DENDRIDIAG®

QUANTIFY THE TOTAL FLORA OF THE AIR BY ATP-METRY

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→ **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, pharmaceutic, 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…

GL Biocontrol

Some of our references

Altis · life.augmented · cnrs · Total · Areva · Louis Dreyfus Armateurs · Dalinat

EDF · LCL Le Crédit Lyonnais · Crédit Agricole Immobilier · cea From research to industry · Climespace GDF Suez · Engie · INRA Science & Impact

BWT Best Water Technology · Nalco · Kurita · Suez Environnement Lyonnaise des Eaux · Brioche Pasquier · Bigard

Nestlé · Aquaprox L'eau a une vie · Danone · Groupe Pomona · Aloès Traitement des eaux

Key points

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

More than **150** microbiogical 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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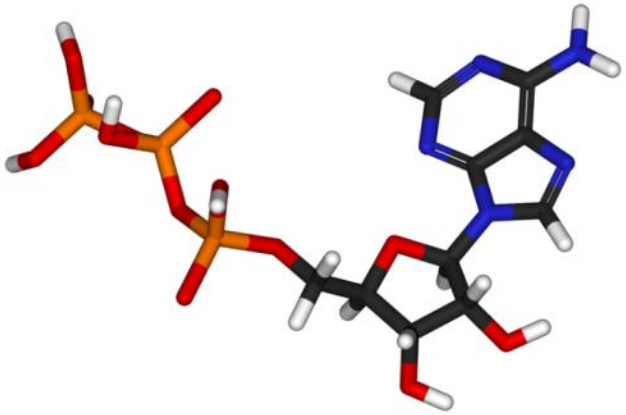
Adenosin triphosphate (ATP) is a molecule that provides energy to drive many processes in living cells. Found in all forms of life, ATP is often referred to as the "molecular unit of currency" of intracellular energy transfer.

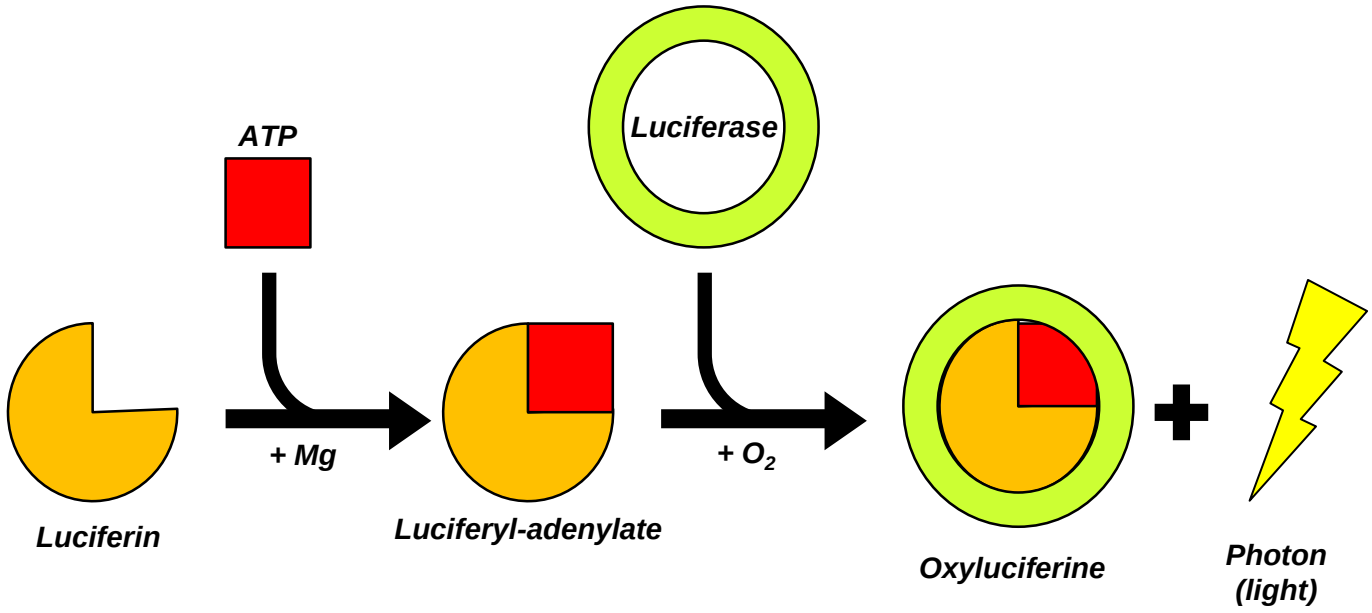


Thus, as ATP is specific to **living environments,** its presence proves the existence of living organisms.

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



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Generality

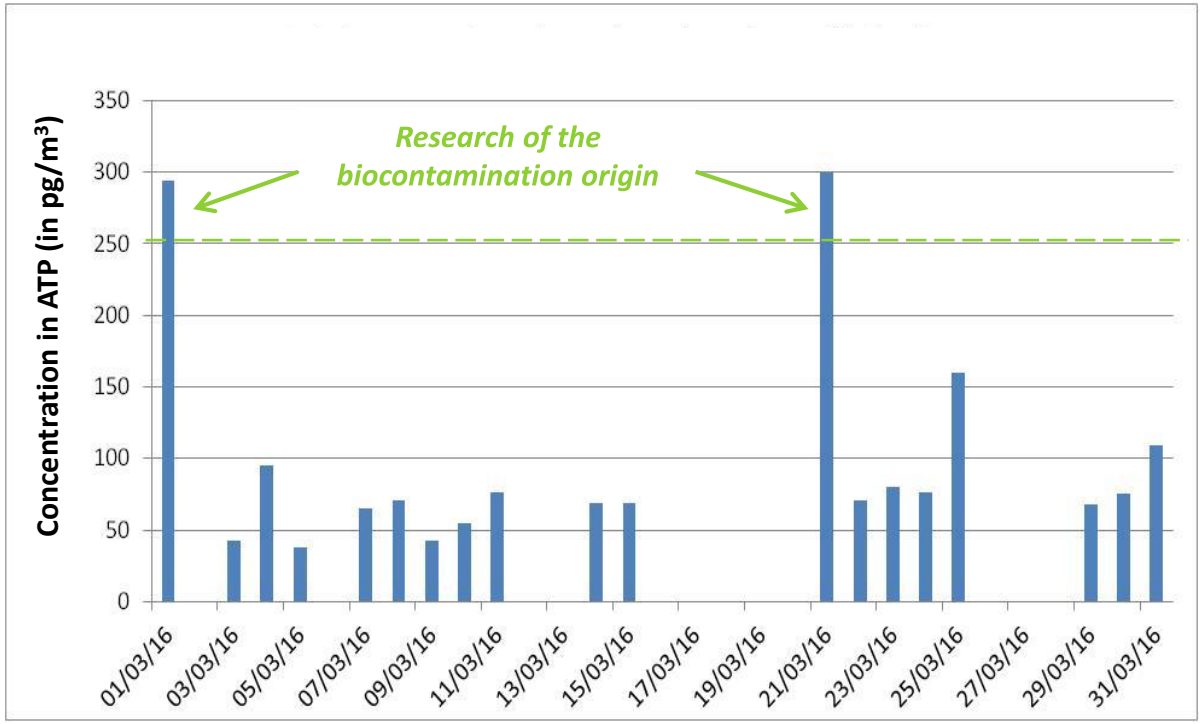
① ATP-metry is one of **the most sensitive and rapid technique** known to measure total flora.

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.

Example of continuous biomonitoring in hotel rooms



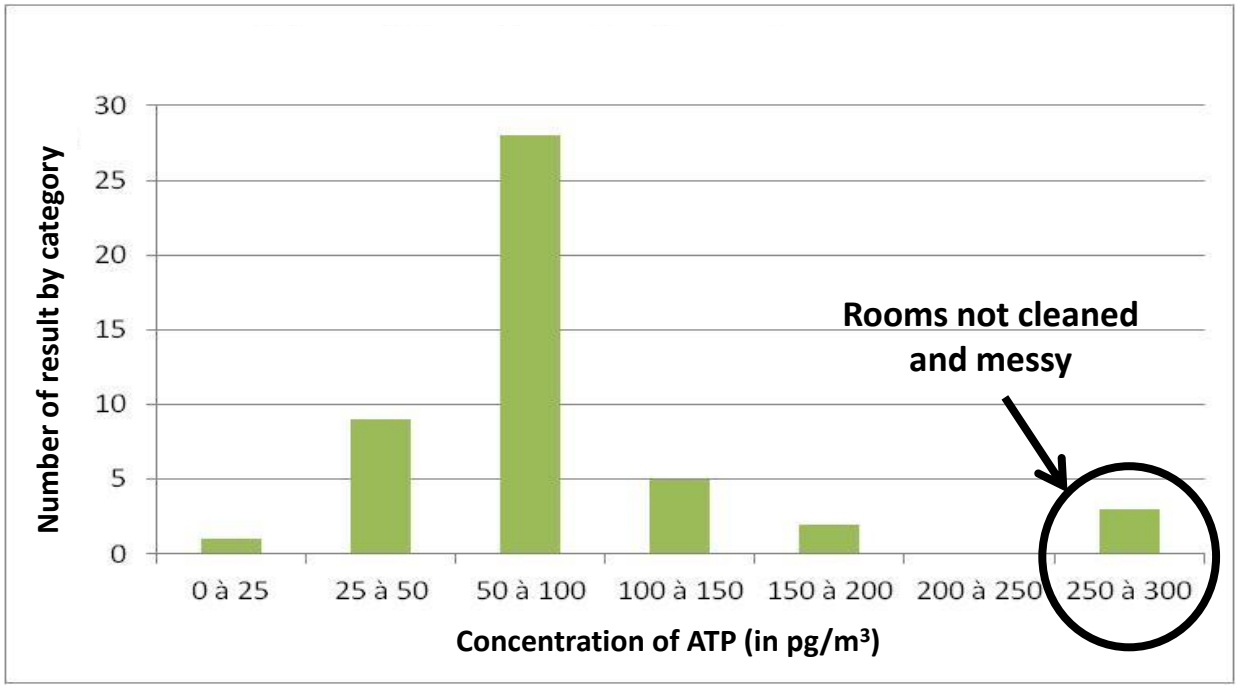
→ **Monitor** in real time the microbiological quality of the air.

→ **Manage** public health risks.

→ **Validate** a cleaning process.

→ **Adapt** and **optimize** treatment strategy.

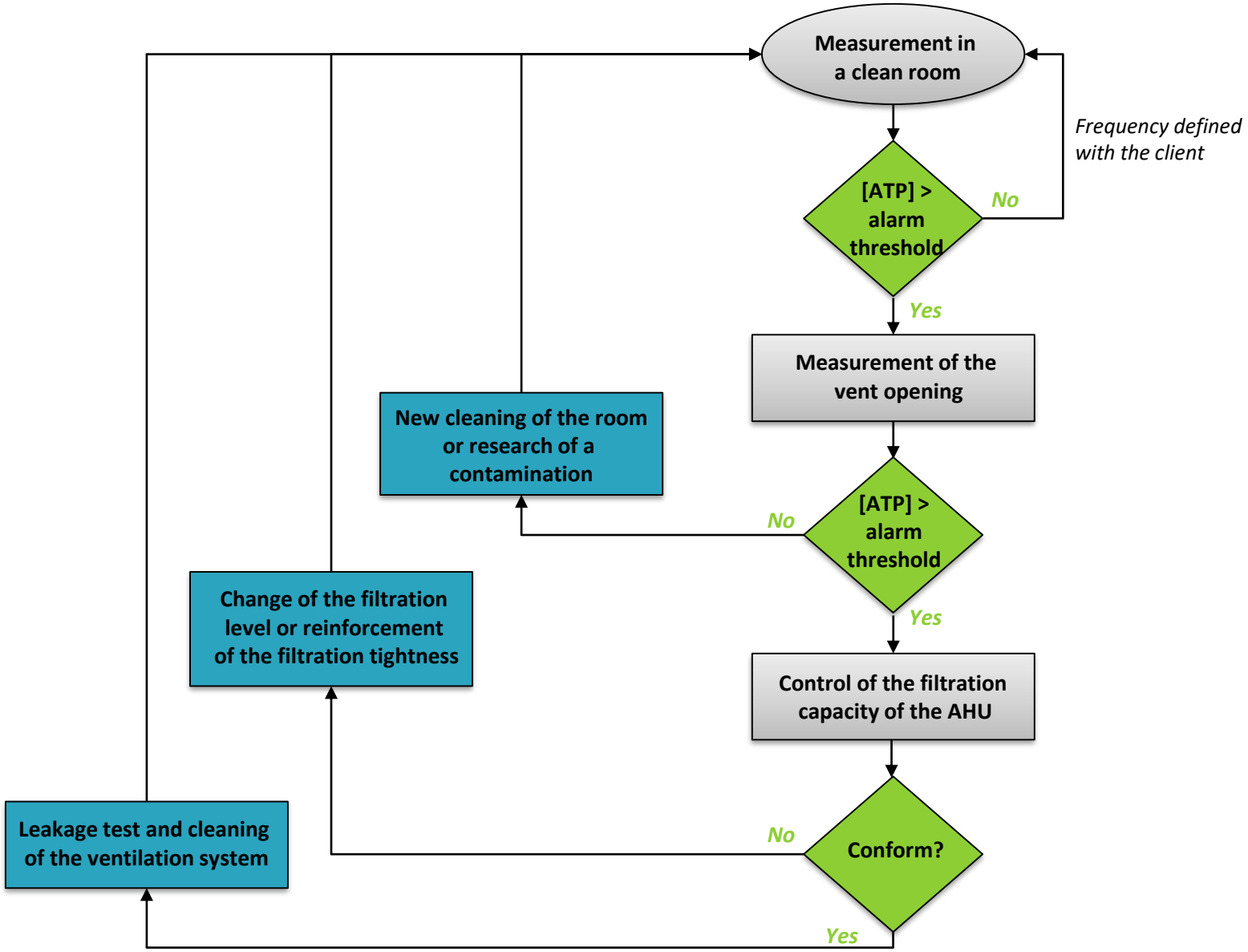
Example of distribution of contamination levels after a cartography



→ **Characterize** critical areas of a building in real time.

→ **Determine** an alarm threshold on a case-by-case basis.

Exemple of a flowchart



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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 sample (minimum 70 liters). 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 easyest	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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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.*

Required equipment: the reagents (30 measurements per kit).

Stability:

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

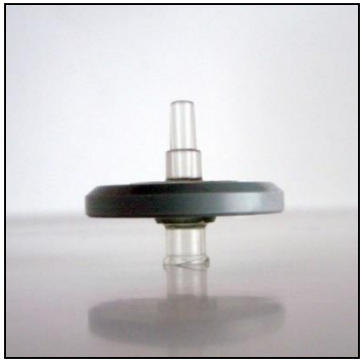
DENDRIDIAG® (enzymatic reagent), **EXTRACTANT** (lysis solution) and **STANDARD** (calibration reagent)

Required equipment: the consumables (30 measurements per kit).

Extension tube luer-lock (sterile)

10 ml syringe (sterile)

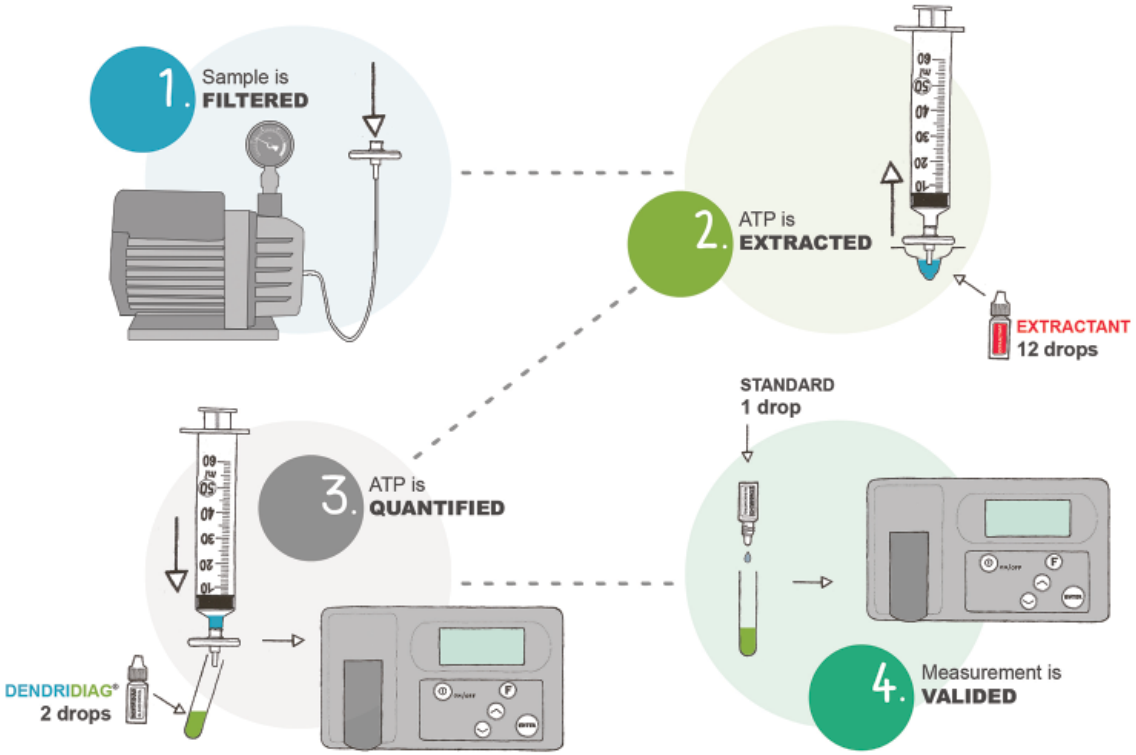
Filter porosity 0.45µm (sterile)



Test tube (sterile)

How to use GL BIOCONTROL's kit?

Protocol key points



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

2 ATP is extracted from the living microorganisms retained on the filter using 12 drops of the **EXTRACTANT** buffer.

3 The extract is transfered to a test tube containing the DENDRIDIAG® reagent. 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 equivalent bacteria per m3.

Results

9. Calculations:

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

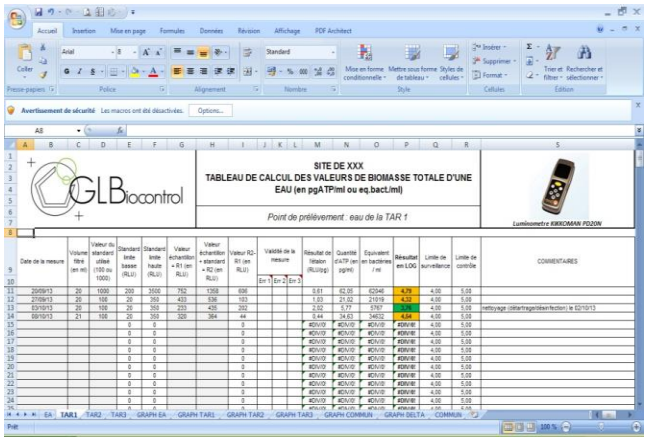
$$[\text{ ATP }]_{\text{(in pg/m}^3\text{)}} = \frac{R1 \times 1000}{\text{Standard} \times V}$$

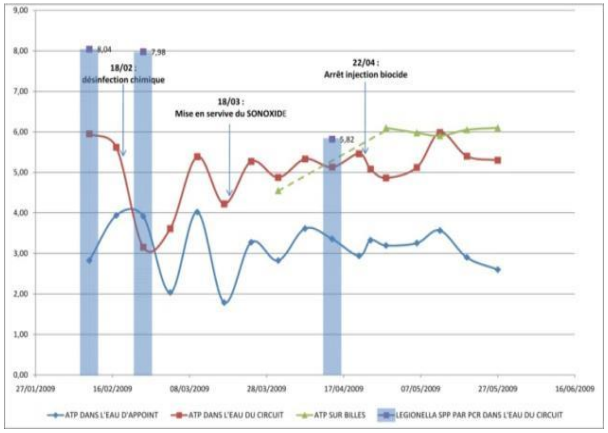
With:
R1 (in RLU): result of the sample
R2 (in RLU): result after standardization
V (in liter): volume of air filtered

Result obtained in: pgATP/m^3, eq.bact./m^3 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:

Volume filtered	R1 value	R2 value	Measurement result		
			ATP quantity	Total flora	
(in m3)	(in RLU)	(in RLU)	(in pgATP/m3)	(in eq.bact./m3)	(in LOG)
0,07	258	342550	10,77	10768	4,03
0,07	3690	354800	150,14	150136	5,18
0,07	50650	369056	2272,48	2272481	6,36

Warning threshold: 100 pg/m^3
Alarm threshold: 200 pg/m^3

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).

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