



DENDRIDIAG®
QUANTIFY THE TOTAL FLORA OF A SURFACE
BY ATP-METRY



GL BIOCONTROL

9, avenue de l'Europe – Cap Alpha – 34 830 CLAPIERS – FRANCE

Phone: +33 (0)9 67 39 35 20 - Fax: +33 (0)9 55 25 40 31

Email: contact@gl-biocontrol.com - Web: www.gl-biocontrol.com



→ GL BIOCONTROL overview

→ What is ATP-metry?

→ Why use ATP-metry?

→ Why use GL BIOCONTROL's ATP-metry method ?

→ How to use GL BIOCONTROL's kit ?





GL BIOCONTROL specializes in environmental risk management and has an expertise in sanitary engineering along with biological monitoring of water and surfaces. Our main areas of expertise are:

Studies

Microbiological diagnosis, evaluation of cleaning and disinfection treatment efficiency

Products

Development of risk management tools (ATP-metry kits for total flora quantification, DNA extraction purification kits, real time PCR amplification kits, electropositive membranes...)

Analysis

ATP-metry, quantification of *Legionella* by qPCR...

Research and development

Innovative tools to study the microbial world, research contract...

Training

Microbiological risk management, laboratory techniques....





Our main application fields



Industrial water

Cooling towers, circuit processes, production units of water for industrial use (e.g. electroplating)...



Sanitary water

Drinking water supply unit, water networks for sanitary use, thermal water systems of fitness and care center facilities...



Ultra-pure

Loops for medical, pharmaceutical, micro-electronic use, haemodialysis, bacteriologically mastered water networks...



Surface

Swimming pools, food processing, cooling towers, domestic hot and cold water production units...



Air

Ventilation systems, hospitals, offices, methanation, composting facilities, farming...

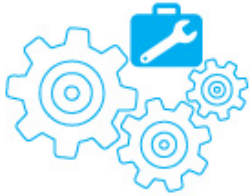


Some of our references





Key points



- 2** PhD in biochemistry and water microbiology.
- 3** development engineers.
- 1** sales engineer.
- 1** administrative assistant.



- More than **150** microbiological studies on site each year.
- More than **30 000** ATP-metry measurement sold each year in France.
- More than **300** facilities equipped with our kit.



- 2** patent filled on detection of pathogens in water samples.
- 1** European project for development of an ATP instrument for autonomous monitoring of the ISS' water circuit.





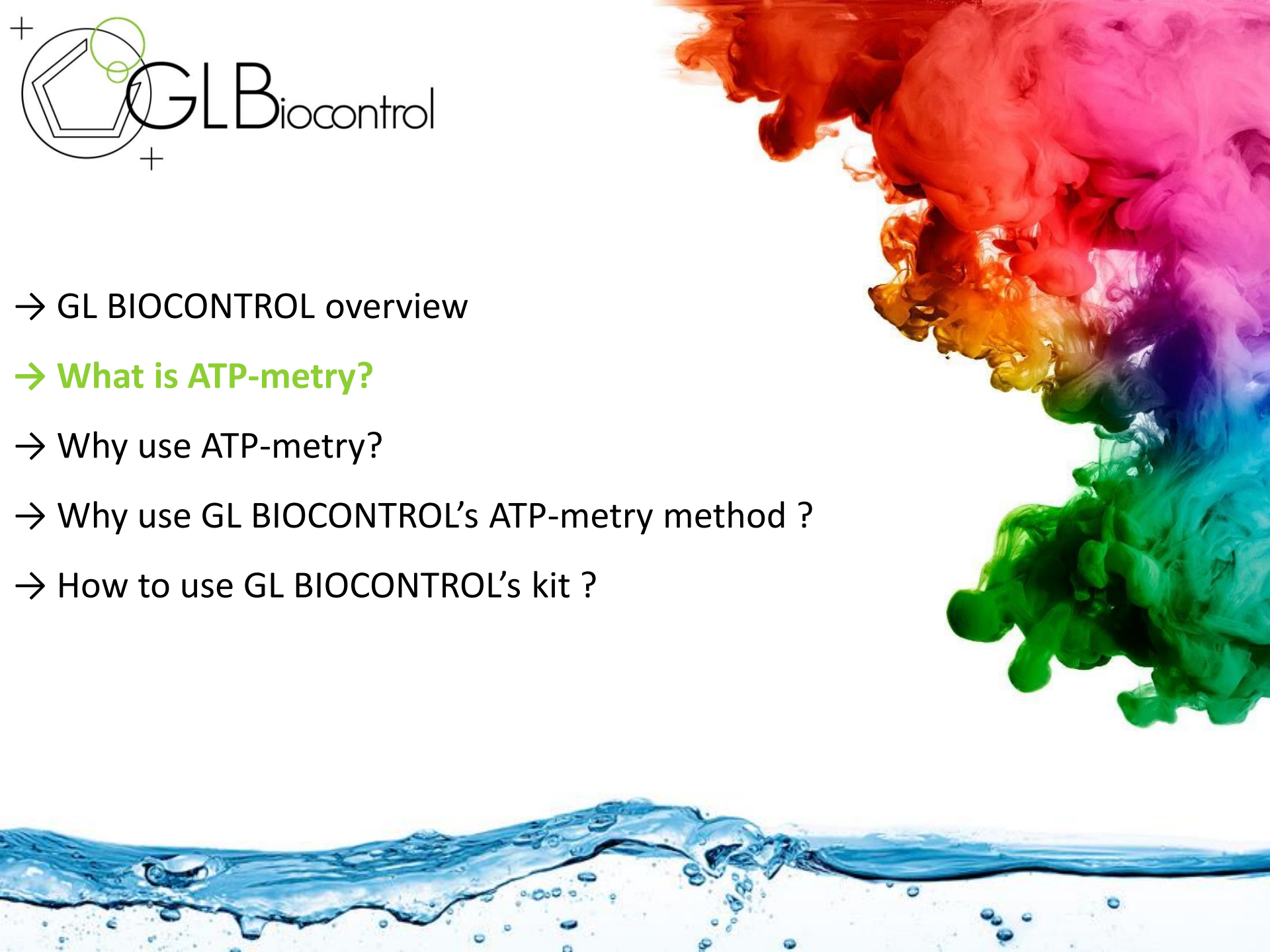
→ GL BIOCONTROL overview

→ **What is ATP-metry?**

→ Why use ATP-metry?

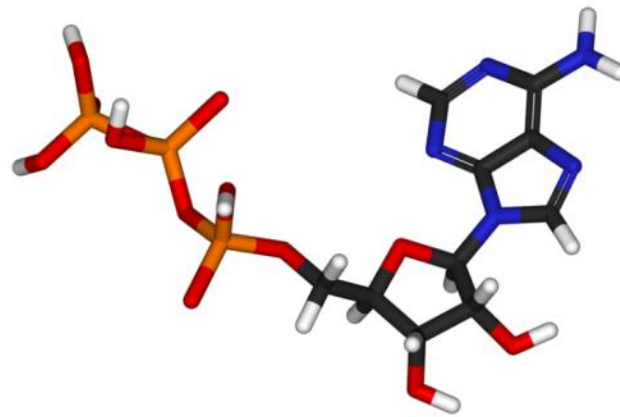
→ Why use GL BIOCONTROL's ATP-metry method ?

→ How to use GL BIOCONTROL's kit ?





Adenosin triphosphate (ATP) is a molecule that provides energy to drive many processes in living cells. Found in all forms of life, ATP is often referred to as the "molecular unit of currency" of intracellular energy transfer.



Thus, as ATP is specific to **living environments**, its presence proves the existence of living organisms.



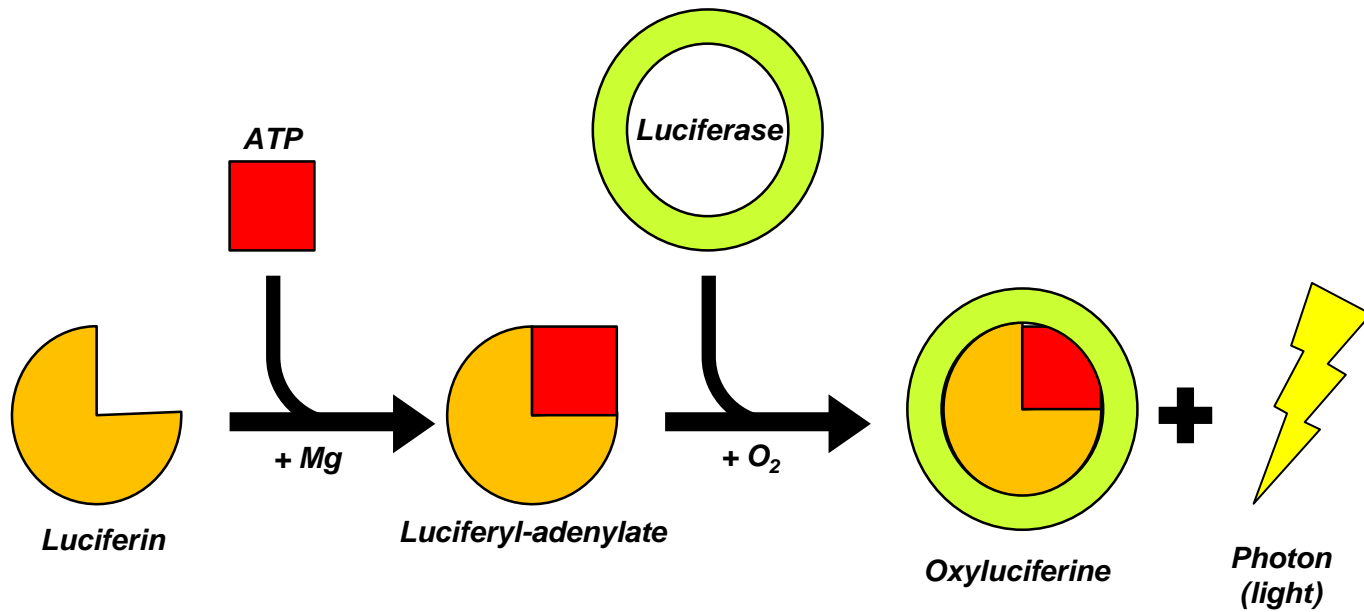


ATP-metry is a molecular biology technique, based on bioluminescence. It measures the **quantity of ATP in a water, surface or air sample.**

To carry out this quantitative analysis, the light emitted by the enzymatic reaction using luciferin and firefly luciferase is measured thanks to a **luminometer.**



Bioluminescence reaction





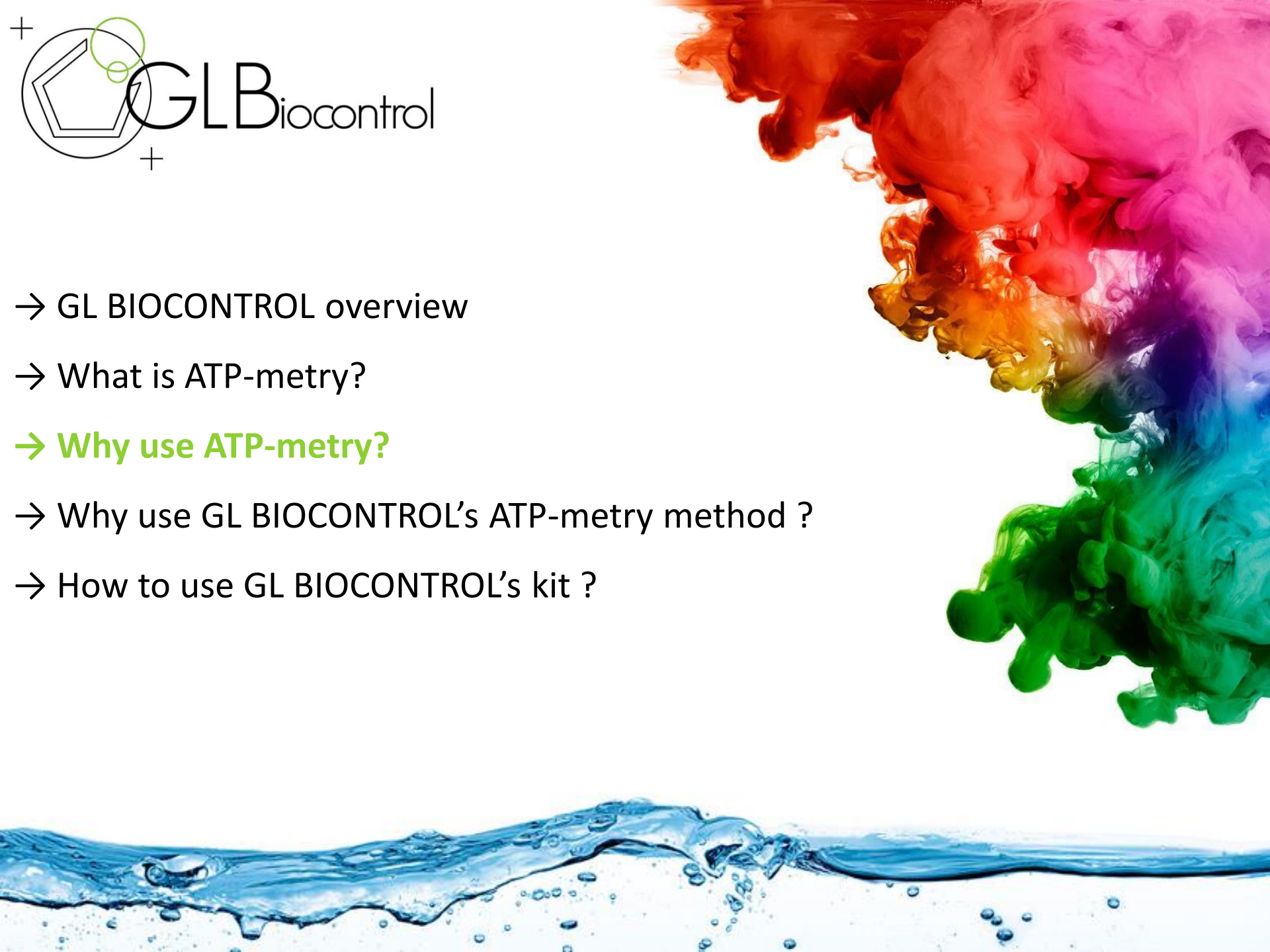
→ GL BIOCONTROL overview

→ What is ATP-metry?

→ **Why use ATP-metry?**

→ Why use GL BIOCONTROL's ATP-metry method ?

→ How to use GL BIOCONTROL's kit ?





Generality

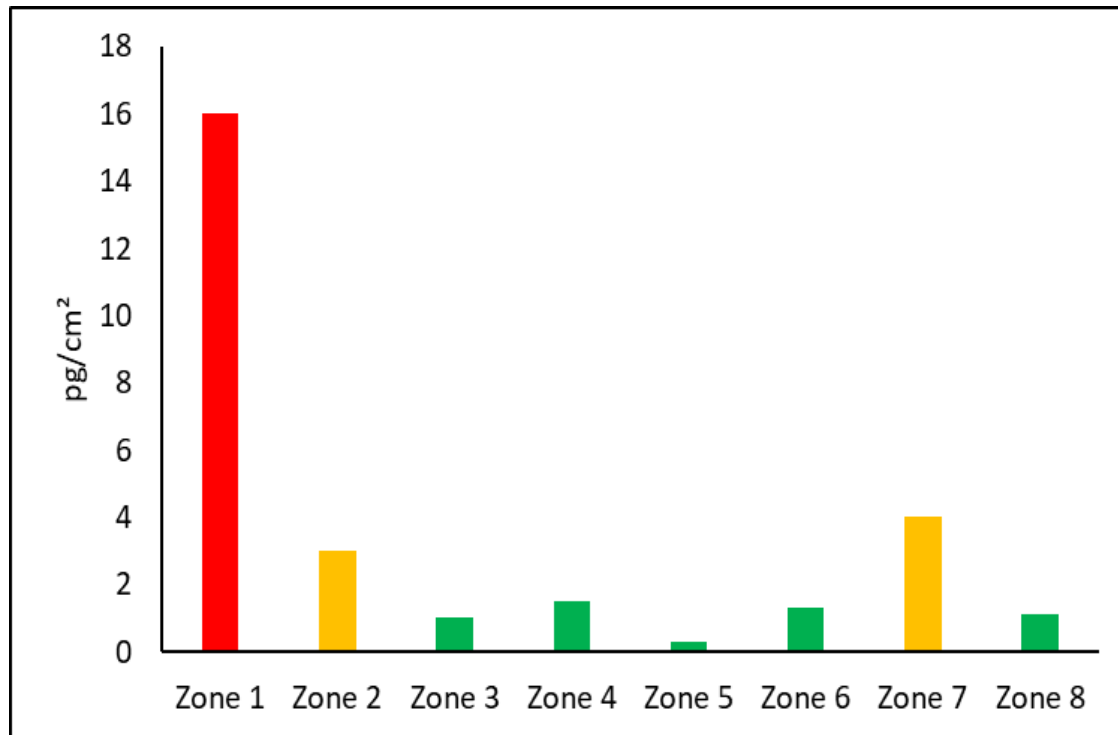
- ① ATP-metry is one of **the most sensitive and rapid technique** known to measure total flora.
- ② ATP-metry is a **robust and accurate** technique with an uncertainty at 0.15 log.
- ③ ATP-metry is an **easy-to-use** method.
- ④ ATP-metry deduces **the quantity of microorganisms** present in a sample, from the light measured.





Example of application

Anticipate risks of microbial shifts through the real-time monitoring of biomass



→ **Control** biofouling of facilities.

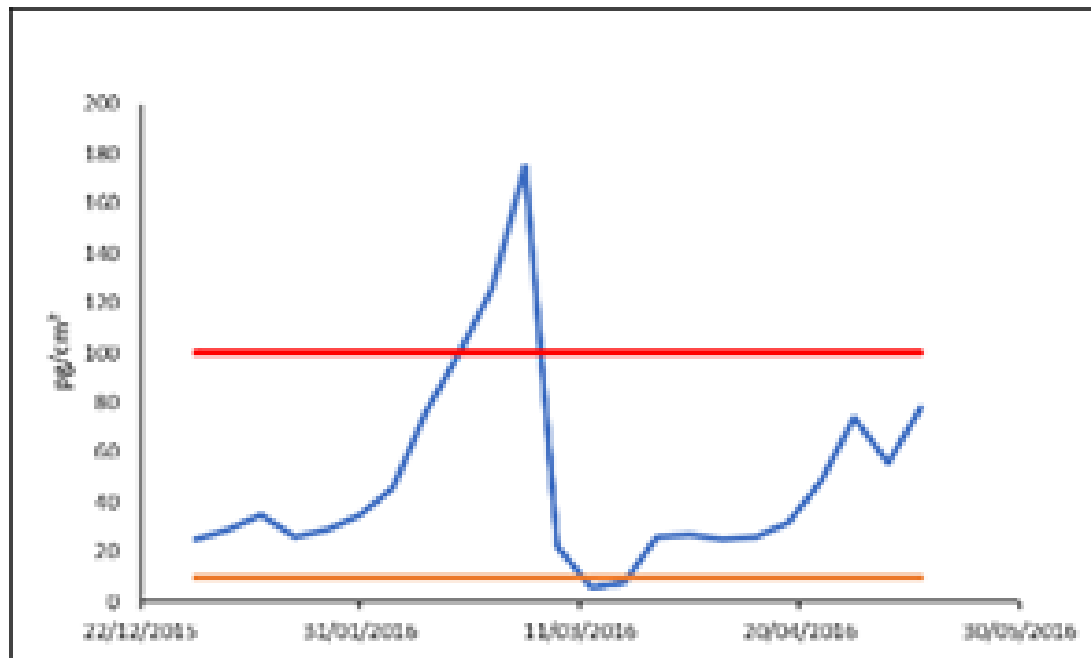
→ **Manage** public health risks (ex : *Legionella*, *Pseudomonas*...).

→ **Avoid** production shutdowns.



Example of application

Manage biofilm formation and evolution in a pipe



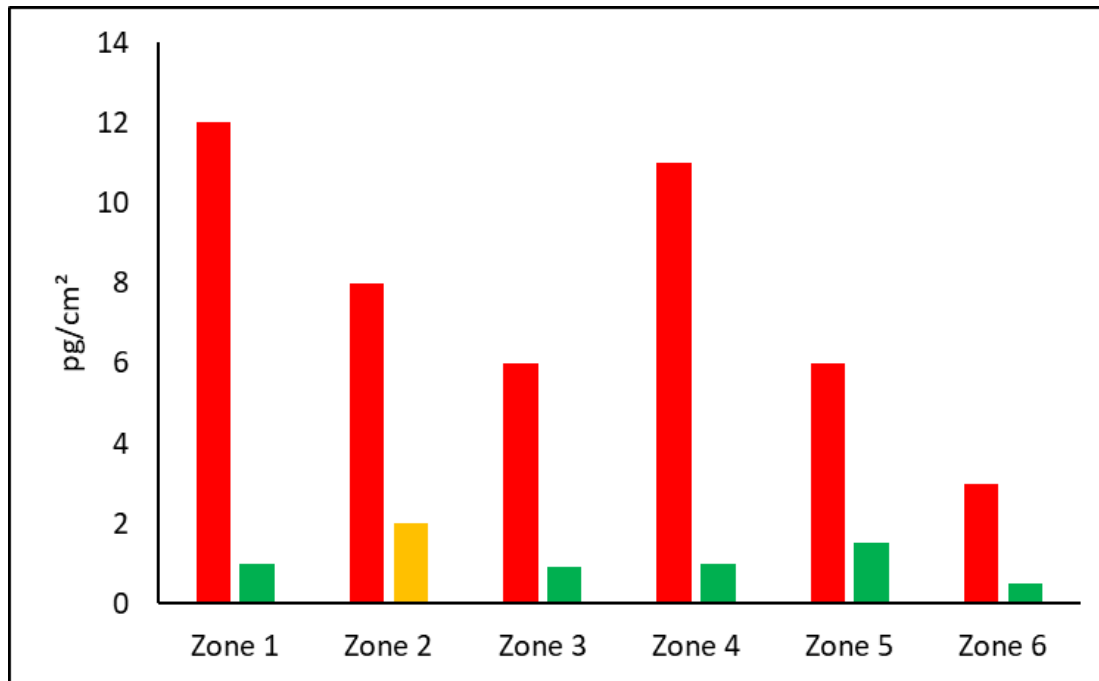
→ **Control** and assess the fouling state of the pipe network.

→ **Start and validate** cleaning and disinfection procedures.



Example of application

Assess treatment processes efficiency in real-time



→ **Validate** the different processing phases:

- Cleaning (biodispersant),
- Disinfection (biocide).

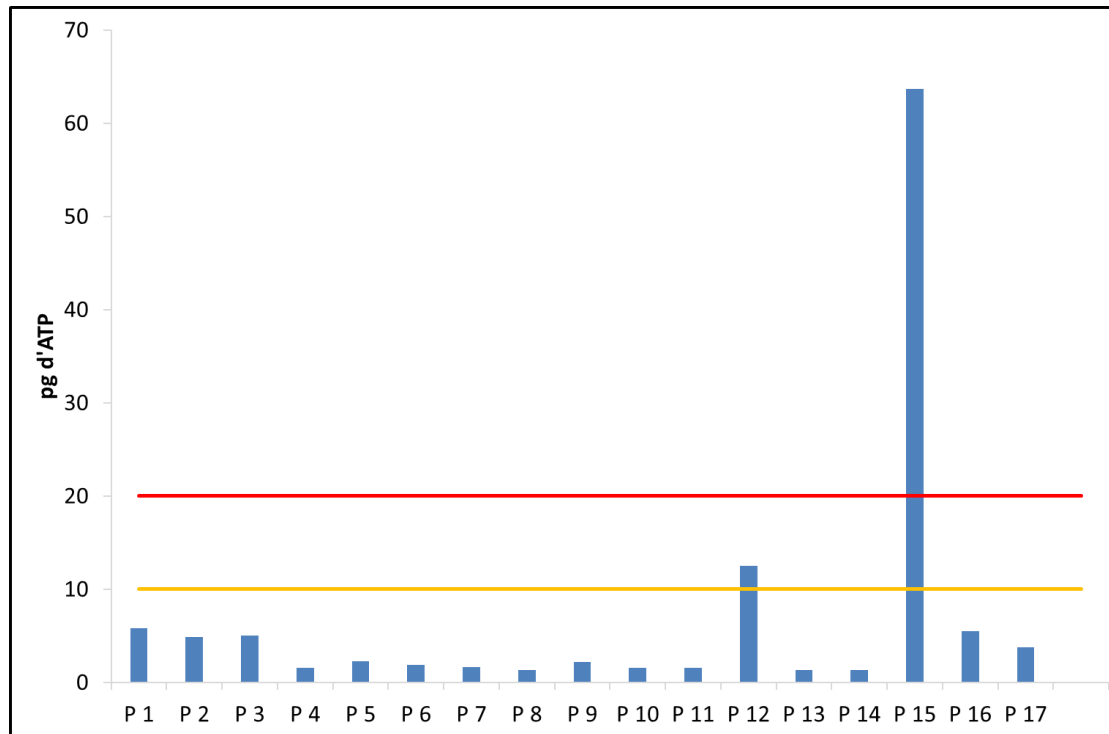
→ **Adapt and validate** treatment strategy.





Example of application

Identification of suitable areas for microbiological growth



→ **Determine** critical areas with important biomass growth.

→ **Adapt** cleaning and disinfection strategy.

→ **Highlight** malfunctions in the installation.





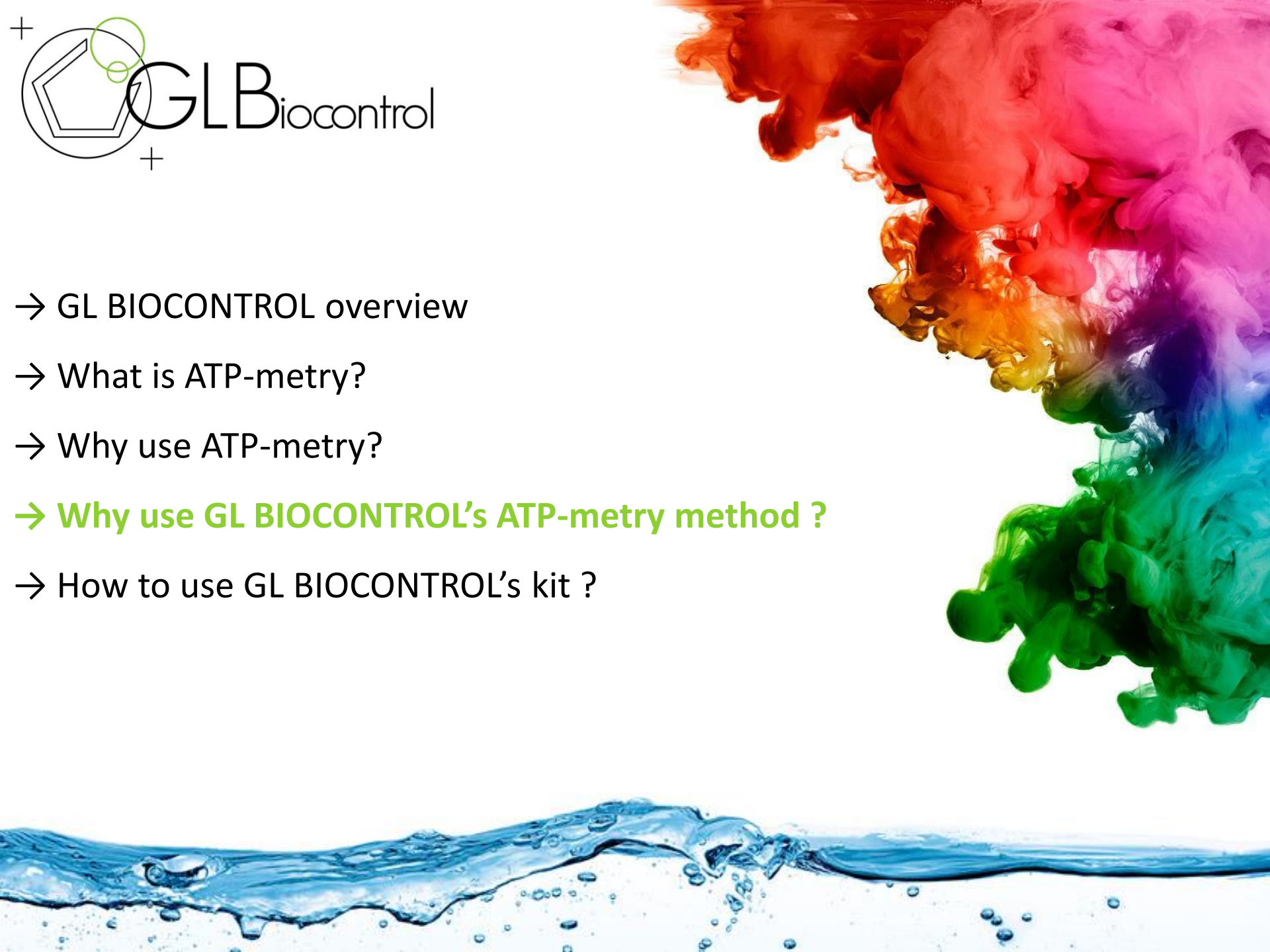
→ GL BIOCONTROL overview

→ What is ATP-metry?

→ Why use ATP-metry?

→ **Why use GL BIOCONTROL's ATP-metry method ?**

→ How to use GL BIOCONTROL's kit ?





Why use GL BIOCONTROL's ATP-metry method ?

When choosing GL BIONCONTROL, you choose :

The most sensitive	Detection of up to 100 living bacteria per liter of sample, cultivable or non-cultivable.
The most relevant	Representative sample (20 cm ²). Reaction performed without dilution.
The most reliable	Calibration of the enzyme activity and consideration of the analyzed matrix effect on the reaction.
The quickest	Get the result in 2 minutes.
The easiest	4-steps protocol. Easy-to-use kit with dropper bottles.
The most flexible	Compatible with most luminometers. Re-freezable reagents.
Technical support	All along the processing.





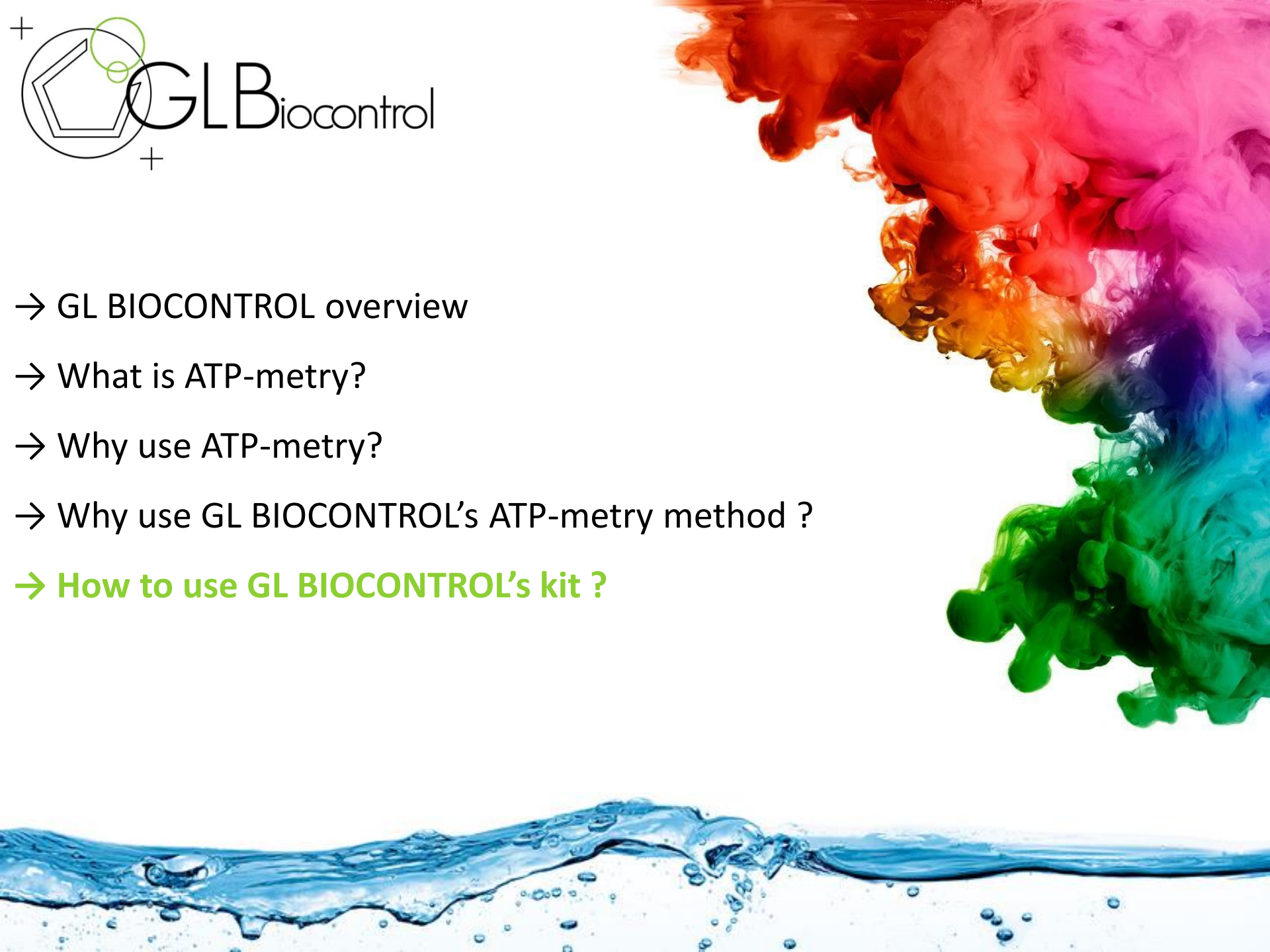
→ GL BIOCONTROL overview

→ What is ATP-metry?

→ Why use ATP-metry?

→ Why use GL BIOCONTROL's ATP-metry method ?

→ **How to use GL BIOCONTROL's kit ?**



Required equipment: the luminometer*.



Luminometer KIKKOMAN PD-30

- **Features:** photodiode detector.
- **Limit of quantification:** 0.25 pgATP/cm² or 250 eq.bact./ cm².
- **Areas of use:** industrial water, sanitary water and surfaces.



Luminometer KIKKOMAN C110

- **Features:** photomultiplier detector.
- **Limit of quantification:** 0.0001 pgATP/ cm² or 0.1 eq.bact./ cm².
- **Areas of use:** ultra-pure water, sanitary or industrial water, surfaces and air.

Required equipment: the reagents (100 measurements per kit).



Stability:

- *1 year in a freezer*
- *8 weeks in a refrigerator*

DENDRIDIAG[®] (enzymatic reagent), **EXTRACTANT** (lysis solution) and **STANDARD** (calibration reagent)





How to use GL BIOCONTROL's kit ?

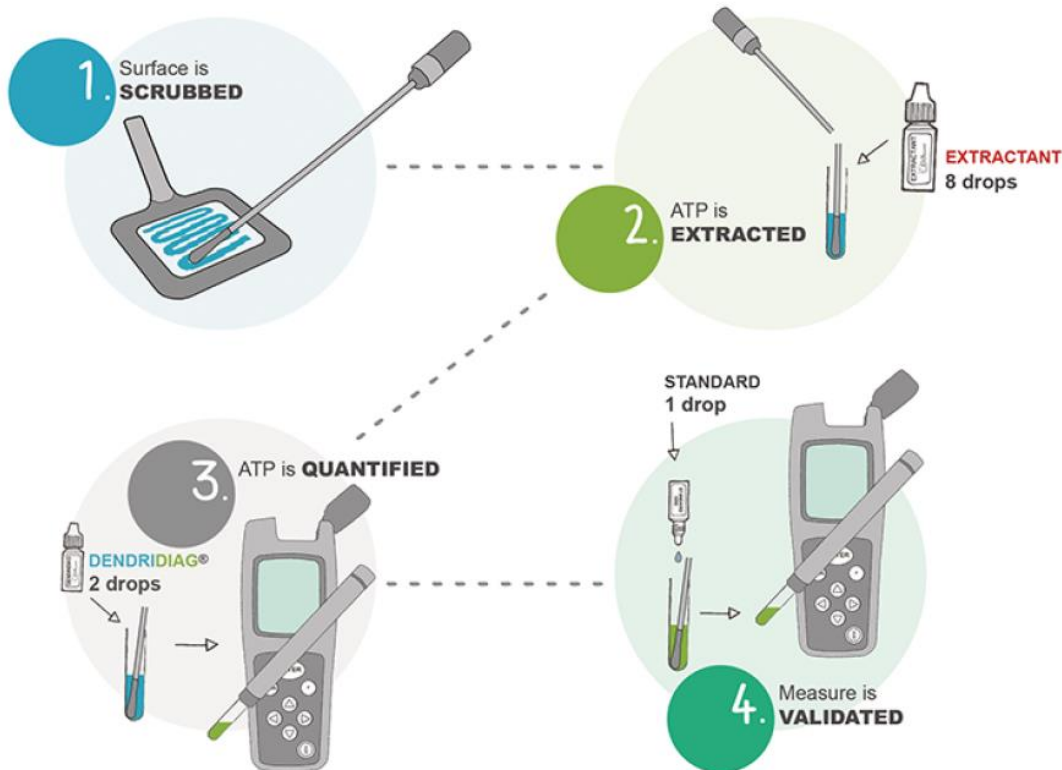
Required equipment: the consumables (100 measurements per kit).



Swab, test tube and sampling template (20 cm²)



Protocol key points



1 The surface to be analysed is sampled using a sterile swab and a sampling template of 20 cm².

2 Using eight drops of the **EXTRACTANT** reagent, ATP is extracted from the microorganisms retained on the swab.

3 Two drops of **DENDRIDIAG®** reagent are added and the bioluminescence reaction begins. Photon emission due to the chemical reaction is measured with the luminometer.

4 A known quantity of ATP is added to the sample to calibrate each measurement taking enzymatic activity of the reagent and environmental factors into account. The result is expressed in picogram ATP or in equivalent bacteria per cm².



Results

9. Calculations:

$$\text{Standard (in RLU/pg)} = \frac{R2 - R1}{1000}$$

$$[\text{ATP}] \text{ (in pg/cm}^2\text{)} = \frac{R1}{\text{Standard} \times S}$$

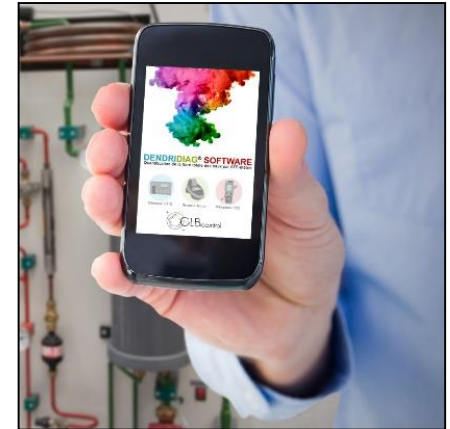
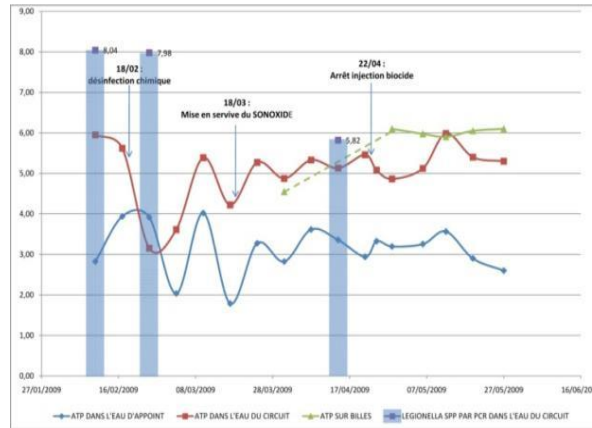
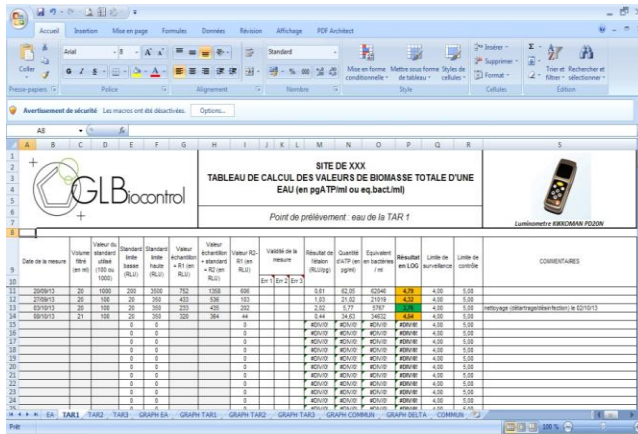
With:

R1 (in RLU): result of the sample,
 R2 (in RLU): result after standardization,
 S (in cm²): surface sampled (20cm²),
 [ATP]: concentration in pgATP/cm².

Result obtained in: pgATP/cm², eq.bact./cm² and LOG.

4 data to fill in: date or sampling point, analyzed surface, results 1 & 2.

Calculation software (Excel or smartphone app): alert in case of measurement error, colored result according to the value obtained, self-generated graphics.





Results interpretation:

Surface sampled (in cm ²)	R1 value (in RLU)	R2 value (in RLU)	Measurement result		
			ATP quantity (in pgATP/cm ²)	Total flora	
				(in eq.bact./cm ²)	(in LOG)
20	2	800	0,13	125	2,10
20	10	800	0,63	633	2,80
20	20	800	1,28	1282	3,11

Warning threshold: 0.5 pg/ml
Alarm threshold: 1.0 pg/ml

Total flora (LOG) < Warning threshold

→ No corrective action

Warning threshold < Total flora (LOG) < Alarm threshold

→ No immediate biohazard, but monitoring reinforced

→ Corrective action recommended if 3 consecutive results are in this area

Total flora (LOG) > Alarm threshold

→ Significant risk of microbiological growth

→ Immediate corrective action recommended



4 easy ways to order:

- by email at contact@gl-biocontrol.com,
- by fax at + 33 (0)9 55 25 40 31,
- by phone at + 33 (0)9 67 39 35 20,
- by mail at GL BIOCONTROL - 9, avenue de l'Europe,
Cap Alpha - 34 830 CLAPIERS (FRANCE).

GL BIOCONTROL

9, avenue de l'Europe – Cap Alpha – 34 830 CLAPIERS – FRANCE

Phone: +33 (0)9 67 39 35 20 - Fax: +33 (0)9 55 25 40 31

Email: contact@gl-biocontrol.com - Web: www.gl-biocontrol.com