



DENDRIDIAG®
**MONITOR THE MICROBIOLOGICAL QUALITY
OF YOUR ULTRA-PURE WATER
IN UNDER 2 MINUTES**

GL BIOCONTROL

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→ GL BIOCONTROL overview

- What is ATP-metry?
- Why use ATP-metry?
- Why use GL BIOCONTROL's ATP-metry?
- How to use GL BIOCONTROL's kit?
- ATP-metry, technique soon used in space!





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...

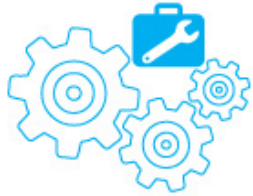


Air

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



Key points



2 PhD in biochemistry and water microbiology.

3 development engineers.

1 sales engineer.

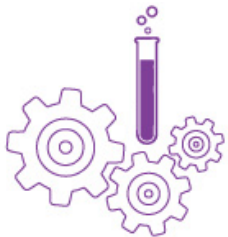
1 administrative assistant.



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.





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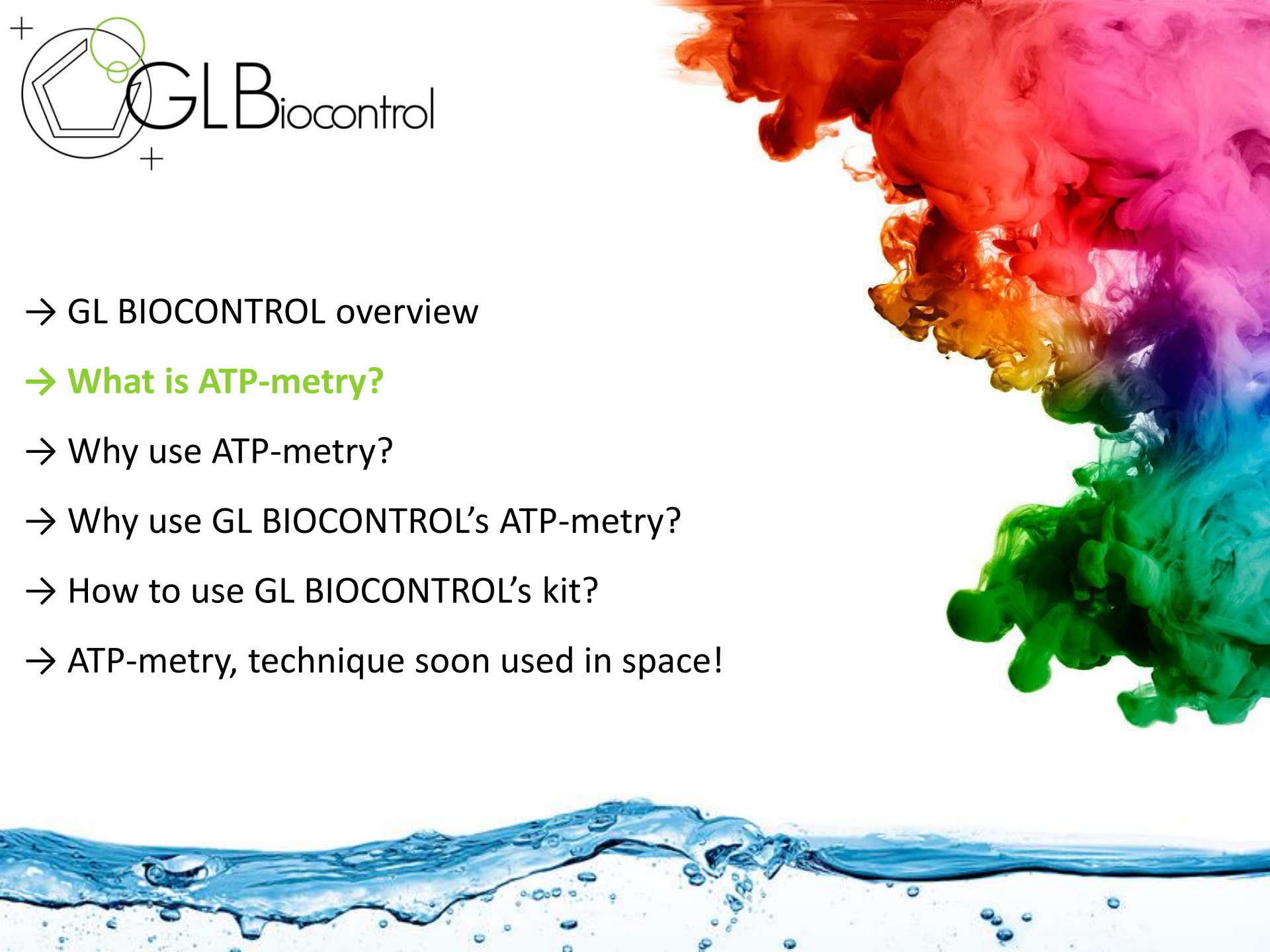
→ **What is ATP-metry?**

→ Why use ATP-metry?

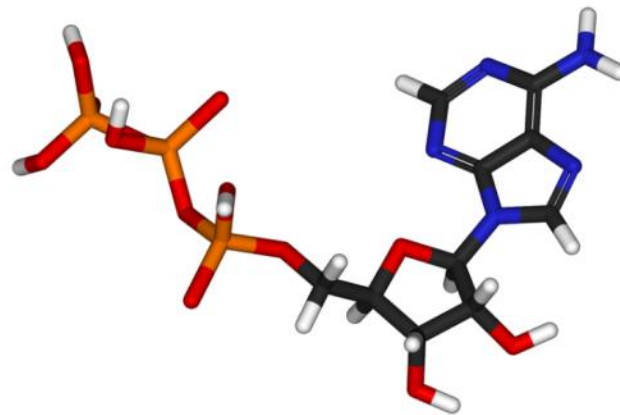
→ Why use GL BIOCONTROL's ATP-metry?

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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.



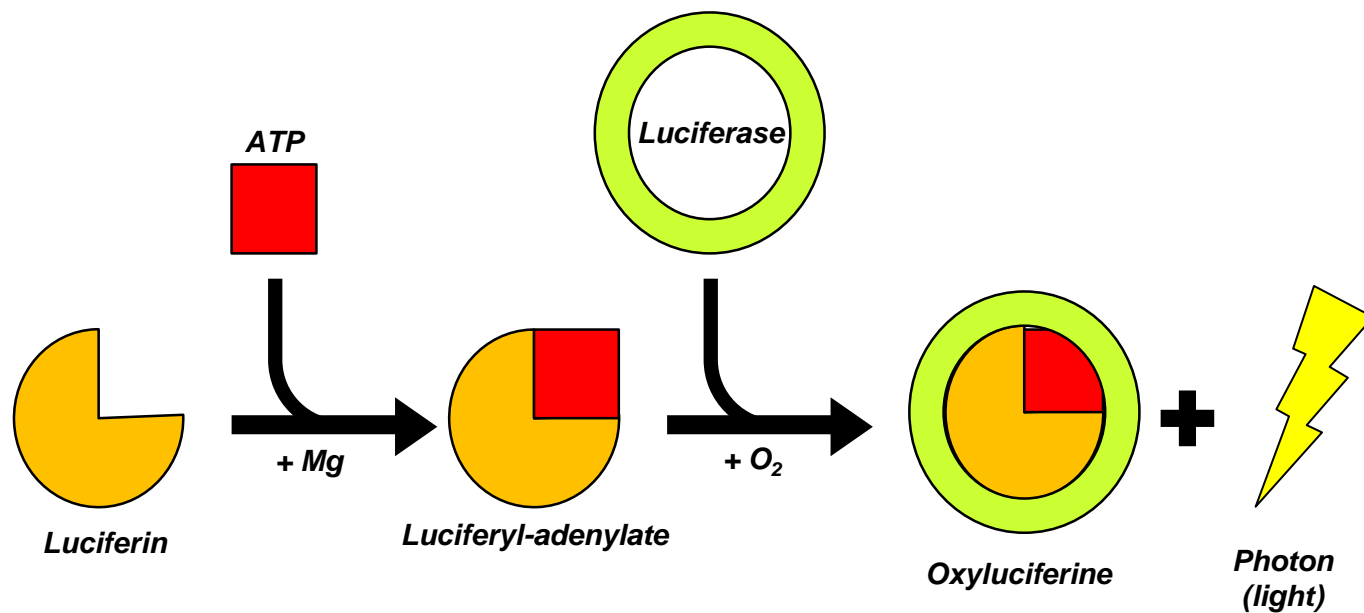


ATP-metry is a molecular biology technique, based on bioluminescence. It measures the **quantity of ATP in a water, surface or air sample.**

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

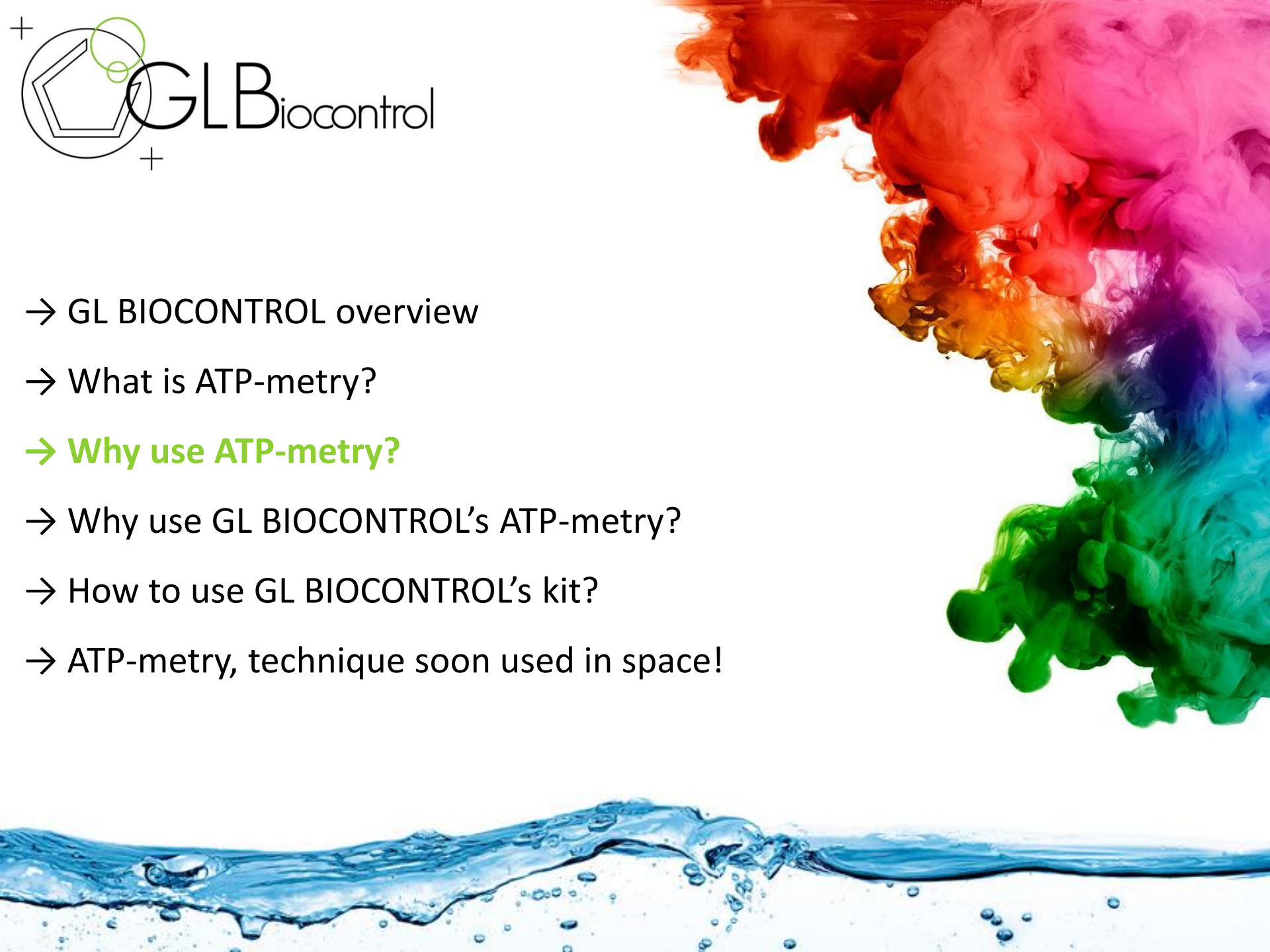
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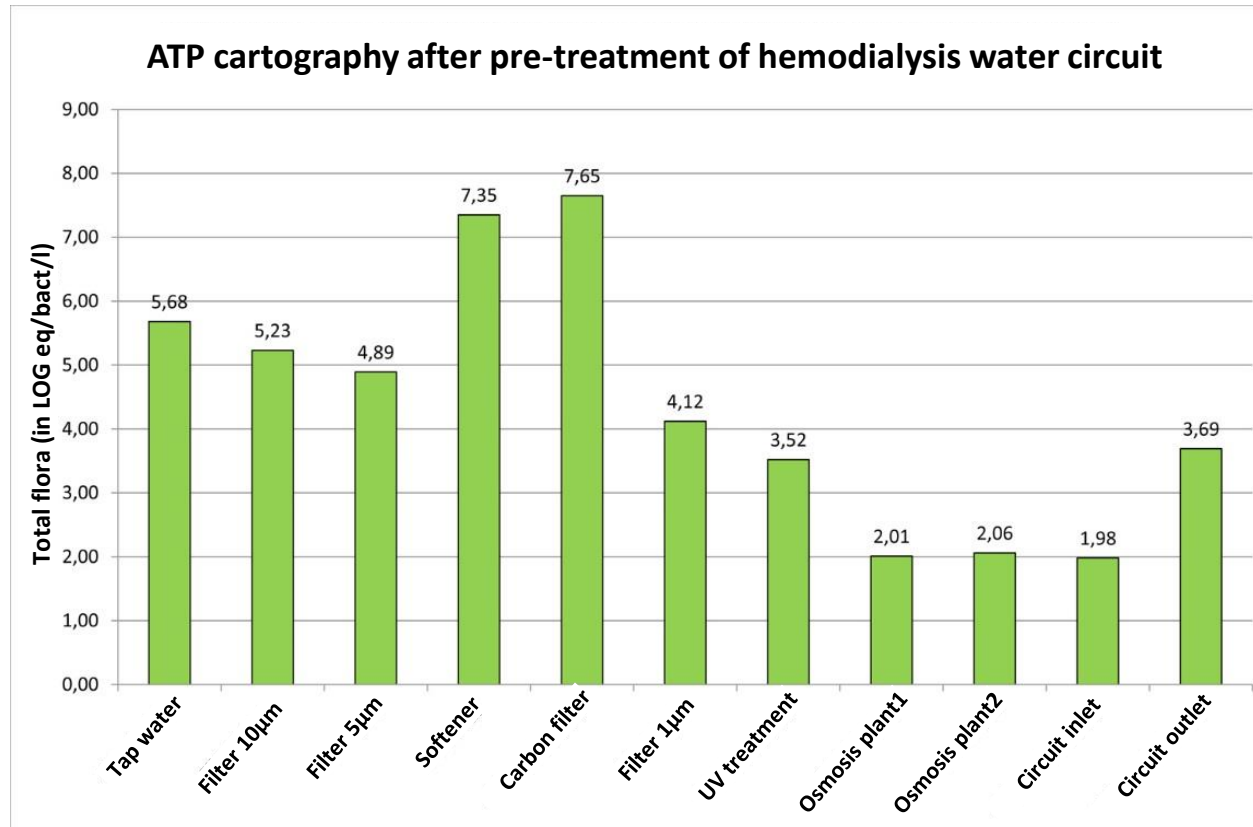


Generality

- 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.



Identification of suitable areas for microbiological growth



→ **Characterize** critical points of a circuit in real-time.

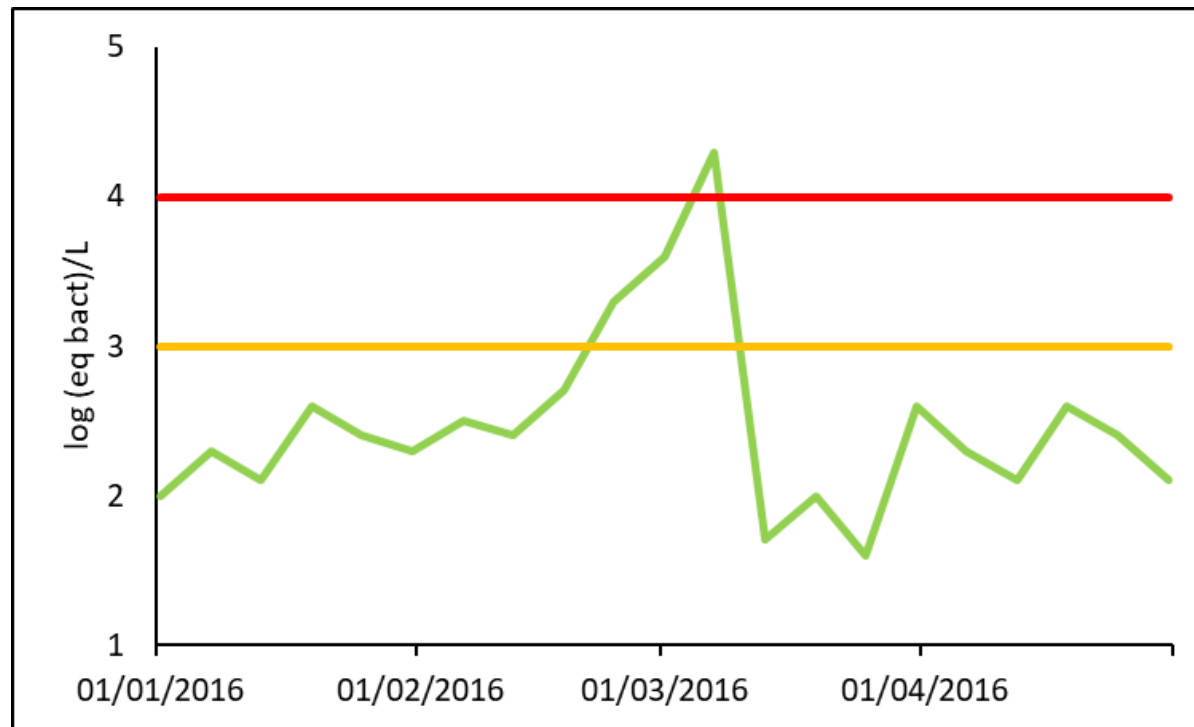
→ **Detect** the network component producing biomass.

→ **Highlight** malfunctions in the network.

→ **Adapt** treatment strategy in real time.



Manage biofouling of your osmosis membrane



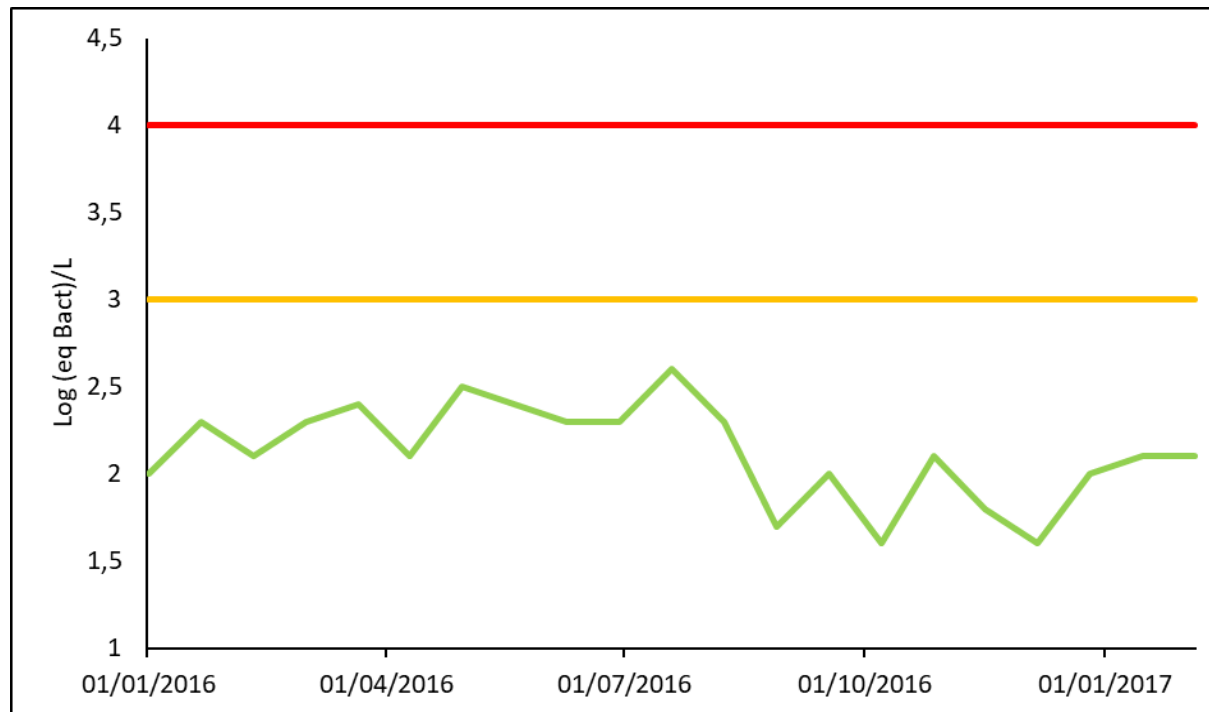
→ **Anticipate** biofouling.

→ **Improve** health risk management (e.g. for dialysis).

→ **Avoid** production shutdown.



Monitor your network in real-time



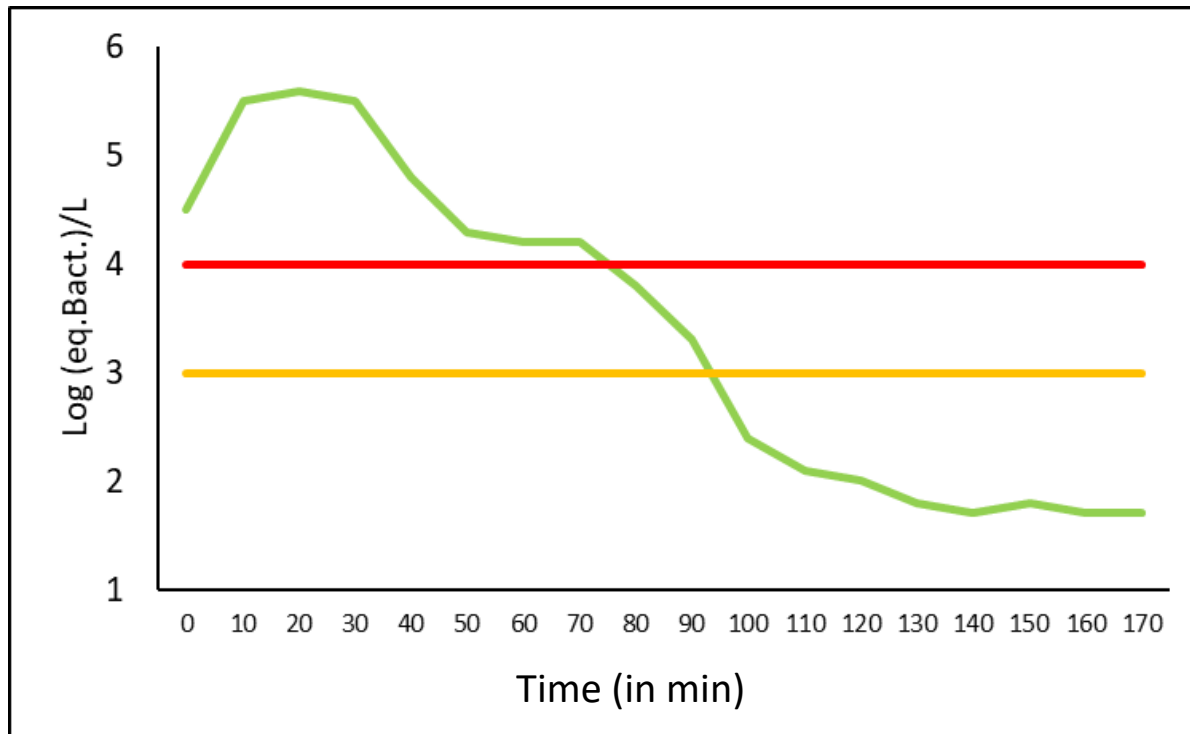
→ **Adapt** your treatment strategy.

→ **Reduce** production defects and non-quality costs.

→ **Reduce** costs due to production shutdown.



Assess preventive treatment process efficiency in real-time



→ **Validate** efficiency of:

- Cleaning (bio-dispersant),
- Draining or rinsing,
- Disinfection (biocide).

→ **Avoid** downtime and optimize manpower.





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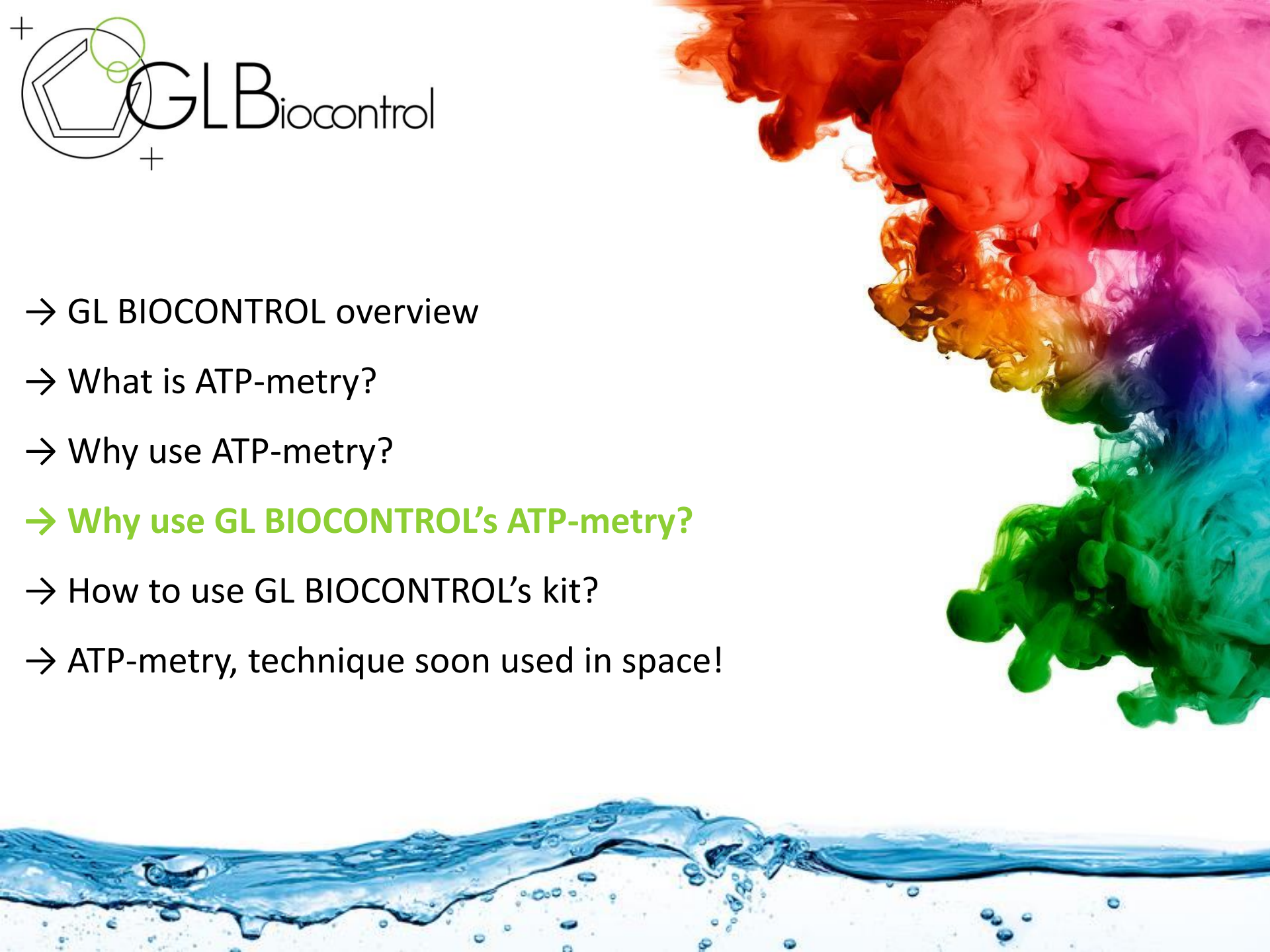
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Why use GL BIOCONTROL's ATP-metry method ?

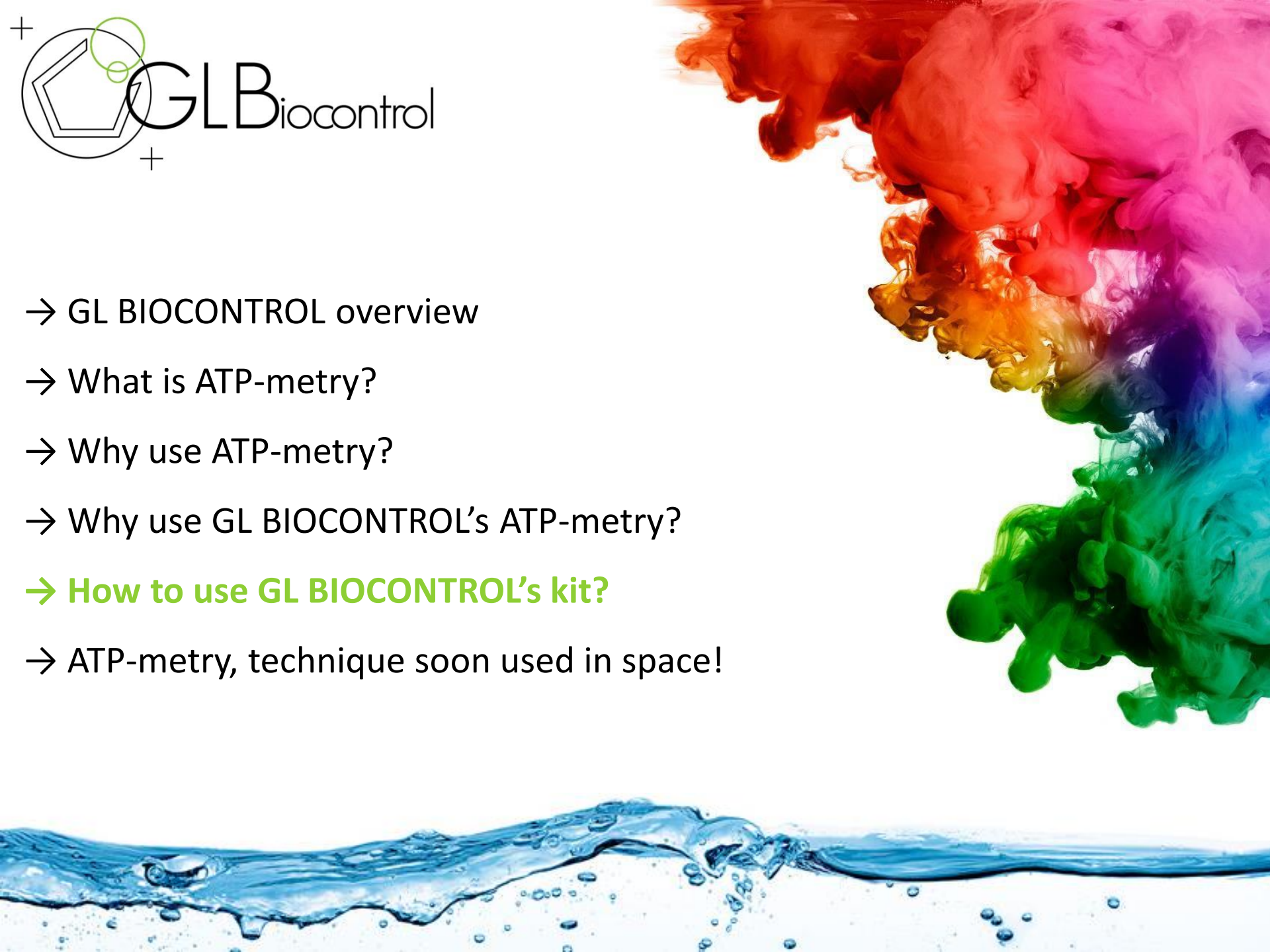
When choosing GL BIONCONTROL, you choose :

The most sensitive	Detection of up to 100 living bacteria per liter of sample, cultivable or non-cultivable.
The most relevant	Representative volume of sample (1 liter). 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.





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How to use GL BIOCONTROL's kit ?

Required equipment: the luminometer*.



Luminometer KIKKOMAN C110

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

**Our kits are compatible with most luminometers on the market.*





How to use GL BIOCONTROL's kit ?

Required equipment: the reagents (60 measurements per kit).



DENDRIDIAG® (enzymatic reagent) and **STANDARD** (calibration reagent)

Stability: 1 year in a freezer and 8 weeks in a refrigerator





How to use GL BIOCONTROL's kit ?

Required equipment: the consumables (60 measurements per kit).

Luer-lock extension tube (sterile)



Syringe of 10 ml (sterile)



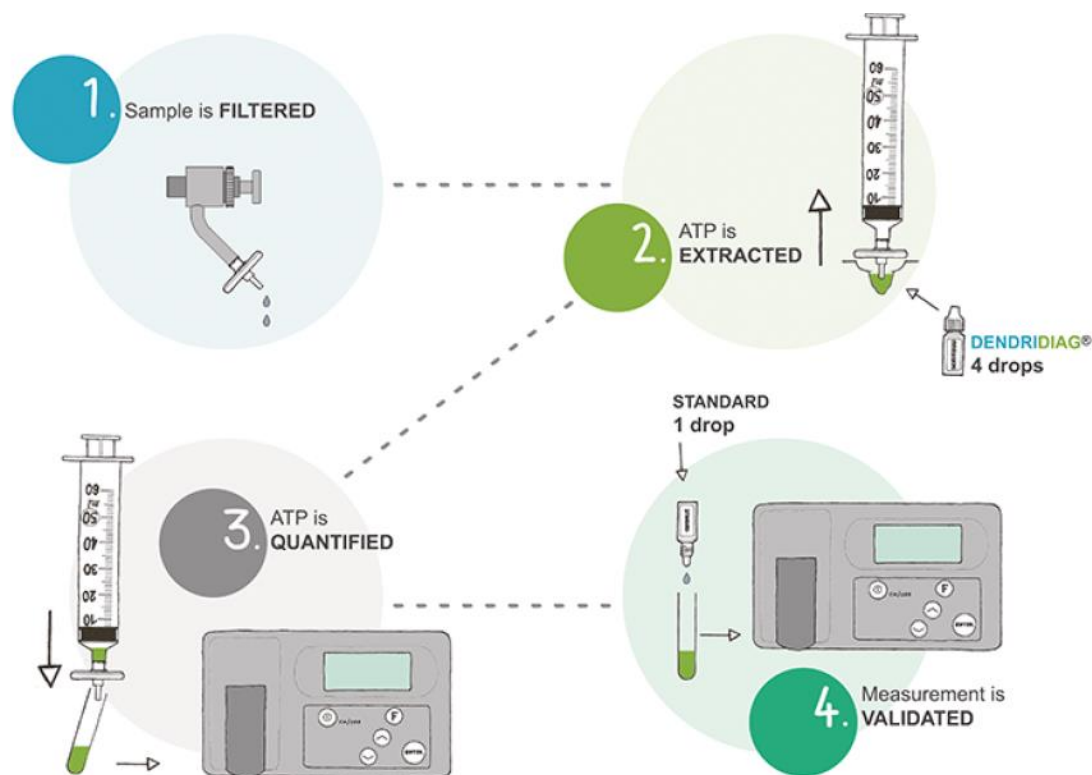
Filter with porosity of $0.45\mu\text{m}$ (sterile)



Test tube (sterile)



Protocol key points



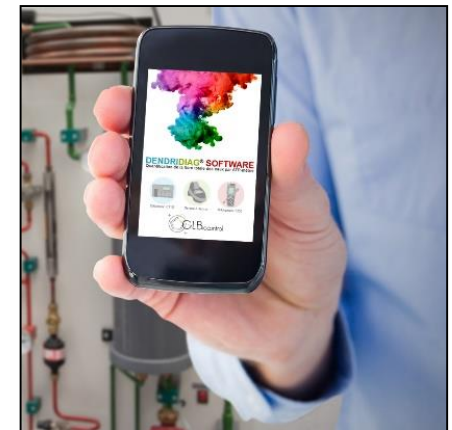
1 Microorganisms contained in the water sample are concentrated on a sterile filter porosity 0.45 μm .

2 ATP is extracted from the living microorganisms retained on the filter using 4 drops of the **DENDRIDIAG®** reagent. The bioluminescence reaction begins.

3 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 litre.







How to use GL BIOCONTROL's kit ?

Results interpretation:

Volume filtered (in ml)	Blank value (in RLU)	R1 value (in RLU)	R2 value (in RLU)	Measurement result		
				ATP quantity (in pgATP/l)	Total flora	
					(in eq.bact./l)	(in LOG)
1000	5	50	325000	0,14	138	2,14
1000	5	756	318000	2,37	2367	3,37
1000	5	3560	335000	10,73	10726	4,03

Warning threshold: 3.00 LOG
Alarm threshold: 4.00 LOG

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



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BIOWYSE project goals (<http://biowyse.eu/>):

- ✓ Design and construction of an **instrument** for real-time monitoring of the **microbial quality** of the drinking water supply system of the **International Space Station (ISS)**.
- ✓ Design and construction of a **surface sampler** for monitoring of the microbial quality of surfaces.

Both instrument are based on GL BIOCONTROL's ATP-metry method.



4 easy ways to order:

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- 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).

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