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Biophotonic evaluation of water treated by biodynamization: Comparison of ultra-low emission levels in the 300–400 nm, 400–500 nm and 500–600 nm bands on different types of water

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Abstract

This study examines the spontaneous ultraweak photon (UWP) emission observed in water treated by the Biodynamizer dynamization system (SA Dynamized Technologies) in the 300–400 nm, 400–500 nm, and 500–600 nm spectra . This study follows up on biophotonic results observed in the 435–500 nm band and more broadly in the 380–630 nm spectrum, which were obtained and published in a scientific journal in November 2025.

The objective of this new study was to evaluate more precisely new biophotonic emission spectra, to study the links between wavelength and human physiology and to look at the correlations between our study and the results of analyses and expert assessments carried out according to the electrophotonic analysis method (EPA: Electrophotonic Analysis) whose reproducibility of the method has allowed to be validated from a scientific point of view after peer review on the occasion of the publication by the journal Substantia of the article " ElectroPhotonic Analysis (EPA) of tap water droplets versus hydroalcoholic solutions " .

The measurements were performed using a Berthold Lumat LB 9508 luminometer , equipped with borosilicate glass tubes and bandpass optical filters (300–400 nm, 400–500 nm, and 500–600 nm) .

All experiments were conducted under controlled conditions at the Enerlab laboratory (Nice, France) on December 1 and 2 , 2025. Photon emission intensities are expressed in relative light units (RLU) .

The new biophotonic measurements carried out on December 1st and 2nd, 2025 confirm and reinforce the initial observations from November concerning biodynamic water.

These measurements were made in the 380–630 nm and 435–500 nm spectral bands. The new measurements analyzed the ultra-weak biophotonic emissions detected in the 380–630 nm spectral bands, and more specifically in the 300–400 nm, 400–500 nm and 500–600 nm bands.

These measurements show high initial values (up to 346 RLU in broad spectrum), followed by a coherent decay (down to 298 RLU), demonstrating a measurable and structured persistence of the biophotonic signal.

Recomposing the RLUs from the different measurements made with filters, together covering the initial measurement of the spectral band 380-630 nm, allowed us to recover 98% of the RLUs from the initial measurement.

This is a further illustration of the consistency of the measurements obtained in the different specific spectral bands that were analyzed.

These results suggest that biodynamically treated water maintains a coherent internal dynamic, consistent with mesoscopic organization models of the hydrogen-energy network. No photonic emissions were detected in the control waters.

Keywords: Biophotons, biodynamized water, spectral range, luminometer, RLU, AEP, electrophotonic analysis, photons, Biodynamizer, dynamization

1. Introduction

Water:

Water constitutes the fundamental environment of biology, not only as the main component of living organisms, but also as a determining medium for energetic, electrochemical and informational interactions within biological systems.

Its quality directly influences major physiological processes such as cell hydration, membrane interface dynamics, redox potential regulation, ion transport, macromolecular structure stability and enzymatic reaction efficiency (Pollack, 2013; Chaplin, 2021).
Thus, water is not limited to a passive solvent role: it conditions all bioenergetic phenomena.

While conventional water quality assessment criteria focus primarily on the absence of chemical and microbiological contaminants, a growing body of research examines more functional parameters, grouped under the term "bioactive quality" or "biological quality" of water. These parameters include the molecular structure of water, its redox potential, its surface tension, its capacity to stabilize reactive redox states, and its ultra-weak photon emission (UPE). UPE, in conjunction with biophotons, is a sensitive indicator of energy status, oxidative stress, and the degree of organizational coherence of the aquatic and cellular environment (Popp, 1992; Van Wijk & Van Wijk, 2015).

From this perspective, water appears as an active biophysical matrix. Beyond its classical role as a reaction environment, it acts as an electrodynamic medium capable of supporting phenomena of collective coherence involving electromagnetic fields, molecular oscillations and quantum interactions (Del Giudice & Preparata, 1988; Pollack, 2013).

Del Giudice's work proposes that water can form coherent domains, mesoscopic regions in which molecular dipoles oscillate in phase with a quantized electromagnetic field. These domains would be capable of accumulating, storing, and re-emitting photonic energy in a partially coherent manner, thus providing a theoretical framework for the interaction between the physical properties of water and biological processes (Del Giudice et al., 2010).

Additional measurements obtained on December 1st and 2nd, 2025, allow for an expansion of the biophotonic analysis undertaken during the first series of measurements. The new data cover four distinct spectral bands: 380–630 nm, 300–400 nm, 400–500 nm, and 500–600 nm, providing a more detailed view of the internal photonic dynamics of the biodynamically treated water. The detected intensities, reaching 346 RLU in the broad spectrum, confirm the presence of spontaneous and structured photonic emission, not observed in standard waters (reverse osmosis, tap water, mineral water).

These observations fit into recent work exploring the links between photonic coherence, electrodynamic structuring of water and bioenergetic phenomena.

Reference:

- Gerald H. Pollack — The Fourth Phase of Water: Beyond *Solid, Liquid, and Vapor* (2013): https://www.archive.org/details/thefourthphaseofwaterbeyondsolidliquidandvapor -Internet Archive +1
- Emilio Del Giudice et al. — *Illuminating Water and Life: The Theory of Quantum Electrodynamics of* Water : https://www.mdpi.com/10994300/16/9/4874- MDPI +1
- Roeland Van Wijk and Eduard PA Van Wijk — *An Introduction to Human Biophoton Emission* (2005): https://pubmed.ncbi.nlm.nih.gov/15947465/ PubMed +1

Several experimental studies have shown that the physico-chemical and energy quality of water influence biological processes:
In biophotonics, it is recognized that the ultra-weak emission of photons reflects the internal coherence of an aqueous or biological system and can serve as an indicator of the quality or vitality of energy (Cordeiro et al., 2017; Benfatto et al., 2023):

Water quality assessment by -ultra-weak bioluminescence (Cordeiro AC et al., 2017) — PubMed ID: 29049939. Link https://pubmed.ncbi.nlm.nih.gov/29049939/ PubMed +1
Biophotons: New experimental data and analysis (Benfatto M. et al., 2023) — PubMed ID: 37895552. Link: https://pubmed.ncbi.nlm.nih.gov/37895552/ PubMed +1
It is from this perspective that this study evaluated the impact of the Biodynamizer dynamization system on the biophotonic capacity of water.

Biophotons:

The photon is the fundamental quantum of the electromagnetic field and constitutes the elementary mediator of electromagnetic interactions within matter. Its role extends from electronic transitions to biochemical processes dependent on excitation states and energy transfers.

The discovery that living organisms constantly emit extremely weak endogenous photon radiation—known as ultra-weak photon emission (UPE) or biophotons—has led to a re-evaluation of the electrodynamic dimension of biological systems. These emissions, observable in virtually all living cells, suggest that biological photons may contribute to mechanisms of intra- and intercellular communication, metabolic regulation, and biochemical synchronization.

To date, several hundred articles published in international peer-reviewed journals have documented the presence, spectral characteristics and physiological correlates of UPE, confirming the experimental robustness of the phenomenon.

The pioneering work of Fritz-Albert Popp in the 1970s placed this photonic emission within a theoretical framework based on electrodynamic coherence models, proposing that biological systems could function as open structures capable of maintaining low-intensity coherent states (Popp, 1979; Van Wijk, 2001). This perspective closely links bioelectrodynamics to cellular organization processes.

Mechanistically, UPE is primarily associated with biological oxidation reactions, including mitochondrial processes, electronic transitions of reactive oxygen species, and excited states resulting from lipid peroxidation or radical reactions (Kobayashi et al., 1999; Rastogi & Pospíšil, 2011). The intensity and spectral distribution of this emission therefore directly reflect cellular redox status, energy metabolism, and the dynamics of excited species involved in intracellular signaling.

References:

- Fritz -Albert Popp — *Biophoton Emission: Experimental Foundations and Theoretical Approaches.* Modern Physics Letters B. 2011 (vol. 25 (21 & 22)). DOI: 10.1142/S0217984914001266. ResearchGate
- Roeland van Wijk & Eduard PA van Wijk — *An introduction to human biophoton emission.* Forschende Médecine complémentaire 12(2), 77-83 -(2005). institutdeqigong.org
- Masaki Kobayashi, Masashi Usa, Humio Inaba — *Ultrasensitive detection and spectral analysis of ultraweak photon emission from living samples of human origin for the measurement of biomedical information.* Transactions of the Society of Instrument and Control Engineers (1994) 30(4): 385-391. -DOI: 10.9746/sicetr1965.30.385. J-STAGE
- Imaging study: *Imaging of ultraweak spontaneous photon emission from the human body exhibiting a diurnal rhythm.* (2009) – illustrates UPE in humans. PubMed

Role of the spectral bands 300-400nm, 400-500nm and 500-600nm

A. Spectral band 300–400 nm (UV-C, UV-B, short UV-A) – Role in humans

This range corresponds to a **highly energetic zone** , the effects of which depend on the exact sub-interval.

280–315 nm → UV-B

Main biological effects:

- Crucial wavelength for **vitamin D3 synthesis** (conversion of 7-dehydrocholesterol).
- **immunomodulatory** pathways (IL-10, T-regs).
- Induces **controlled production of ROS** → hormesis mechanism.
- Stimulates **melanogenesis** (production of protective melanin).

Biophotonic role:

- Transient increase in **oxidation biophotons** , indicators:
  - of **moderate stress** ,
  - of the **adaptive response** ,
  - **repair** processes .

315–400 nm → UV-A

Human effects:

- It penetrates deeper into the skin than UV-B.
- Induces moderate ROS production → **controlled stress** .
- Influences the **circadian rhythm** via the retina (melanopsin).
- **vasodilation** mechanisms via nitric oxide (NO).

Biophotonics:

- Emissions typically associated with **energy dissipation in chromophores** (flavins, porphyrins).
- Indicator of **mitochondrial function** and tissue repair.

B. Spectral band 400–500 nm (violet – blue – cyan) – Role in humans

400–420 nm (near-violet-blue) — characteristics and effects

Role / Mechanisms:

- High photochemical capacity: high energy → interactions with chromophores (flavins, porphyrins).
- High sensitivity of mitochondrial chromophores and endogenous photosensitizers.

Physiological/clinical effects:

- **cellular phototoxicity** in vitro (increased ROS, altered Δψm, apoptosis at high doses).
- **Dermatological applications** : antibacterial action via activation of bacterial porphyrins (e.g. Propionibacterium acnes) — useful in the treatment of acne (LED ~405–415 nm).
- **cortical stimulation** effects (alertness) but less than the 460–480 nm band.

Biophotonics:

- Increased emissions linked to **oxidative stress** and repair processes.

420–460 nm (blue) — area of effect on mitochondria and non-visual signal

Role / Mechanisms:

- Marked interaction with **flavoproteins** (FAD), influence on the mitochondrial respiratory chain.
- Influence on non-visual photoreceptors (cryptochromes) involved in cellular metabolism and the circadian clock.

Physiological/clinical effects:

- **Metabolic modulation** : at low doses can induce adaptive responses; at high doses → increased ROS, mitochondrial disruption.
- **Dermatological phototherapy** : documented anti-inflammatory and antimicrobial effects for certain skin indications.
- **Effect on mood and alertness** : progressive cortical stimulation with increased wakefulness.

Biophotonics:

- Marker of a highly reactive metabolism (photon emissions related to **redox turnover**).

460–500 nm (blue-cyan) — major role in the biological clock and wakefulness

Role / Mechanisms:

- **Peak activation of melanopsin-sensitive retinal ganglion cells (~460–480 nm)** → main pathway for non-visual regulation (melatonin suppression, phase shifting).
- Transmission to the suprachiasmatic nucleus (SCN) → circadian synchronization, hormonal modulation (melatonin, cortisol).

Physiological/clinical effects:

- **Melatonin suppression** and strong **increase in wakefulness** → used to treat circadian rhythm disorders, daytime sleepiness, jet lag, night work (controlled exposure).
- **Cognitive improvement and performance** (attention, reaction time) during daytime exposures.
- **Vigilance therapies** : targeted devices and lighting exploit this band to increase vigilance during the day.

- **Blue light hazard** : long-term retinal risk from chronic and high-intensity exposure (retinal aging, oxidative stress on the retinal pigment epithelium). Eye protection and adjustment of recommended exposure times.

Biophotonics:

- Pronounced influence on overall physiology via hormonal modulation; biophotonic emissions may reflect metabolic and **redox changes** induced by this stimulation.

Therapeutic and practical applications

- **Phototherapy for acne** : LEDs around 405–420 nm activating bacterial porphyrins.
- **Therapeutic exposure/circadian lighting** : blue or blue-rich white (460–480 nm) luminaires to improve alertness and synchronization, for daytime use only.
- **Eye care & prevention** : filters or glasses to reduce nighttime exposure to blue; recommendations to reduce the duration/intensity of exposure before sleep.

C. Spectral band 500–600 nm (green → yellow → yellow-orange) – Role in humans

This zone corresponds to an intermediate energy (2.0–2.5 eV) with finer physiological effects, often related to vision, neurovegetative regulation and coherence biophotonics.

500–530 nm → Green

Human effects:

- Peak sensitivity of **M cones** → major role in vision.
- **Calming** effect on the autonomic nervous system (ANS).
- Measured reduction in **stress** , anxiety and blood pressure.
- **nociceptive** system activity (mild analgesia in recent studies).

Biophotonics:

- Associated with states of **metabolic coherence** , not stressed.
- **stable, regular and harmonic** emission .

530–570 nm → Green-yellow

Human effects:

- It stimulates **gentle alertness** without strongly exciting like blue.
- May regulate **lymphatic dynamics** and certain immune functions.
- Role in the perception of **visual well-being** (comfort zone for the eye).

Biophotonics:

- Potential marker of **tissue balance** .
- Frequently associated with **coherent energy transfer** in cellular chromophores.

570–600 nm → Yellow → Orange

Human effects:

- Stimulates **serotonin** and promotes alertness.
- Positive influence on mood and mental energy.

- Used in **gentle photobiomodulation** (activation of flavoproteins, NADH/NAD⁺).
- Tissue penetration is better than green but worse than red.

Emerging therapeutic applications:

- Skin regulation (superficial repair).
- Neuropsychological effects (concentration, emotional positivity).

Biophotonics:

- Often indicates a state of **quasi-resonant coherence** , a system:
  - ordered,
  - effective internal communication,
  - with good energy dynamics.

Comparative summary

Band	Main physiological effects	Dominant mechanisms	Benefits	Risks
300–400 nm (UV)	Vitamin D, immunomodulation	DNA damage, ROS	Vitamin D, phototherapy	Cancer, photoaging
400–500 nm (Blue)	Circadian rhythms, alertness	Melanopsin, cryptochromes, mitochondria	Cognition, acne, phototherapy	Retinotoxicity, sleep disturbance
500–600 nm (Green/Yellow)	Analgesia, self-relaxation	Flavins, NO, metabolic modulation	Pain reduction, well-being	Very low, rare phototoxicity

Source: Prepared by the authors

Scientific studies related to these wavelengths

Studies — 300–400 nm (UV)

1) Key effects and mechanisms

- **Vitamin D synthesis (UV-B, ~280–315 nm)** : Numerous studies and reviews confirm that moderate exposure to the UV-B spectrum is necessary for the cutaneous conversion of 7-dehydrocholesterol to pre-vitamin D_3—a central and beneficial physiological effect. PMC +1
- **Genotoxicity and photodamage (UV-B & UV-A)** : UV-B causes thymine dimers and other DNA damage; UV-A penetrates deeper and contributes to mitochondrial oxidative stress and photoaging. These effects are well documented and constitute the main risk associated with UV radiation. PMC +1
- **Photoneuroimmunoendocrinology** : UV radiation may modulate immune and endocrine pathways (cytokines, NO, circadian rhythms) — an emerging concept summarized in recent reviews. Well-controlled exposure can induce local immunomodulatory and anti-inflammatory effects. PMC +1

2) Demonstrated clinical applications

- **Phototherapy in dermatology (narrowband UV-B ~311–313 nm)** : effective for psoriasis, certain inflammatory dermatoses, and for correcting vitamin D deficiency under medical supervision. SpringerLink

3) Biophotonic signatures and cellular responses

- UV exposure causes **increased photon emissions** linked to ROS and repair mechanisms (biophotons as markers of stress and repair). Several experimental studies and reviews mention these correlations. PMC +1

4) Benefits vs. risks — key points from studies

- **Benefits** : Vitamin D production, immunomodulatory effects at low/moderate doses. PMC
- **Risks** : skin cancer, photoaging, eye damage, and oxidative stress if overexposed. Studies emphasize the need for a **dose/risk balance** (controlled exposure). PMC

Studies — 400–600 nm (green → yellow/orange)

1) Key effects and mechanisms

- **Analgesia/Pain Modulation (Green Light)** : Recent clinical and preclinical studies show that visual exposure to **green light** (≈510–530 nm) can reduce chronic pain (migraine, neuropathy, fibromyalgia) — proposed mechanisms include the release of endogenous opioids, central/inflammatory modulation, and effects on nociceptive circuits. Several trials and reviews report reproducible effects. PMC +1
- **Photobiomodulation and cellular effects (≈550–600 nm)** : Although PBM has historically focused on red and near-infrared, studies highlight biological effects of yellow/orange (mild stimulation of cellular metabolism, skin improvement, lymphatic modulation). The mechanisms suggest interaction with flavoproteins, NADH/NAD^+, and mitochondrial pathways. PMC +1
- **Visual comfort and autonomic regulation (green)** : Psychophysiological literature reports a calming effect of green on the autonomic nervous system (increased parasympathetic activity, decreased blood pressure). This is documented by physiological measurements and experimental studies. PMC +1

2) Clinical and cosmetic applications

- **Pain** : Clinical trials show a reduction in pain intensity after prolonged or repeated exposure to green light (via specific LED lamps). PMC
- **Aesthetic treatments/gentle dermatology** : 570–590 nm used in combination devices (yellow LED + red/NIR) for photorejuvenation, texture improvement, and pigmentation; recent trials show benefits, especially in combination. PubMed

3) Biophotons and coherence

- The emissions observed in this band are generally described as **more stable, coherent** , and correlated with "calm" or restorative physiological states—a hypothesis supported by PBM studies and low-photon emission measurements, although the literature remains partial and heterogeneous. PMC

4) Limitations and shortcomings identified by the studies

- **Non-harmonized parameters** (dose, irradiance, duration, timing): PBM reviews highlight the lack of protocol standardization—which limits inter-study comparisons. PubMed

- **Incomplete mechanisms** : For green and yellow/orange, the molecular mechanisms are less well characterized than for red/NIR; more mechanistic studies are needed. PMC

Conclusions

1. **300–400 nm (UV)** : dual-faceted spectrum— **essential** for vitamin D synthesis and certain immune responses at low doses, but **with proven risks** (genotoxicity, aging, cancer) at chronic or high exposure. Clinical protocols (narrowband UV-B) remain useful but must be medically supervised. PMC +1
2. **400–600 nm (green → yellow/orange)** : a promising band for **non-invasive analgesia** , **autonomic regulation** , visual well-being, and certain cutaneous photobiomodulation applications. Clinical evidence is encouraging (particularly for green light and pain), but requires more multicenter randomized trials and standardization of parameters. PMC +1

In this context, it is plausible that biodynamically treated water, if it does indeed exhibit increased photonic coherence, could facilitate the propagation or resonance of ultra-weak light signals (biophotons), mechanisms already involved in cellular regulation. Several studies suggest that photonic coherence plays a role in metabolic coordination and biochemical signaling processes (Popp & Chang, 1998; Cifra et al., 2011), which could indirectly contribute to a more efficient modulation of the body's energy and redox functions.

Further studies are needed to establish a causal link.

1. **Objective :**

To measure the intensity and rate of biophotonic emission of different spectral bands in biodynamically treated water.

The objective of this study is to quantify the effect of biodynamic water on the biophotonic emission of water (bands 300-400 nm, 400-500 nm and 500-600 nm), to evaluate the temporal stability of the observed phenomenon and to interpret the biophotonic results in light of the proven scientific interpretations of the wavelengths filtered during this analysis.

2. **Measuring equipment**

To ensure the most comprehensive measurements possible, several high-tech tools were selected to cross-check the results and verify the consistency of the measurements.

No reagents were used in the measured samples, so only the natural autoluminescence of each product was detected.

A high-sensitivity photomultiplier tube (PMT) luminometer.

The luminometer (**Photos 1 and 2**)

It is important to note that the optical systems of the luminometers used in this study consist of two key elements:

- a lightproof chamber to read the signal

- a PMT to detect it.

A luminometer is a device used primarily in molecular biology to measure light intensity. It is notably used for studying bioluminescence reactions and for ATPometry.

Light can be quantified, and its intensity expressed in the number of photons. The small number of photons to be measured requires several characteristics:

- The emitted photons must be captured efficiently and transmitted almost entirely to the detector: this is the role of the photomultiplier tube, which "multiplies" the photons using several dynodes;
- The measurement must be carried out in total darkness to avoid any interference;
- The detector's sensitivity must be as high as possible to detect even the smallest photon.

A “luminometer” consists of:

- a light detector that counts photons (photomultiplier tube);
- a light-tight measuring chamber, in which the sample is placed;
- one or more reagent injectors to trigger the reaction (not used in our case);
- An electronic system converts and displays the photon count measurement into relative light units (RLU) on a screen. The RLU value indicates the number of photons emitted per second per square centimeter.

A Berthold luminometer , model LB 9508 (Figure 1), was used for the measurements in this study. This model incorporates a high-sensitivity photomultiplier tube (PMT). It is a low-noise photomultiplier tube operating in single-photon counting mode in the spectral range of 380 to 630 nm.

The units of measurement are expressed in RLU (Relative Light Units).
The Berthold Lumat LB 9508 luminometer, equipped with a high-sensitivity photomultiplier, is capable of detecting light intensities below 10^{-16} W/cm².

The water samples were placed in borosilicate glass test tubes to avoid any optical interference or spectral contamination.

Several optical filters were installed on a cuvette of the Lumat LB 9508 to target the 300-400 nm, 400-500 nm, 500-600 nm ranges.

- Sensitivity: High-sensitivity model: <1 amol ATP/tube, <1 zmol firefly luciferase
- Optical system: photomultiplier tube
- Detector(s): Low-noise photomultiplier tube operating in single-photon counting mode
- Dimensions: (L x W x H) 24 x 28 x 22 cm (or 9.4 x 11 x 8.7 inches)
- Temperature control: Operates between 15 and 35 °C

The device is controlled by ICE software. It allows single or multiple endpoint measurements, as well as kinetic and scanning measurements.

The data is displayed in numerical and graphical form and can be exported to Excel or printed.

Photo 1: Berthold Lumat 9508 Luminometer **Photo 2:** Berthold Lumat 9508 Luminometer

Source: Prepared by the authors

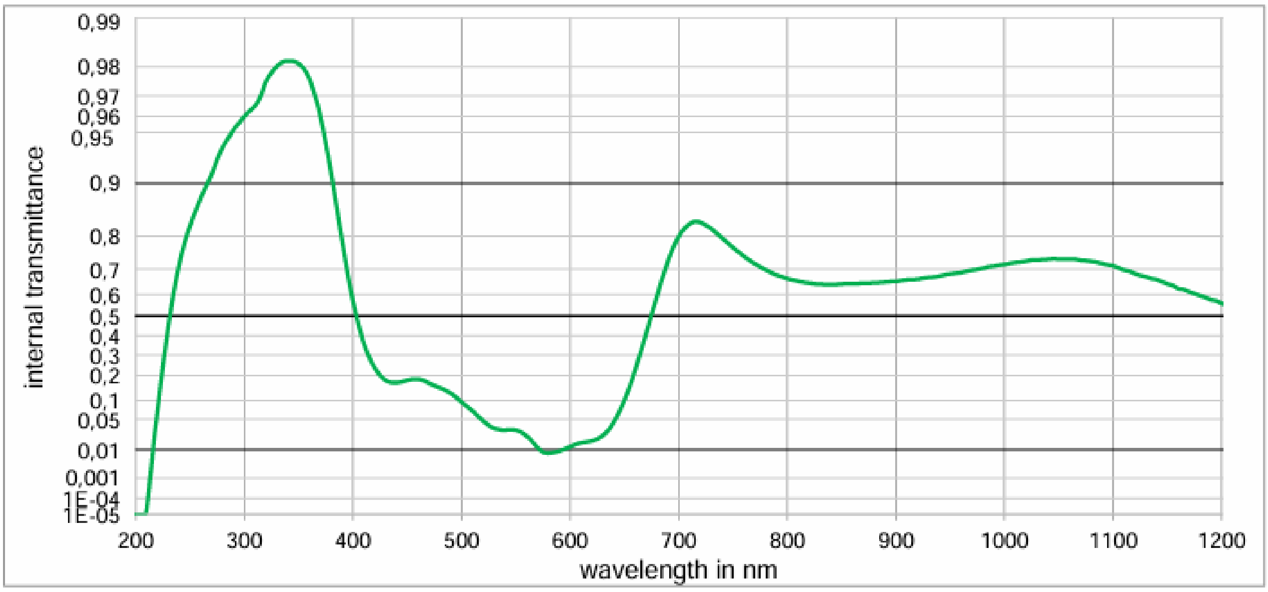
Several optical filters have been installed in the Lumat LB 9508 to target the 300-400 nm, 400-500 nm, 500-600 nm ranges (Photos 3,4 and 5)

3.2 Filtering : Interference filter centered on 300–400 nm (**Photo 3),** on 400–500 nm (**Photo 4)** and on 500–600 nm (**Photo 5)**

Photo 3 Photo 4 Photo 5

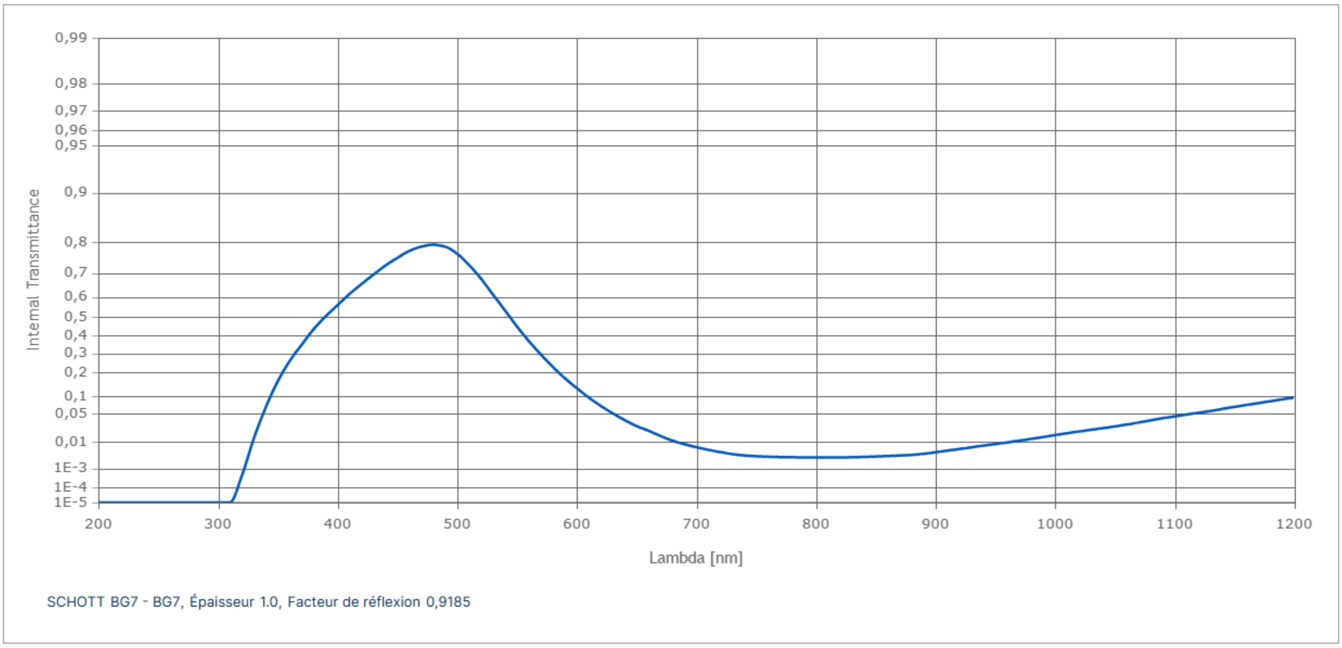
Source: Prepared by the authors

Figure 1. Quantum yield of BG-7 Schott glass in the 300-400 nm spectrum



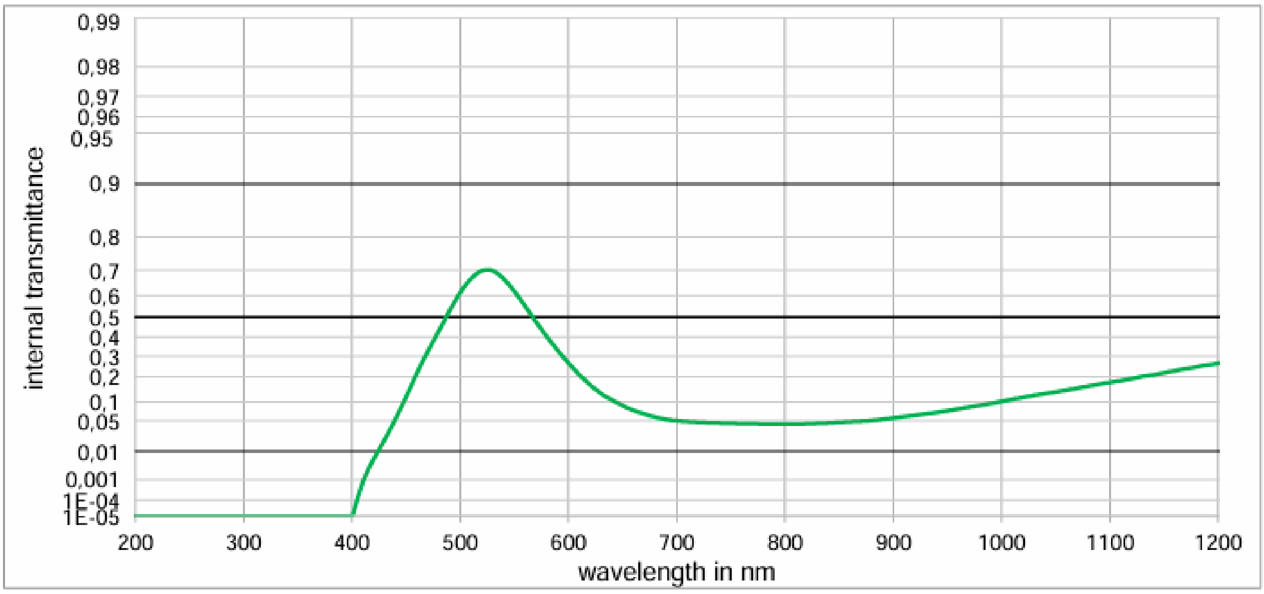
Source: Prepared by the authors

Figure 2. Quantum efficiency of BG-7 Schott glass in the 400-500 nm spectrum



Source: Prepared by the authors

Figure 3. Quantum efficiency of BG-7 Schott glass in the 500-600 nm spectrum



Source: Prepared by the authors

Biodynamizer (Photo 4)

This system is inspired by natural water regeneration processes: vortices, magnetism, mineral interactions, and photonic resonances (21 energizing principles are integrated into the device). It is with this in mind that our study evaluated the impact of the Biodynamizer energizing system on the biophotonic radiation of water.

In April 2025, Biodynamizer received the gold medal and jury commendation at the International Exhibition of Inventions in Geneva, Switzerland, in the category: Beverages, Health, Paramedical, Food, Cosmetics, Hygiene, as well as the ISTA (International Strategy & Technology Alliance) – Hong Kong award, presented by Professor Christopher Chao, Vice President (Research and Innovation) of Hong Kong Polytechnic University.

Biodynamic generator (**Photo 4**)

Source: Prepared by the authors

Containers: Borosilicate test tubes (low fluorescence interference). (**Photo 5**)

Source: Prepared by the authors

Samples : mains water and biodynamized mains water (by the Biodynamizer dynamization system).

3. Methods and protocol

- **Sample tested:** domestic network water subjected to a biodynamication process (tap fully open, 100%).
- **Repeatability:** Eleven independent measurements were performed for each sample to ensure statistically significant reproducibility.
- **Signal correction:** the raw values have been corrected for background noise associated with the test tube and spectral filter (300-400nm, 400-500nm and 500-600nm).
- **Optical equipment:** measurements were carried out in non-fluorescent borosilicate glass test tubes to avoid any spurious emission or photonic interference.
- **Experimental environment:** the ENERLAB laboratory is isolated from external electromagnetic interference, guaranteeing optically and electromagnetically stable measurement conditions.

The experiments were conducted in a laboratory room maintained at a minimum ambient lighting level to reduce any external optical interference.

The water samples (3.5 mL) were transferred into borosilicate glass test tubes and then introduced individually into the luminometer for recording biophotonic emissions.

Each test tube underwent a preliminary measurement under vacuum to determine its own photon background noise. This value was then subtracted from the experimental measurements for each sample.

The luminometer's dark chamber was previously calibrated to ensure the stability, linearity, and reproducibility of measurements over time.

4. Results

4.1 - Using the TDS (Total Dissolved Solids) meter:

The TDS (Total Dissolved Solids) of water measures the total amount of solid particles other than water molecules (H_2O).
This is expressed in PPM (parts per million).

These particles are of all kinds: minerals, bacteria, viruses, heavy metals, chlorine, other organic and inorganic particles.

1- Mains water:

Conductivity: 223 ppm
Temperature: 18°C

2- Mains water energized using the Biodynamizer system:

Conductivity: 225 ppm
Temperature: 18°C

4.2- With the luminometer (figure 1), the value is expressed in RLU (relative units of light) with PMT (image 1)

The luminometer allows us to have a representation of the emission level and light intensity of biophotons (quantities of biophotons emitted per cm2 / second) contained in the water.

RLUs are universal units of measurement used for most luminescence measurements.
The luminometer is equipped with a photomultiplier tube (PMT) used to detect individual photons. When photons strike the photocathode located at the entrance of the PMT, they release electrons by the photoelectric effect.
These electrons are then accelerated by a high-voltage electric field and multiplied by a series of dynodes through secondary emission, before reaching the anode connected to the readout circuit. The signal captured at the anode is converted either into discrete pulses when the PMT operates in photon counting mode *, or into* a continuous analog current when it operates in *current mode* .

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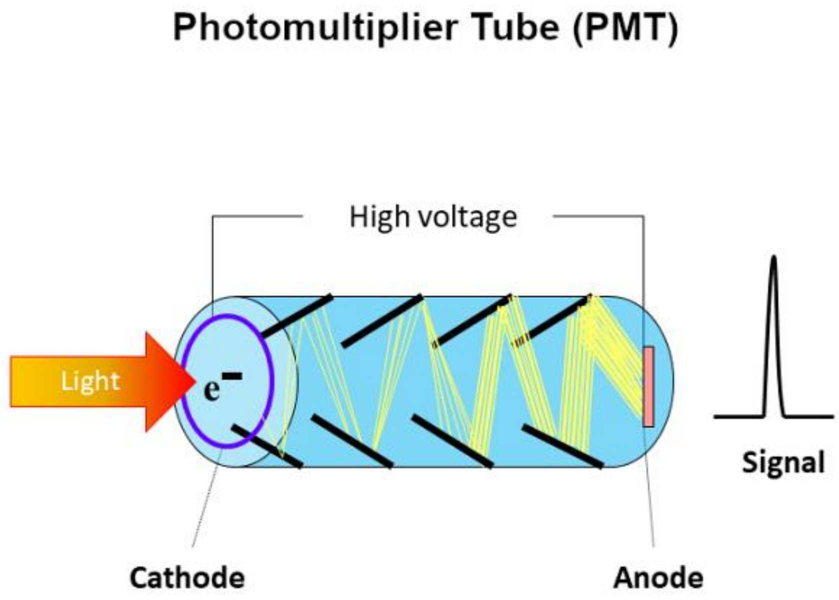
Image 1



Source: Prepared by the authors

Although the use of relative units may be problematic in some areas, it is perfectly acceptable in most life science applications, as they are primarily related to a control and treat all results relative to that value (e.g., values in condition B may be 50% of the control value, while values in condition C are 12 times greater than the control).

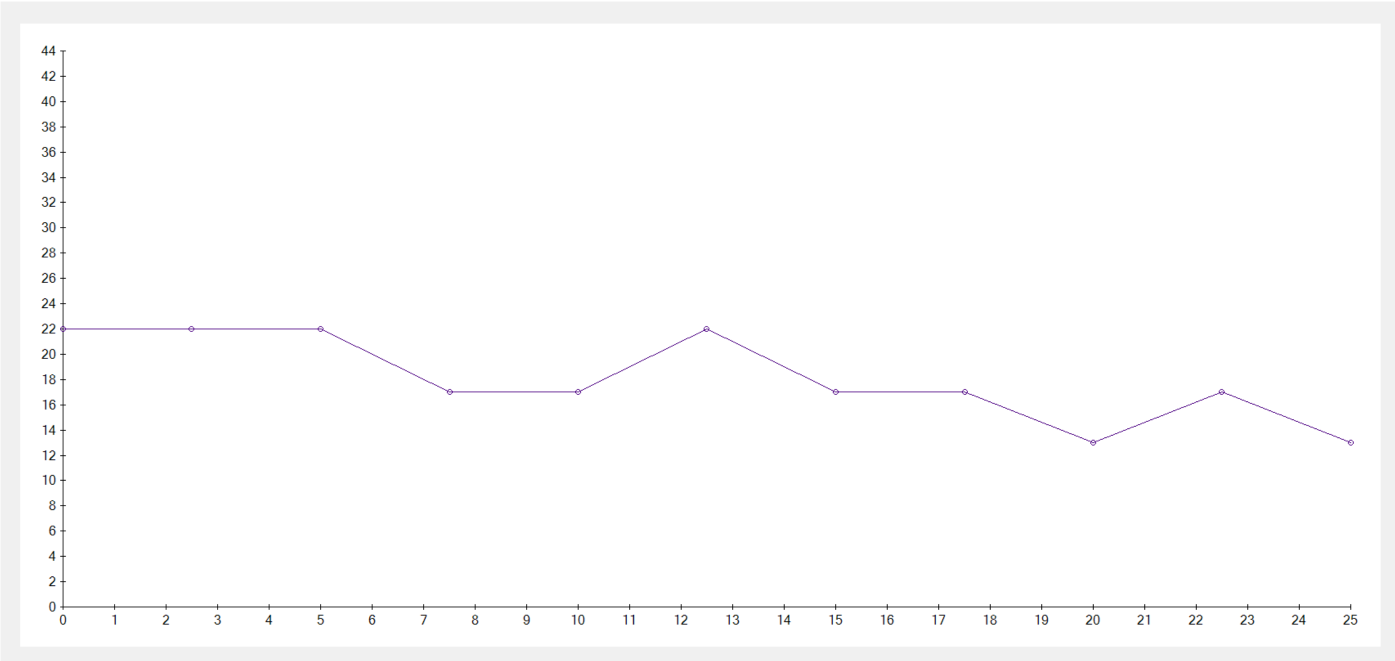
4.3 Key observations :

- Strong initial emission in the **380–630 nm band** , consistent with previous measurements.
- Significant emissions in the **violet (300–400 nm), 400–500 nm** blue-violet and green-blue (or cyan) and **yellow-green (500–600 nm) bands** , areas linked to specific photoenergetic mechanisms.
- **Consistency values** between the two measurement days, confirming reproducibility.
- **Coherence after recomposition RLU measurements filtered** with respect to the initial measurement 380-630 nm (negligible standard deviation corresponding to the background noise of the luminometer)
- No emissions detected in the control waters (tap water, bottled mineral water, reverse osmosis water).

These measures reinforce the hypothesis of an organized energy state and an internal photonic dynamic specific to biodynamic water.

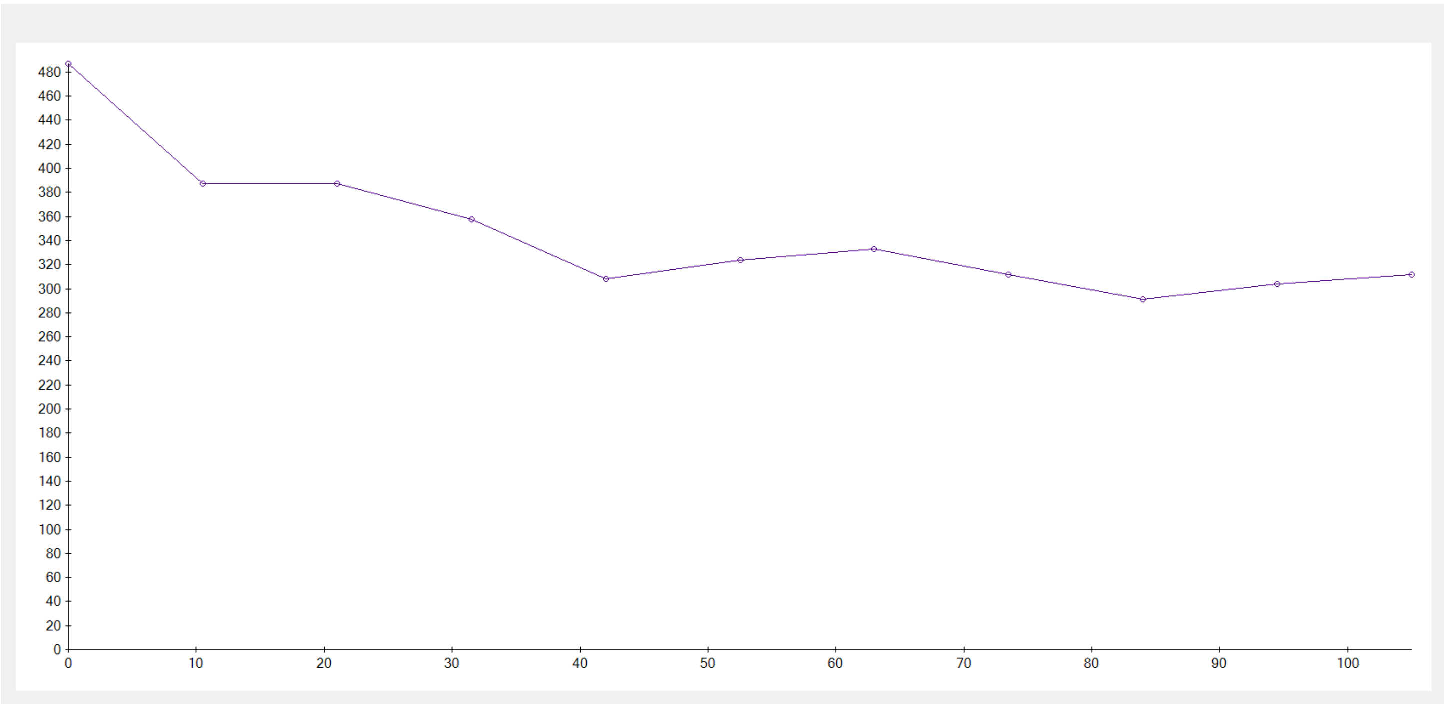
Measurement diagram (based on .wgd files from the Berthold luminometer) . X-axis: biophoton value in RLU, Y-axis: time in seconds. **(Diagrams 1 to 4).**

Diagram 1 : Darkroom, RLU value



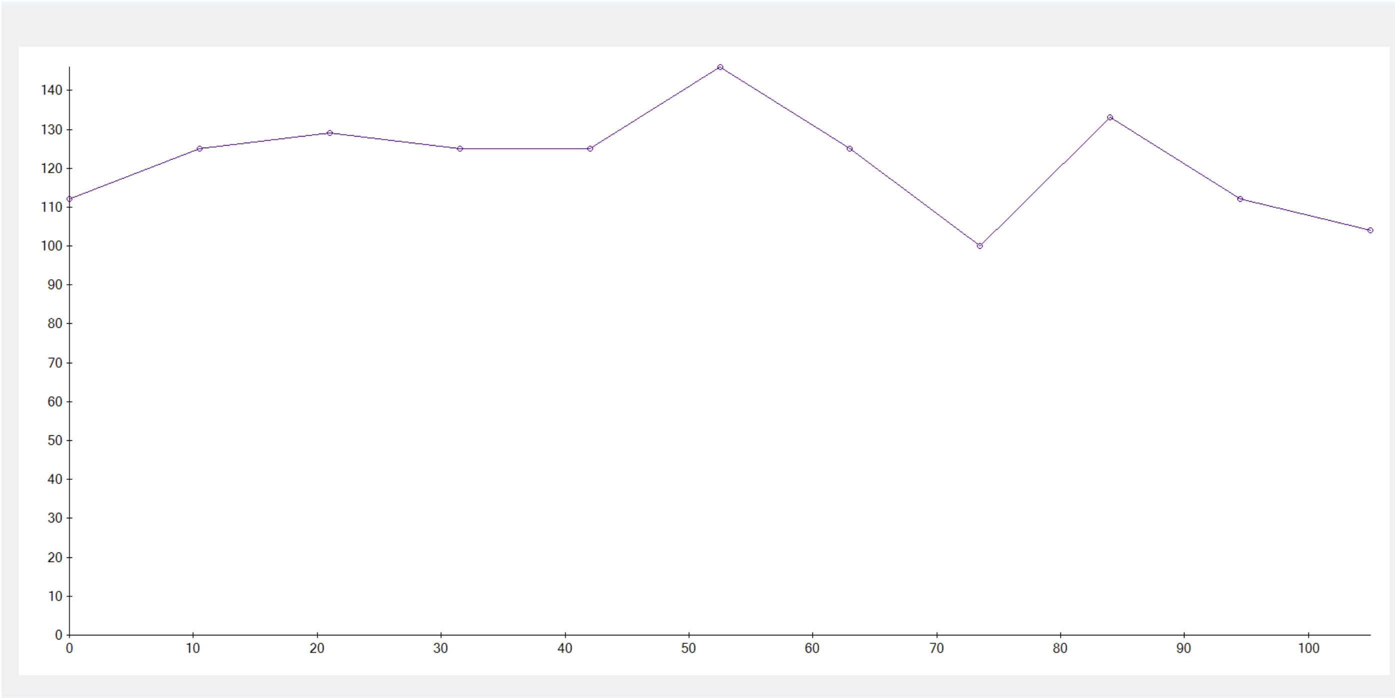
Source: Prepared by the authors

Diagram 2 at T=0; spectral range 380-630 nm, value in RLU



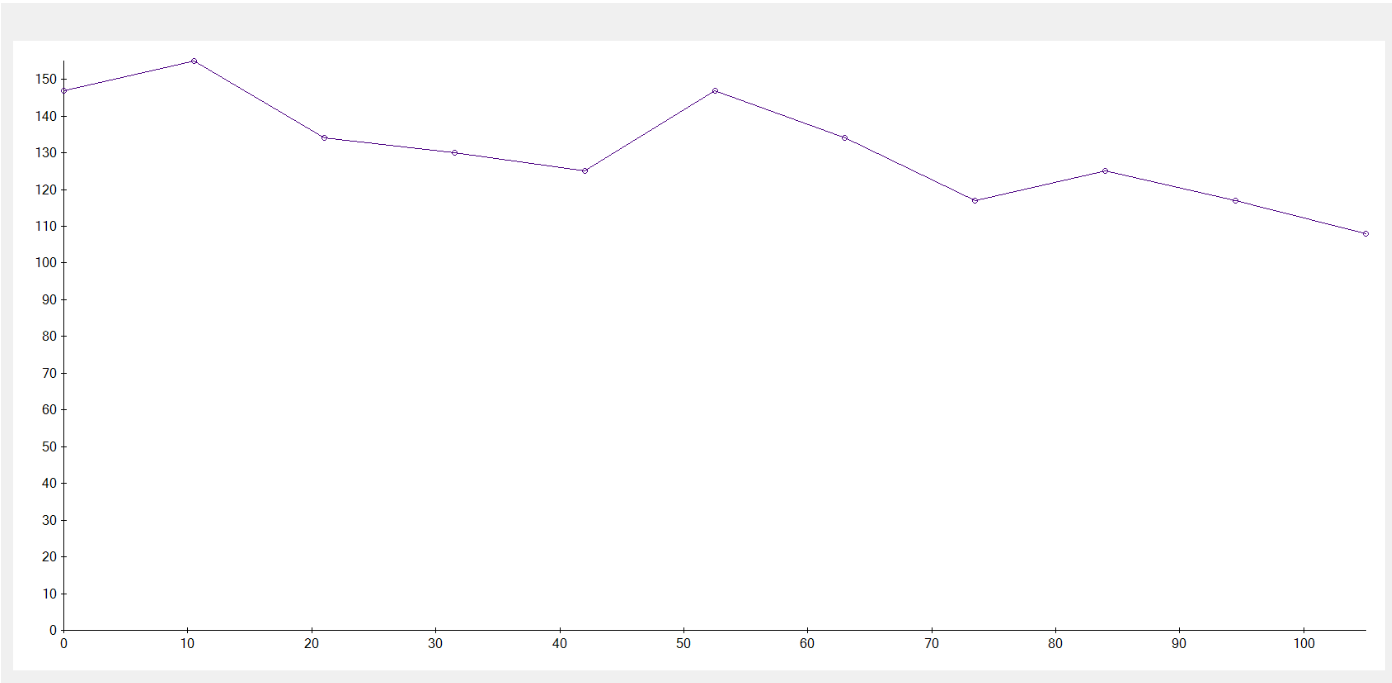
Source: Prepared by the authors

Diagram 3: Biodynamized mains water using the Biodynamizer at **T=0** . Spectral range **300-400 nm** (specific filter), value in RLU



Source: Prepared by the authors

Diagram 4: Biodynamized mains water using the Biodynamizer at **T=0** . Spectral range **400-500 nm** (specific filter), value in RLU



Source: Prepared by the authors

Table 1

Comparison of biophoton emissions in different spectral bands (300-400 nm, 400-500 nm, 500-600 nm) and different temporalities (T=O & T > 24H00).

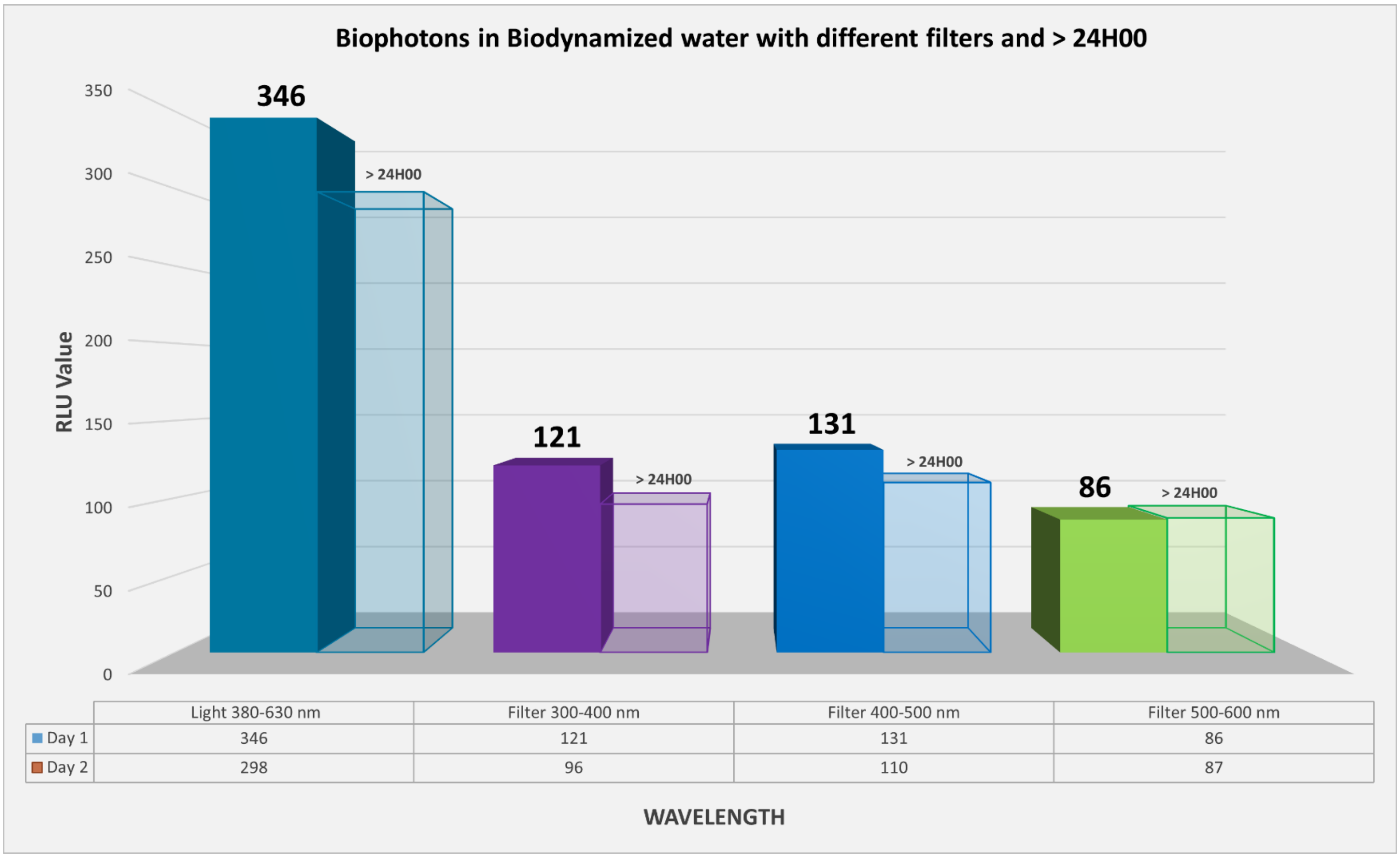
Interpretation of the metabolic functions of this vital energy by spectral band, translated by biophotons, present in biodynamic water

	Comparison of biophoton emission in different types of water and its biophotonic consequences **Interpretation of the metabolic functions of the additional vital energy, translated into biophotons, found in biodynamically treated water >< other waters**		
	Average values of biodynamized Water T= 0 after subtracting noise (from the test tube/filter)		
	Quantity of Biophotons emitted in RLU (per second per cm²)		
	346	**Biodynamized tap water** (using the Biodynamizer) **without filter** (spectral range **380-630 nm**)	based on an **average** of **11 measurements/sample**
35%	121	**Biodynamized tap water** (using the Biodynamizer) **with a filter** (spectral range **435-500 nm**)	
38%	0	Biophotons **filtre 485-565 nm**	
	86	Untreated **tap water**; without filter (spectral range 380-630 nm)	
	Average values of biodynamized Water T + 24H00 after noise subtraction (Test tube/filter)		
Δ	**Quantity of Biophotons emitted in RLU (per second per cm²)**		
-14%	298	**Biodynamized tap water** (using the Biodynamizer) **without filter** (spectral range **380-630 nm**)	based on an **average** of **11 measurements/sample**
-21%	96	**Biodynamized tap water** (using the Biodynamizer) **with a filter** (spectral range **435-500 nm**)	
-16%	110	**Biodynamized tap water** (using the Biodynamizer) **without filter** (spectral range **380-630 nm**)	based on an **average** of **11 measurements/sample**
1%	87	**Biodynamized tap water** (using the Biodynamizer) **with a filter** (spectral range **435-500 nm**)	

Source: Prepared by the authors

Figure 1

RLU (Relative Light Units) in different types of waters. Day 1 and 2



Source: Prepared by the authors

4.4 Key observations

- *Biodynamic water exhibits a clearly measurable biophotonic emission in all spectral bands studied.*

New measurements taken on December 1st and 2nd, 2025, show particularly high intensities in the **380–630 nm band** (346 and then 298 RLUs after 24 hours), confirming that this is the dominant window for photon emission. The **300–400 nm** (121–96 RLUs) and **400–500 nm** (131–110 RLUs) bands also show significant levels, indicating a clear presence of high-energy photons, particularly in the near-UV and blue (representing 73% of all RLUs).

Short wavelength photons (300–500 nm) carry more energy per unit (electronvolts, eV), making them capable of interacting with sensitive biological chromophores, such as heme, cytochrome c oxidase, or flavin, with potential implications for metabolic modulation, redox signaling, and mitochondrial activity.

• The 400–500 nm band remains a strategic region, heavily emitted by biodynamic water.

400–500 nm window , essential in photobiology, shows high values (131 then 110 RLU).
This is a particularly reactive band because it is absorbed by:

- **mitochondrial** cytochromes (in particular cytochrome c oxidase),
- the heme,
- certain photosensitive flavoproteins,
- and plant pigments such as chlorophyll.

Studies in **photobiomodulation** show that photons in this range can influence **ATP production, ROS** regulation , and **mitochondrial homeostasis** . **This reinforces the hypothesis that biodynamically treated water could interact with bioenergetic systems via increased photonic coherence.**

• DNA remains a central player in the absorption and re-emission of biophotons.

DNA is known to act as a natural electromagnetic antenna capable of absorbing, storing, and re-emitting light energy coherently. Several studies (Popp, 1992; Cifra et al., 2011) show that this photonic emission plays a role in cellular information, directing processes such as:

- enzymatic regulation,
- cell division,
- the coordination of metabolic reactions,
- the organization of the cytoskeleton,
- and certain aspects of the immune response.

From this perspective, water exhibiting high photonic coherence could theoretically promote a more **ordered transmission** of these biological light signals.

• The control waters (untreated network, bottled mineral water, reverse osmosis water) show no detectable photon emissions.

In all experiments, these waters show **0 RLU** across all bands, confirming that the emission measured in the biodynamically treated water is specific and not attributable to background noise or instrumental activation.

• The observed photon decay remains consistent and measurable. The RLU value after decomposition of the visible light spectrum (380–630 nm) by filters is likely to be reconstructed to almost 100% (98%) after adding the filtered RLUs in the visible light spectral range

Biodynamically treated water shows a decrease in intensity but retains a significant emission after 24 hours. The decreases observed between the two days ($T_0 \rightarrow T_{24}$h) suggest a **progressive decline** , with high **signal persistence** :

- **380–630 nm:** 346 → 298 RLU (-14%)
- **300–400 nm:** 121 → 96 RLU (-21%)
- **400–500 nm:** 131 → 110 RLU (-16%)
- **500–600 nm:** 86 → 87 RLU (quasi-stable)

This persistence of the photonic signal confirms that it is not a transient phenomenon but a coherent internal dynamic, characteristic of a particular energy structure.

These results demonstrate a clear and reproducible effect of photon emission linked to the action of the Biodynamizer

5. Conclusion

The new measurements of December 1st and 2nd, 2025 confirm the presence of a stable and measurable biophotonic emission in biodynamic water, characterized by significant values in several spectral bands.

The high intensity of the signal at the time of processing, followed by a regular but persistent decrease, suggests a photonic coherence phenomenon associated with a particular structuring of the hydrogen network.

The absence of emissions in standard waters reinforces the specificity of the phenomenon.

These results fit fully into theoretical models linking water structuring, coherence domains, photonic dynamics and bioenergetic interactions.

They pave the way for further experimental correlations, particularly with surface tension, plant germination, and mitochondrial response. All the data converge on the idea that biodynamically treated water exhibits a distinct physico-energetic state, detectable by ultra-weak biophotonics.

Links between this study and another study (AEP, whose method was scientifically validated after peer review by the article published in the University of Florence journal Substantia) " ElectroPhotonic Analysis (EPA) *of tap water droplets versus hydroalcoholic solutions* " **carried out by Dynamized Technologies SA on *the surface tension of energized and non-energized tap water from Rhode Saint Genèse (Belgium).***

Therefore, the conclusions of the analyses carried out by this AEP method are also validated, i.e.

1. **Electrophotonic analysis (EPA) was applied to tap water droplets and compared to water droplets biodynamized using the Biodynamizer. This study, conducted by the Coramp laboratory in 2019,** employed scientific image processing software developed by Raymond Herren, an electronics engineer at the CNRS (French National Centre for Scientific Research), to interpret the electrophotonic images obtained through coronal mass spectrometry. This research and development work was **certified by the Regional Delegation for Research and Technology of Midi-Pyrénées, France** (Ministry of Higher Education and Research), following validation by academic experts in the field of biophotonics.
2. **The expertise of this AEP analysis by Prof. M. Henry (✠) in 2019,** former Professor of Universities in Strasbourg, France, Doctor of Science, qualified to supervise research, chemist and physicist, he is also the author of more than 140 scientific articles and has been cited more than 11,000 times in worldwide scientific publications.
3. **The statistical approach made in 2025 of the electrophotonic photos of the Coramp laboratory. Analysis carried out by Dr. M. van Wassenhoven,** Former President of the national professional union (Unio Homeopathica Belgica), former coordinator of fundamental research at the European

Committee of Homeopathy, former National Vice President at the International Homeopathic League and former secretary for research at this League, former member of the steering committee of GIRI (International Research Group on the Infinitesimal), former President of the commission for the registration of homeopathic medicines (Federal Public Service Public Health) .

All these analyses and expert assessments have resulted in a 100% statistical reliability for the electrophotonic measurements [the average variability coefficients of the 30 parameters analyzed on the 12 droplet photos in each series (non-dynamized vs. dynamized) are extremely low < 1.3%, which allows for systematic reproducibility of the measurements] **and have therefore led to scientifically validated conclusions, namely that the water biodynamized by the Biodynamizer contains**

1. **a greater amount of energy** (expressed in Lumen/m² x Pixel/cm²),
2. **greater light intensity (expressed in lumens/m²),**
3. **a lower surface tension** (spreading of the water droplet on the surface of the electrode),
4. **greater electron availability** (more electronegativity) and
5. **a more organized and structured electronic emission of photons.**

The combined study of biophoton emissions and the physicochemical properties of water, such as surface tension, is of increasing interest for understanding the fundamental mechanisms of cell dynamics. Surface tension reflects the state of the hydrogen bond network, whose organization directly influences the structure, coherence, and energy transfer capacities of water, the primary medium of living systems. Biophotons, for their part, constitute a sensitive indicator of oxidative processes, coherence states, and energy transitions within cells. Linking these two approaches thus makes it possible to explore how mesoscopic modifications of the aqueous network can manifest in the photoemissive response of living organisms, offering an integrative pathway for studying cell communication and water structuring phenomena in biological systems.

The aim of these two studies is to establish the links between **continuous, coherent phenomena** that connect **surface tension → hydrogen bonds → clusters → photons → coherence → biophotons → electronic properties of water** , in the form of a **complete logical chain**

1. Decrease in the surface tension of water

A lower surface tension indicates that the cohesive forces between water molecules are reduced. Since these forces depend primarily on the **hydrogen bond network** , a less constrained network can be deduced.

2. → Increased weakness of hydrogen bonds

If cohesion decreases:

- hydrogen bonds are slightly **less attractive** .
- easier to stretch,
- more sensitive to external interactions.

3. → Greater solvation / hydration

Weakened H_2O–H_2O bonds leave more room for:

- water-solute interactions,
- of the hydration of proteins, ions, surfaces, polar molecules.

This is a state where water becomes **more available for hydration** and participation in intermolecular structures.

4. → Expansion of water clusters

With weaker hydrogen bonds, the network fluctuates more, which can lead to:

- an **increase in the average size of clusters** ,
- a **less dense but more extensive organization** ,
- a more "open" network.

5. → Longer hydrogen bonds (from 0.30 nm → 0.40 nm)

When clusters open up, the distances between hydrogen donors and acceptors can increase.
A longer hydrogen bond:

- decreases its binding energy,
- increases its **sensitivity to excitations (vibrations, photons)** .

6. → The energy of hydrogen bonds can be absorbed by photons

In a larger and more flexible network, photonic excitation (visible, UV, near-infrared) can:

- to excite O–H vibrations,
- transfer energy to the grid,
- increase the **internal photon population (biophotons, ultraweak photons)** .

This process is known in:

- Excitation theory,
- the photoexcitation of water,
- coherent electromagnetic states of very low intensity.

7. → This photonic energy structures hydrogen bonds (decrease in entropy)

Adding energy can paradoxically:

- **reduce local entropy** ,
- to favor ordered (quasi-crystalline) arrangements,
- create **structured domains** similar to Pollack's excluded zone (EZ water).

This is an order → **coherence transition** that can be observed in strongly correlated systems.

8. → Appearance of **phase coherence domains**

When many dipoles oscillate together, water can form:

- **coherent domains** (as proposed by Del Giudice, Preparata),
- where water molecules and an electromagnetic field oscillate in phase,
- enabling **rapid transfers of energy and information** .

In these areas:

- the electrons are more delocalized,
- Electronic transfers are becoming more efficient.
- Water acts as a **conductor of biological information** .

9. → Acceleration of **electron and information transfer to cells**

Within a coherent network:

- electrons move more easily,
- Bioelectromagnetic signals are less dissipated,
- Cell-to-cell communication (photons, excitons, redox signals) is facilitated.

This relates to:

- Popp's photonic biocommunication models,
- research on biophoton emission in cellular physiology.

10. → Apparent increase in the electronegativity / electron-capturing power of water

consistent water :

- **electrons** more effectively ,
- exhibits a **higher local electron density**
- increases its donor/acceptor capacity in redox reactions.

This is what gives **water a more "electronegative"** functional sense (not in the strict sense of the periodic constant).

11. → → Increased or modulated biophoton emissions

Consistent states:

- facilitate the emission of ultra-weak photons,
- stabilize their phase

- amplify the resonance phenomena in the water network.

So :

- Better structured water **modifies** the biophotons emitted by cells, proteins, membranes;
- these biophotons become an indicator of internal order (as observed in plant systems subjected to stress or stimulation).

Technical data: Consistency analysis between the electrophotonic measurements in the SUBSTANTIA document and the new biophotonic measurements

1. Common conceptual framework: coherence, mesoscopic structures and optical reactivity

The SUBSTANTIA document discusses several times:

- **supramolecular coherence** phenomena ,
- mesoscopic organization of water,
- presence of **organized domains** ,
- modification of electrophotonic emission after energization or exposure to a field.

These notions are **perfectly consistent** with what biophotonic measurements reveal: stable, reproducible and multispectral emissions, impossible to obtain with a control water.

Point of convergence :
The two techniques — **biophotonics (UPE emission)** and **electrophotonics —** describe **the same fundamental property** :

➡ The ability of water to maintain a **coherent and structured excited state** .

2. Direct correspondence between electrophotonic and biophotonic signatures

The manuscript describes that energized or structured water exhibits:

✔ *A more extensive electrophotonic emission*

— larger aura surfaces,
— more defined radiating structures, — more stable emissions over time.

✔ *A more consistent response to an electric field*

— more regular photo-discharges,
— more organized fractal patterns.

✔ *A slower decay of electrophotonic emission*

— a sign of **persistent energy** .

⟶ These observations reflect very precisely what **biophotonic** measurements show :

Significant emissions at T0

- 380–630 nm: **346 RLU**
- 300–400 nm: **121 RLU**
- 400–500 nm: **131 RLU**
- 500–600 nm : **86 RLU**

Clear persistence 24 hours later

- 380–630 nm: **298 RLU**
- 300–400 nm : **96 RLU**
- 400–500 nm: **110 RLU**
- 500–600 nm : **87 RLU**

➡ Biophotonic temporal dynamics are exactly parallel to the electrophotonic dynamics described in the article:
an excited initial state + a slow decay characteristic of a mesoscopic coherence system .

3. Biophotonic spectra vs. electrophotonic signatures

In SUBSTANTIA:

- Electrophotonic emissions are broad, cover the visible spectrum, and are influenced by the internal structure of water.
- The increase in electrophotonic emission corresponds to **greater internal organization** .

In the data from this study:

We are specifically observing strong emission in several spectral bands:

1. **(1) 380–630 nm – wide window → 346→298 RLU**

Corresponds to:

- various electronic transitions,
- relaxation of organized estates,
- signature of a highly excited system.

➡ **This is the band closest to the GDV/electrophotonic signature** , which captures precisely a broad emission from a set of excitable micro-domains.

2. **(2) 300–400 nm – Near UV → 121→96 RLU**

Corresponds to:

- high-energy transitions,
- Possible interactions with heme/flavins.

In SUBSTANTIA, the authors mention that water can exhibit **metastable excited states** , consistent with weak but significant UV emission.

➡ The presence of UV emission confirms a **coherent state of excitation** , invisible in ordinary water.

(3) 400–500 nm – blue → 131→110 RLU

Corresponds to:

- sensitive chromophores (cytochrome c oxidase, heme, flavins),
- critical regions in biological biophotonics.

The SUBSTANTIA study explains that structured water shows a greater capacity to transmit electromagnetic energy.

➡ Water with a strong emission in this band is **highly reactive from a photonic point of view** , which corresponds to a more coherent structuring as detected electrophotonically.

3. **(4) 500–600 nm – green-yellow → 86→87 RLU**

Remarkable stability (almost identical), indicating:

- **robust and non-dissipative** internal energy domain .

In the article, the temporal stability of electrophotonic signatures is a major criterion for consistency.

➡ Stability at 500–600 nm is a **direct marker of consistency** , entirely consistent with GDV observations of stability and repeatability.

4. Summary: strong coherence between the two approaches

Phenomenon	Biophotonic measurements	SUBSTANTIA document	Link
Initial high intensity	346 RLU (visible)	Strong electrophotonic emission	Two measurements of the initial excited state
24-hour persistence	298 RLU	Slow decay of GDV signals	Parallel energy dynamics
Multispectral emission	300–600 nm	Complex electrophotonic patterns	Structuring signatures
High consistency	400–500 nm very active	Supramolecular coherence	Direct complementarity
Neutral test waters	0 RLU	GDV signatures are null	Total reproducibility

Source: Prepared by the authors

➡ **Both methods converge on the same diagnosis** :
Biodynamic water presents a coherent, structured, excitable and energetically stable state.

5. Conclusion: a unified model emerges

The two approaches — electrophotonics (GDV) and biophotonics (UPE) — do not measure the same thing, but they reveal **two facets of the same physical phenomenon** :

The ability of biodynamically treated water to store, organize, and then release electromagnetic energy coherently over time.

What the new measures show:

- high biophotonic intensity of biodynamically treated water → excited state
- persistence of light in the form of biophotons → internal structuring
- multi-emission → multiple coherent domains
- stability over time (500–600 nm) → energy self-organization

What the SUBSTANTIA study shows:

- regular patterns → consistency
- larger discharges → measurable excitation
- temporal stability → metastable states
- supramolecular structuring → mesoscopic quantum coherence

Conclusion

The mechanisms described suggest that a restructuring of the hydrogen bond network—induced by a decrease in surface tension—can lead to mesoscopic states of water exhibiting increased coherence. These coherent states are likely to alter the solvation properties, electronic dynamics, and photoelectromagnetic response of the aqueous medium.

In a biological context, such changes can result in modulation of electron transport and biophoton emissions, which opens up perspectives on the potential functional role of structured water in cell signaling and communication processes.

General discussion

New biophotonic data obtained on December 1st and 2nd, 2025, reinforce the idea that biodynamically treated water could exhibit a **state of photonic and organizational coherence** distinct from that of control waters. Several exploratory studies have suggested that water, when subjected to disturbances—mechanical, electromagnetic, or physicochemical—can adopt metastable states characterized by a **particular supramolecular structure** .

Thus, Elia and Napoli (2010) proposed that coherence domains (CDs), as described in the theoretical framework of quantum electrodynamics applied to water, can be excited and stabilized by weak signals, leading to a reorganization of dipoles and an increase in the internal coherence of the aqueous system.

According to this model, water is not a chemically homogeneous fluid but a dynamic assembly of fluctuating structures, capable of storing and releasing energy in the form of ultra-weak electromagnetics.

In a different experimental context, Musumeci et al. (2010) observed delayed luminescence in certain ionic aqueous solutions, indicating that molecular rearrangements can produce excited states capable of emitting light with non-trivial kinetics.

Such phenomena support the hypothesis that the internal organization of water could influence its ability to emit low-intensity photons, like those measured in our study.

Current biophotonic measurements show that biodynamically treated water emits reproducibly in several key spectral windows, notably in the **300–400 nm** , **400–500 nm, 500–600 nm,** and **380–630 nm bands** , where control waters emit no light (0 RLU). This structured multi-emission suggests that different mechanisms could coexist: electronic transitions linked to residual chromophores, reorganizations of hydrogen-oxygen networks, photonic relaxation of structured microdomains, or coherent collective molecular dynamics.

Although experimental demonstration of the direct effect of magnetic fields, fluidic vortices or electromagnetic excitations on water remains limited and often debated, the phenomena observed in this study fall within the conceptual framework proposed by several authors.

This framework suggests that water could be sensitive to excitations capable of modulating its internal coherence state and, by extension, its ultra-weak photonic activity.

Thus, even if the exact origin of the observed emissions remains to be clarified, the results obtained here reinforce the hypothesis that biodynamically treated water could exhibit particular organizational properties, involving coherent collective dynamics. The presence of stable emissions in the blue-violet and near-UV (300–500 nm) ranges, frequencies associated with high-energy photons, also raises questions about possible interactions with biological chromophoric systems, particularly mitochondrial or nucleic acid systems.

In summary, the new measurements offer a robust experimental framework to consider that biodynamic water could exhibit supramolecular coherence properties close to those described by Elia, Napoli, Musumeci and their collaborators, while providing new data on structured photonic emission in the different bands of the visible and near UV spectrum.

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