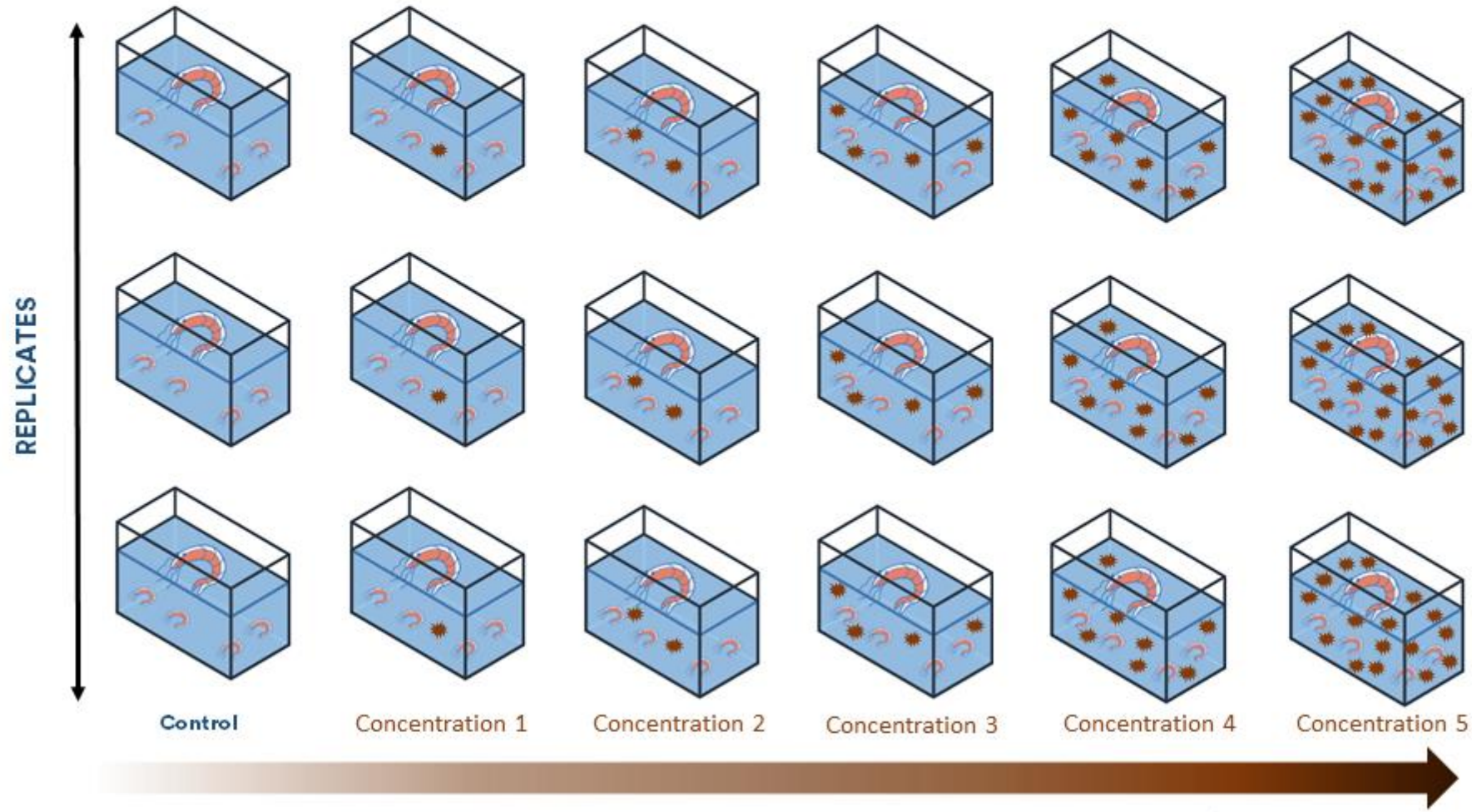
- Bioassays can be conducted, among others, on drinking water, wastewater, surface water and groundwater.

- In vivo and in vitro bioassays

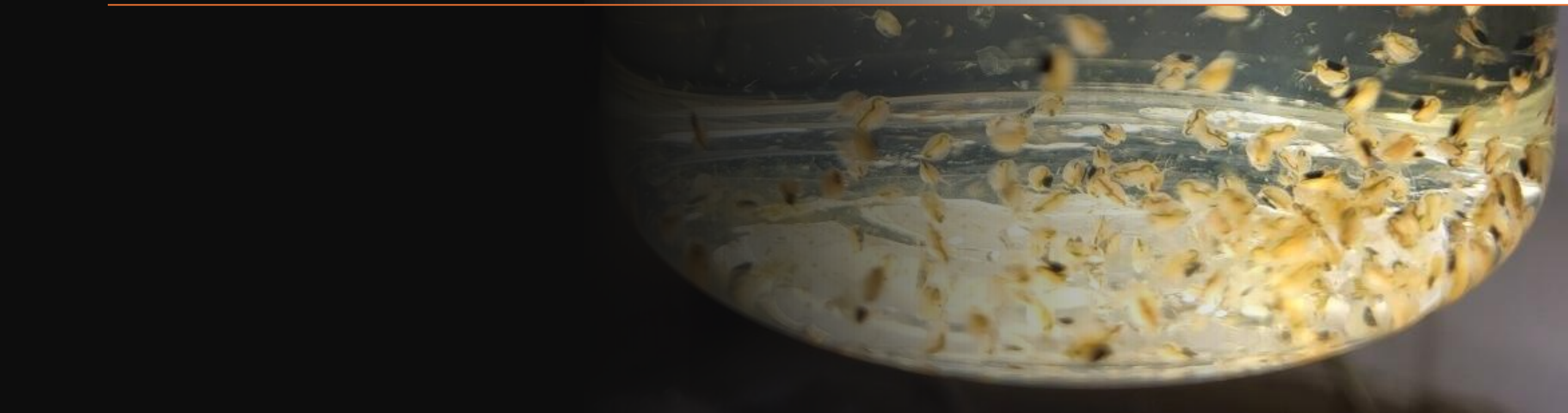
# Principle of a laboratory bioassay

Observed effects : mortality, growth, reproduction, DNA damege, ...

After a given time, we count the number of individuals affected in each container



# IN VIVO BIOASSAYS = need of living organisms



# Burden of Culturing Test Organisms

- **Infrastructure-intensive** :

Requires lab space, aquaria, lighting and constant temperature

- **Resource-demanding** :

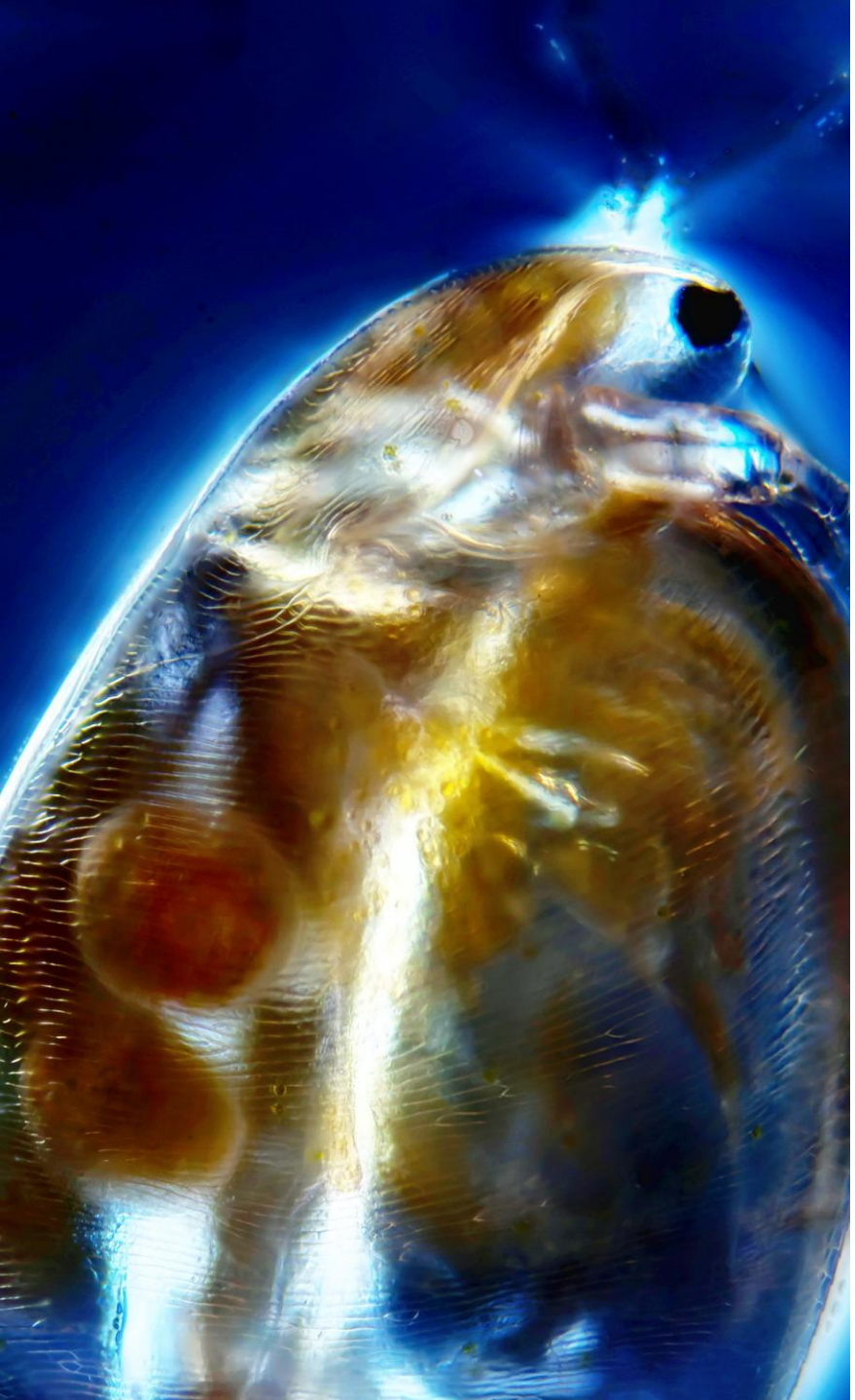
Daily feeding, water changes and breeding maintenance

- **Expertise-dependent** :

Requires trained personnel and experience

- **Risk of variability** :

Sensitivity and health of organisms can vary with culturing conditions



MICROBIOTESTS

# Microbiotests TOXKITS & TEST BIOTA

**SOLUTIONS FOR**

**ENVIRONMENTAL TOXICITY TESTING**

**AND**

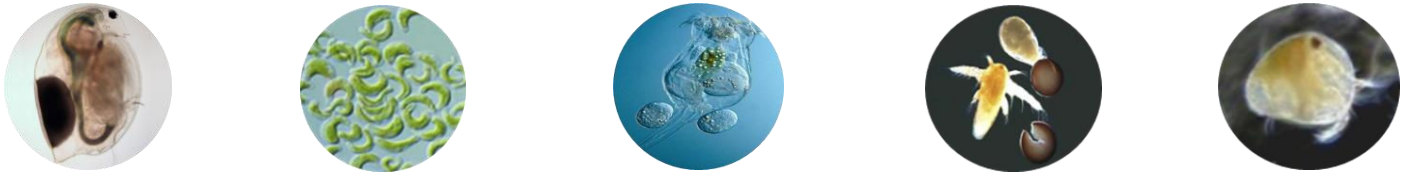
**RESEARCH**

MICROBIOTESTS

# Introduction to Microbiotests and Toxkits

- Microbiotests Toxkits : Ready-to-use bioassays starting from dormant life stages
- Organisms are hatched on-demand from cysts, resting eggs or immobilized stages
- Long-term storage, culture-independent, and easy to use
- Provide reproducible and comparable results across labs :

  standardized test procedures (ISO and OECD)
- Genetic uniform and qualitative biological materials



MICROBIOTESTS

# Application areas

- Registration of new chemical substances

  (detergents, cosmetics, phytosanitary products, pesticides, antifoulings, …)
- Monitoring of wastewater from urban wastewater treatment plants and

  industrial effluents (WWTP inlet and outlets)
- Ecotoxicity of special waste and evaluation of the ecotoxicological risk

  of polluted sites
- Control of leachate from landfills, inceration residues, WWTP sludges,

  dredged sediments, …

MICROBIOTESTS

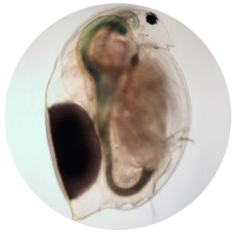
# Microbiotests Toxkits

## FRESHWATER / WASTEWATER

### Tests with crustaceans

**DAPHTOXKIT F**

24-48h mobility inhibition test
with *Daphnia magna*
*Conform with ISO Standard 6341 and OECD Guideline 202*



**THAMNOTOXKIT F**

24h mortality test
with *Thamnocephalus platyurus*
*Conform with ISO Standard 14380*

**CERIODAPHTOKXIT F**

24h mortality test
with *Ceriodaphnia dubia*
*Adheres to test method US EPA 2002.0*

MICROBIOTESTS

# Microbiotests Toxkits

## Tests with micro-algae

### ALGALTOXKIT F

72h growth inhibition test
with *Pseudokirchnariella subcapitata*
*Conform with ISO Standard 8692 and OECD Guideline 201*

## Tests with higher aquatic plants


### DUCKWEED TOXKIT F

72h growth inhibition test
with *Spirodela polyrhiza*
*Conform with ISO Standard 20227*

MICROBIOTESTS

# Microbiotests Toxkits

## Tests with rotifers


### ROTOXKIT F

24h mortality test
with *Brachionus calyciflorus*
*Conform with ISO Standard 19827*


### ROTOXKIT F CHRONIC

48h reproduction test
with *Brachionus calyciflorus*
*Conform with ISO Standard 20666*

## Tests with ciliated protozoans


### PROTOXKIT F

24h growth inhibition test
with *Tetrahymena thermophila*
*Standardised screening method*

MICROBIOTESTS

# Microbiotests Toxkits

## SEAWATER / ESTUARIES

### Tests with micro-algae


**ALGALTOXKIT M**

72h growth inhibition test
with *Phaeodactylum tricornutum*
*Conform with ISO Standard 10253*

### Tests with crustacceans

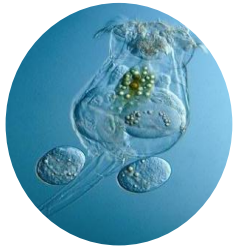

**ARTOXKIT M**

24h mortality test
with *Artemia franciscana*
*In current use in several countries as a recommended acute toxicity test*

### Tests with rotifers


**ROTOXKIT M**

24h mortality test
with *Brachionus plicatilis*
*Conform with ISO Standard 19820*



MICROBIOTESTS

# Microbiotests Toxkits

## SEDIMENTS / SOILS / SOLID WASTES

### Tests with crustacceans

**OSTRACODTOXKIT F**

6 days mortality and growth inhibition test
with *Heterocypris incongruens*
*Conform with ISO Standard 14371*

### Tests with terrestrial plants

**PHYTOTOXKIT SOLID SAMPLES**

**PHYTOTOXKIT LIQUID SAMPLES**

72h germination and root growth inhibition test
with seeds of 3 higher plants
*Conform with ISO Standard 18763*

# BioLight® Toxy

*ISO 11348*-3: Water quality

Determination of the inhibitory effect of water samples on the light emission of Alii*vibrio fischeri* (luminescent bacteria test)



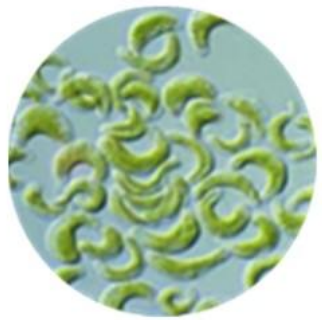
BioLight®

*Freeze-dried reagent of Aliivibrio fischeri*
(strain NRRL B-11177)

MICROBIOTESTS

# *ISO 8692* : Water quality

## Fresh water algal growth inhibtion test with unicellular green algae

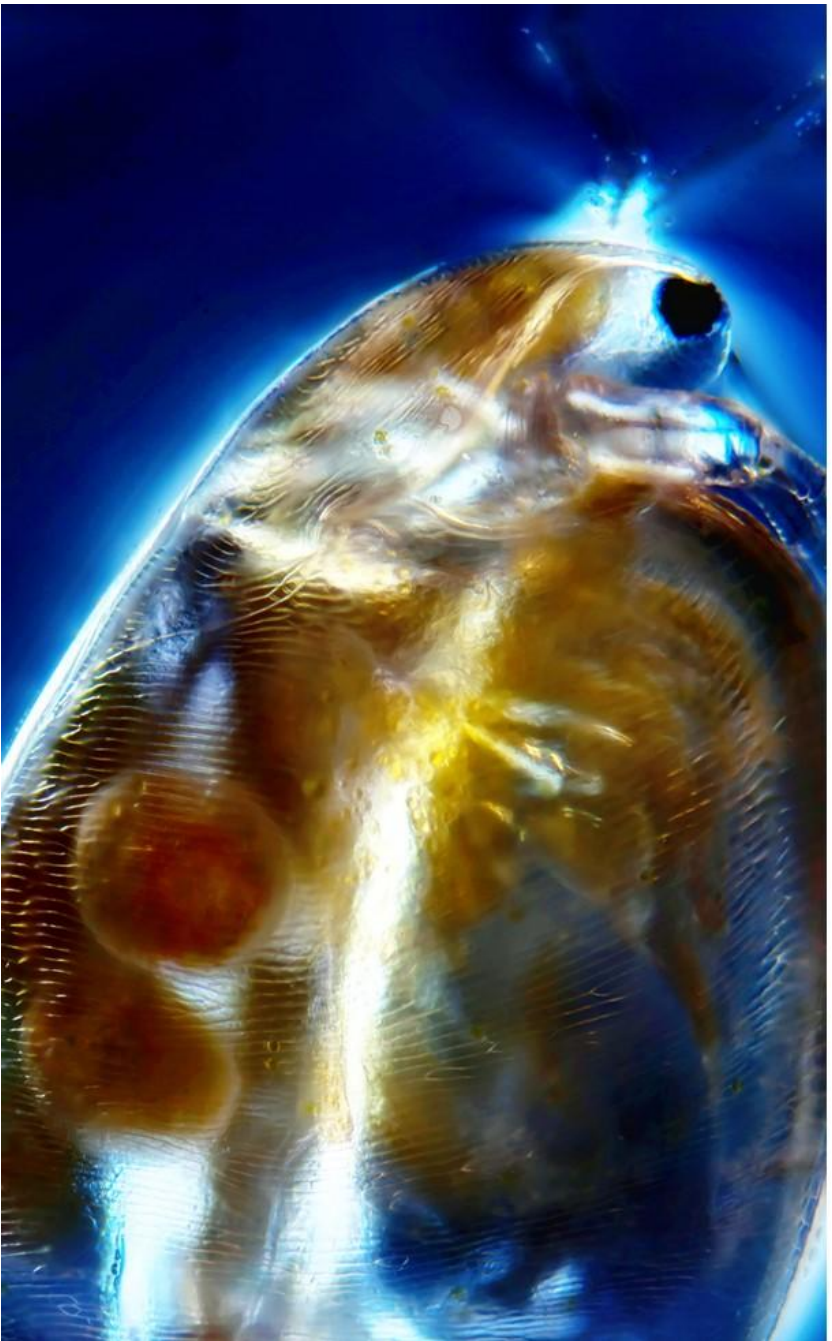



***Microbiotests ALGALTOXKIT F***

***Standardized and culture-independent***

***toxicity testing and research :***

***Using algae obtained from alginate beads :***
***Pseudokirchneriella subcapitata /***
***Desmodesmus subspicatus***



## *ISO 6341* : Water quality

## Determination of the inhibition of mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute Toxicity Test

MICROBIOTESTS

***Standardized and culture-independent toxicity testing and research :***

***Using Daphnia hatched directly from ephippia***

# The New Generation In Acute Toxicity Testing

AQUA SCIENCE

# Water Quality Luminescent Bacteria Test

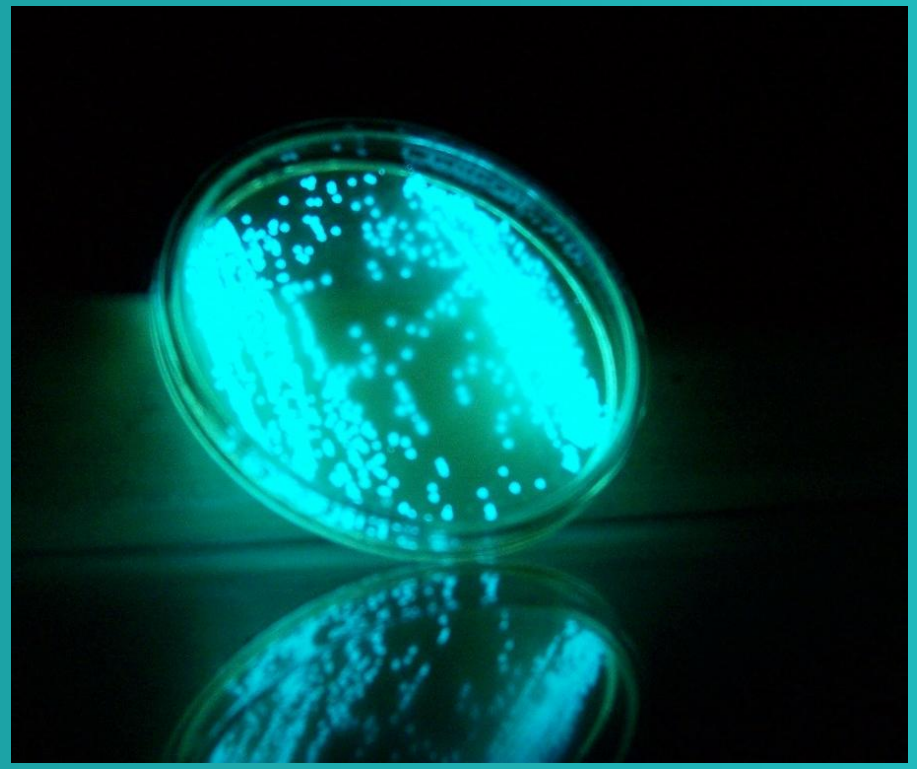
determination of the inhibitory effect of water samples on the light emission of Aliivibrio fischeri

ISO 11348 consists of the following parts :

Part 1 : Method using freshly prepared bacteria ( ISO 11348-1 )

Part 2 : Method using liquid dried bacteria ( ISO 11348-2 )

Part 3 : Method using freeze dried bacteria ( ISO 11348-3 )



BioLight®

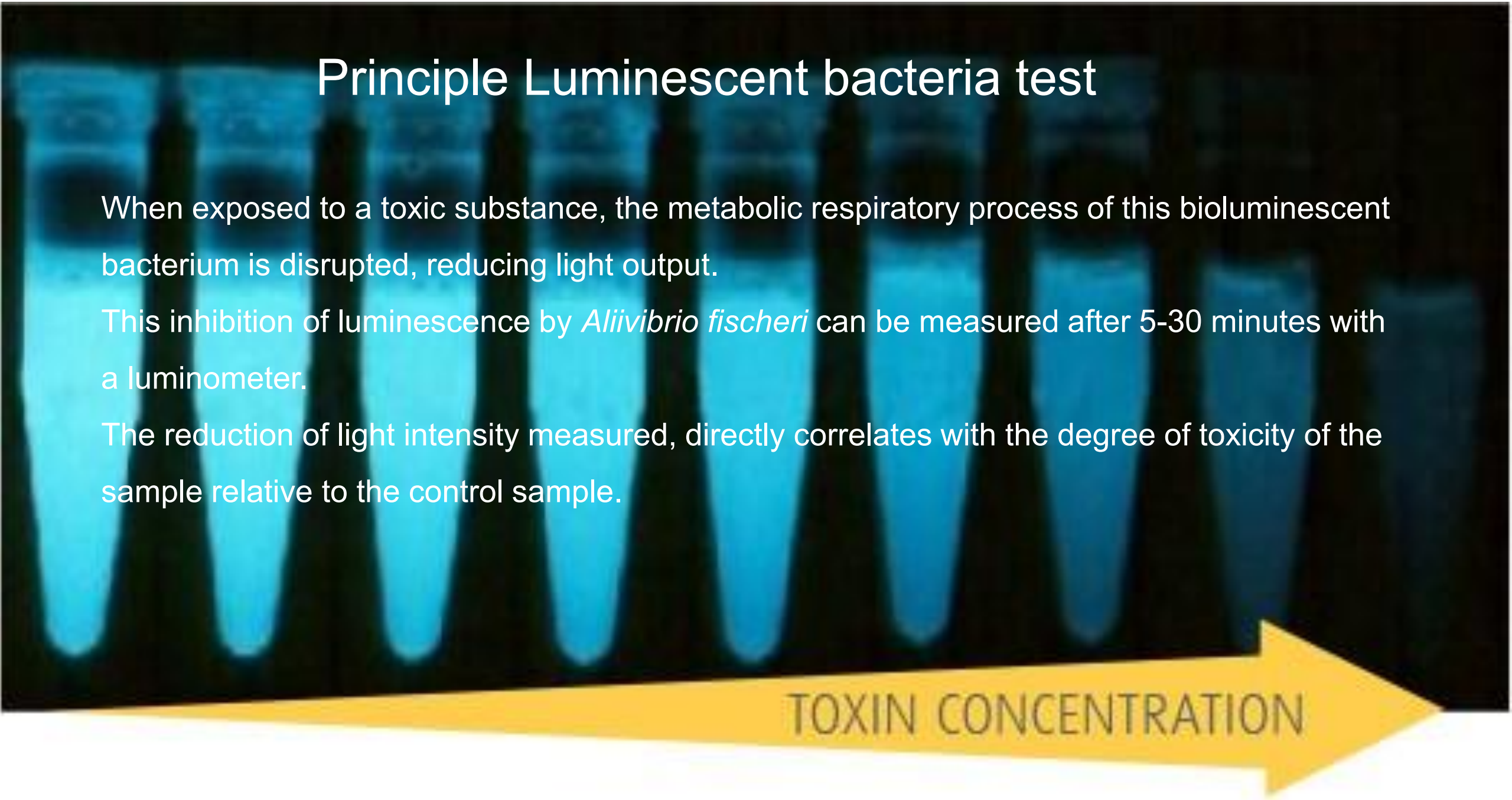
*Aliivibrio fischeri* (formerly *Vibrio fischeri* ) is a marine bacterium that luminesces as a natural part of its metabolism under optimal environmental conditions.

# Principle Luminescent bacteria test

When exposed to a toxic substance, the metabolic respiratory process of this bioluminescent bacterium is disrupted, reducing light output.

This inhibition of luminescence by *Aliivibrio fischeri* can be measured after 5-30 minutes with a luminometer.

The reduction of light intensity measured, directly correlates with the degree of toxicity of the sample relative to the control sample.



# FIELDS OF APPLICATION
# LUMINESCENT BACTERIA TESTS

## ❑ Environmental analysis

Monitoring wastewater
Screening sediment quality and soils
Hazardous waste classification
Bioremediation
Surveillance environmental emergencies

## ❑ Drinking water production

Detection of deliberate or accidental contamination
Control of water supply sources (ground- and surface water)
Checks of the distribution network and delivery systems

## ❑ Waste Water Treatment Plants

Screening of influent before treatment
Cost containment due to overload of toxic substances
Protecting biological treatment
Controlling the cost of chemical additives
Effluent discharge legislation

## ❑ Industrial applications

Drilling fluids / Petrochemical industry
Mining wastes, soil and water
Industrial effluents

Biosensor test using bioluminescent bacteria have been used for more than 25 years and their capability in detecting toxic substances is well understood.

**DISCONTINUED**


BioLight®
Toxy
AQUA
SCIENCE

# Highest Quality Bioluminescent Reagent


BioLight®

## Freeze-dried reagent with Aliivibrio fischeri (conform ISO 11348-3)

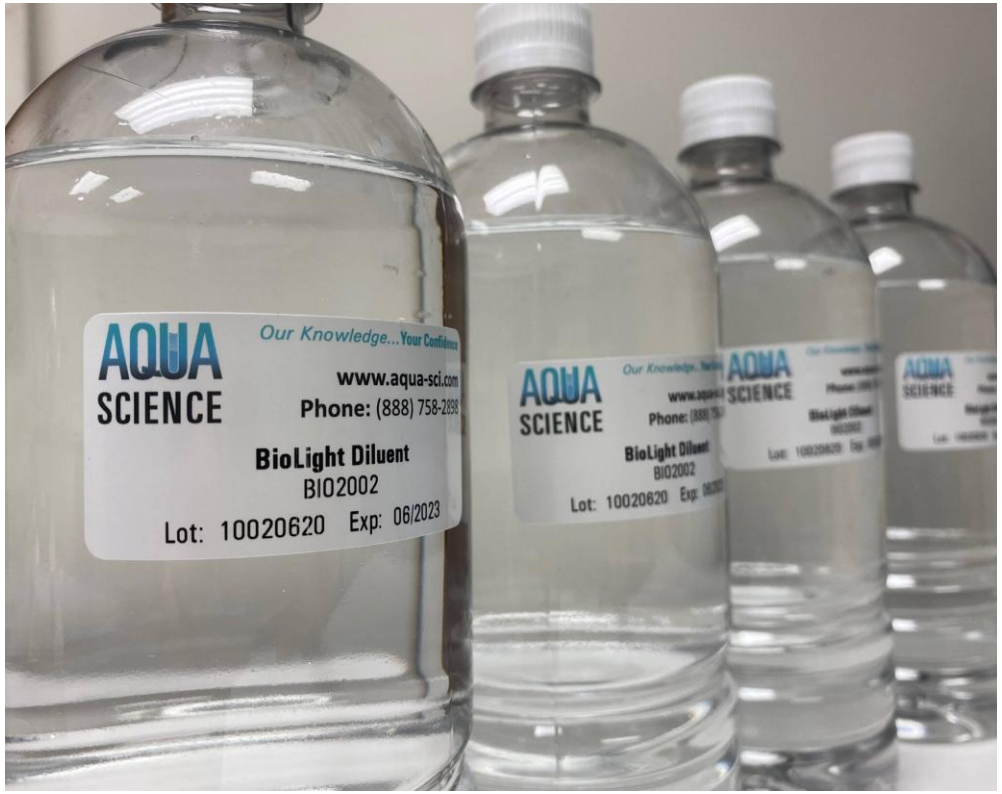
One hundred million cells / vial

Store frozen at -20 °C to – 25°C

Useful up to 4 hours after reconstitution

Two year shelf life from date of manufacture

Sensitive to > 3.600 chemical compounds





BioLight®

# CONSUMABLES

BioLight Recon

BioLight Diluent

BioLight Solid Phase

Diluent

BioLight Salinity

Adjustment

BioLight®
Toxy

**VERSATILE** combined instrument benchtop and field reader

**EXPANDABLE** can accomodate up to 2 cooling blocks

**COMPLETE** on-board instruction software and data evaluation

**CUSTOMIZABLE** instructions and protocols

**SPEED** reading time only 3 seconds

**ACCESSIBLE** wireless instrument control

BioLight Toxy


7” touch screen

Read well
15 ± 0,5 °C

USB
connection

Reagent well
5,5 ± 1 °C

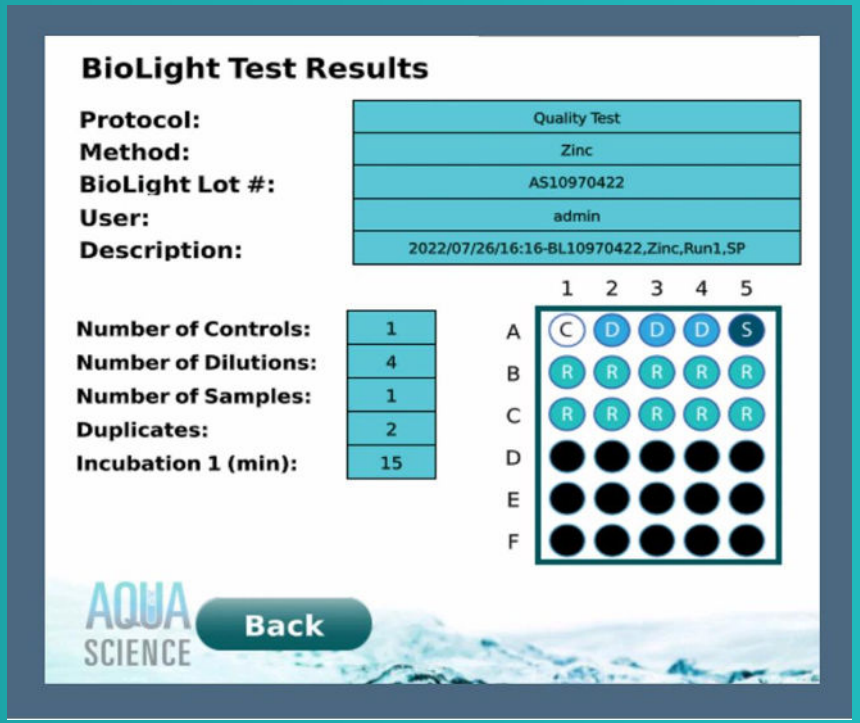
# BioLight Cooling blocks
# Liquid (12 mm tubes) and  Solid Tests (17 mm tubes)

Sample well
15 ± 0,5 °C

Possibility of working with two cooling blocks.
(Up to 60 wells at the same time)

## Custom PLC Software Interface on board

- Easy to Set Up
- Built-in test methods and protocols
- Customizable instructions and settings
- Multiple languages
- Remote access and assistance
- Free online software update up to two years after purchase
- EU service center in co-operation with Ecotox Lds.




BioLight® Toxy

# ACUTE TOXICITY TEST PROTOCOLS

- **EC50 Test - 2%, 45% or 81,9%**
  Testing that provides a calculated EC50 value an measure relative toxicity

- **% Effect Test - 2%, 45% or 81,9%**
  Testing using a single concentration

- **Equivalence Test**
  Used with an undetermined sample to compare the relative acute toxicity with a control sample

- **ISO**
  Complies with standardized method ISO11348-3

- **Solids Test**
  Used for soil and sediments

- **Phenol Standard**

- **Zinc Standard**

- **3,5 – Dichlorophenol Standard**

MICROBIOTESTS

AQUA SCIENCE

Interested in more information?

www.microbiotests.com