



## Re-imagining the World of Diagnostics with B.EL.D™

ONE DEVICE, HUNDREDS OF APPLICATIONS

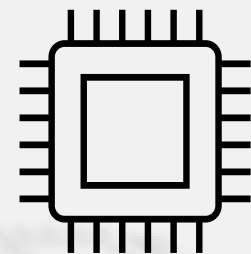
# About EMBIO

EMBIO Diagnostics is a **biotech company** which **designs** and **develops innovative, portable**, biosensor-based **digital devices** for **rapid diagnostics**.

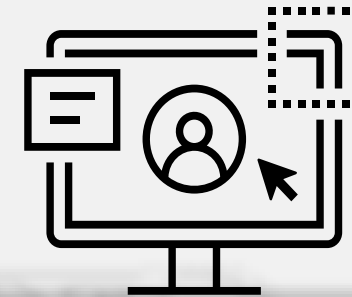
Our devices find applications covering the needs of a wide range of industries including **Environmental, Food safety and Medical sectors**.



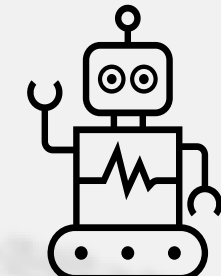
**Molecular and  
Bioengineering**



**Hardware and  
Electronics Engineering**



**Software Engineering**



**Machine Learning and AI**

# Our Laboratories

molecular laboratory



microbiological laboratory



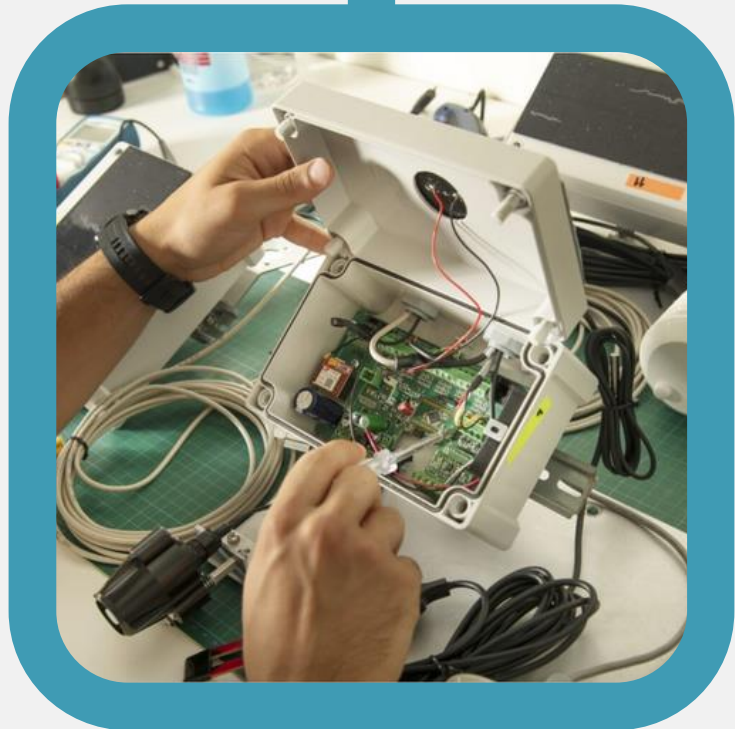
Selection as a FOODTECH 2022 Finalist



Winner of Global EBRD STARVENTURE challenge in 2020



Winner of Pan-European Network of Robotics DIHs for Agile Production

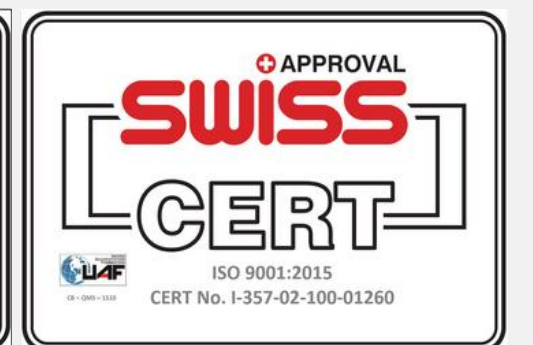


prototype and robotics laboratory

Chosen organization



Microsoft for Startups



# Introducing Bioelectric Diagnostics

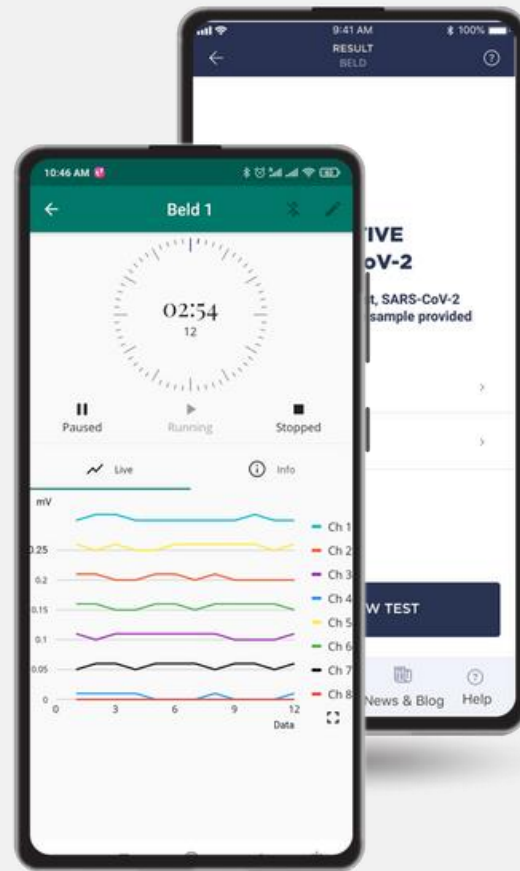
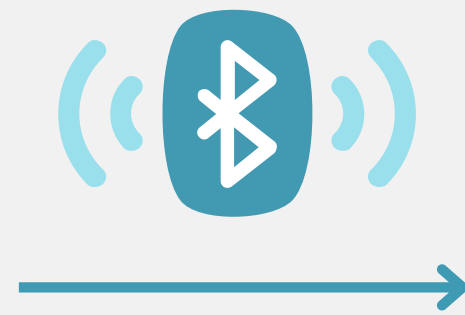
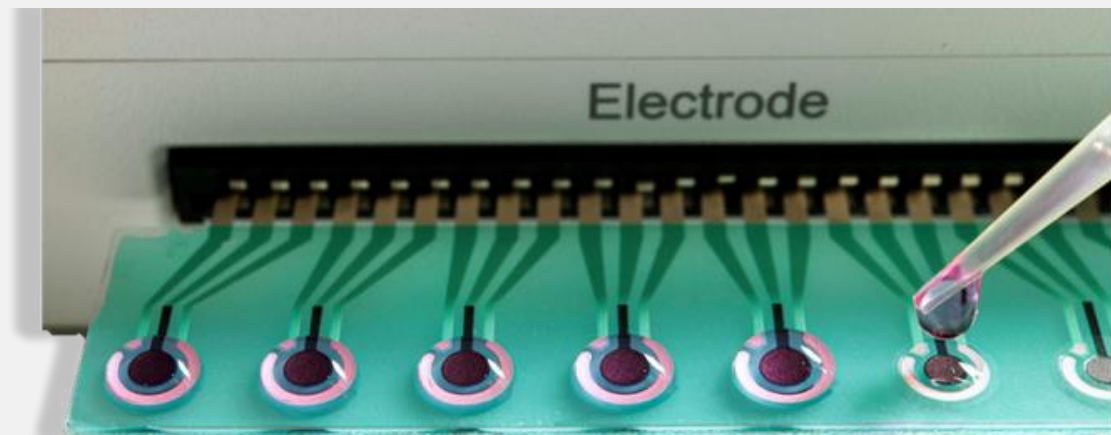


Rapid

PORTABLE

DIGITAL

 3 min





# Introducing **B.EL.D™**

B.EL.D™ uses open circuit potential and high-precision analog-to-digital converters to measure electrical signals, enabling high-performance control, parallel measurements and high-speed testing

- **Potentiometry**: electrochemical technique
- Uses screen-printed electrodes to detect analytes.
- **Measures changes in the potential** difference between two electrodes.
  - A working, a reference electrode, and a counter electrode are printed onto a substrate
  - Introduced samples cause a change in the electrochemical properties of the electrode surface
  - The potential difference between the working and the reference electrodes is then measured using a potentiometer
  - Changes in the potential difference are proportional to the ion concentration in the sample.



# Machine Learning Algorithm

By using machine learning, B.EL.D™ data analysis algorithms continuously improve their accuracy

01

## Data Set:

Data of analysis are obtained as a time-series of potentiometric measurements.

02

## Training / Testing Dataset:

The training dataset is used to determine the algorithm thresholds and the testing dataset is used for the algorithm evaluation.

03

## Processing / Feature extraction:

Two-step procedure:  
i) clean and calibrate data  
ii) extract feature vectors for algorithm development

04

## Algorithm:

The algorithm uses the feature vectors as input to produce/calculate the final results by setting thresholds.

Sample Evaluation



# Manage your B.EL.D device

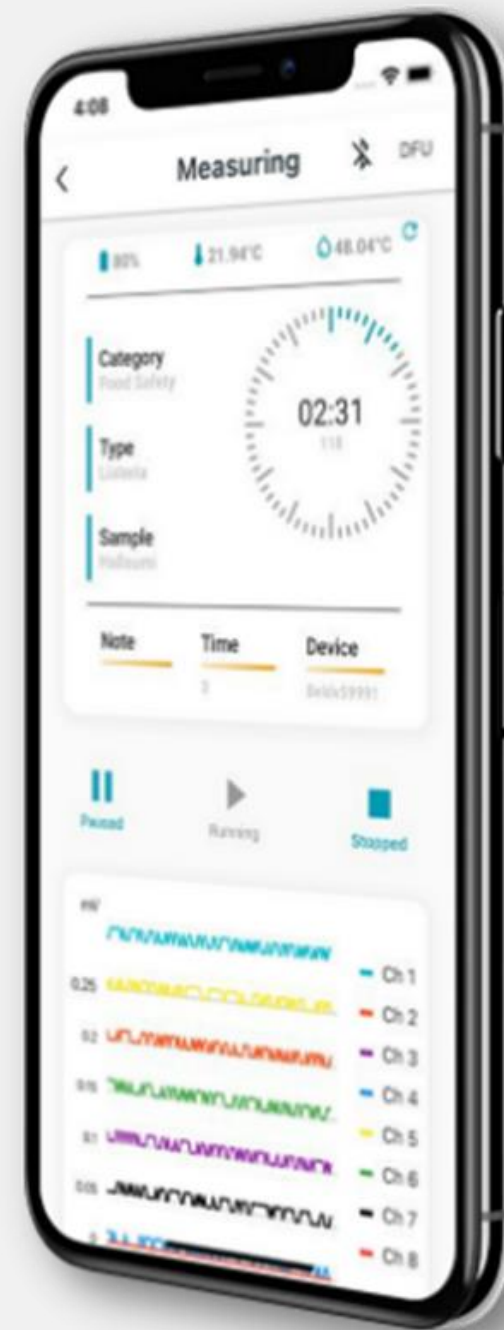
Use B.EL.D™ **Mobile App** to

- connect B.EL.D™ to your phone or tablet
- get results in the **App**
- share results with your team
- store data on the cloud

Use B.EL.D™ **Dashboard** to

- access raw data
- overview, compare, and analyze
- share with your team
- generate reports
- overview statistics

Download B.EL.D™ mobile application





## Benefits

- ✓ wireless and portable
- ✓ results in less than 3 min
- ✓ high sensitivity and specificity
- ✓ 100+\* tests per battery charge cycle
- ✓ up to 8 hours use on single charge
- ✓ usable at any location
- ✓ affordable consumables
- ✓ can be used by employee with no scientific background

\*number of tests varies on the environment, the user speed and the battery health of the device



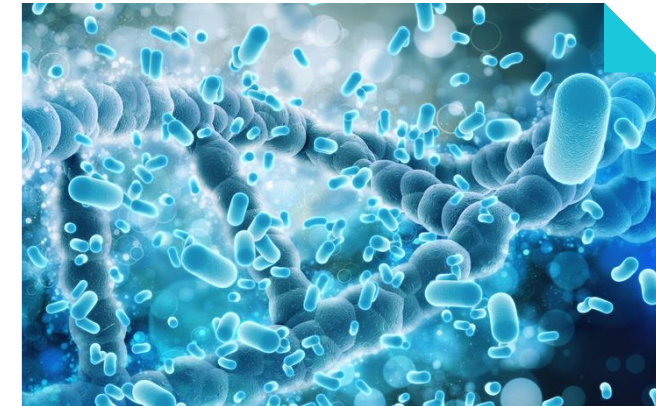


## Health facilities & food systems



### B.EL.D™ TVC

- Food & Beverage
- Pharmaceutical industry
- Health facilities
- Hospitality
- Laboratory
- Cosmetics



### B.EL.D™ Listeria M.

- Meat & meat products
- Dairy products & ice cream
- Leafy vegetables

### B.EL.D™ Ballast water

- Shipping companies
- Port authorities
- Cruise ships



### B.EL.D™ GAC

- Water treatment plants
- Air Filtration (i.e. F&B Industry)
- GAC manufacturers
- Sewage treatment plant
- Pharmaceutical industry

## Environmental

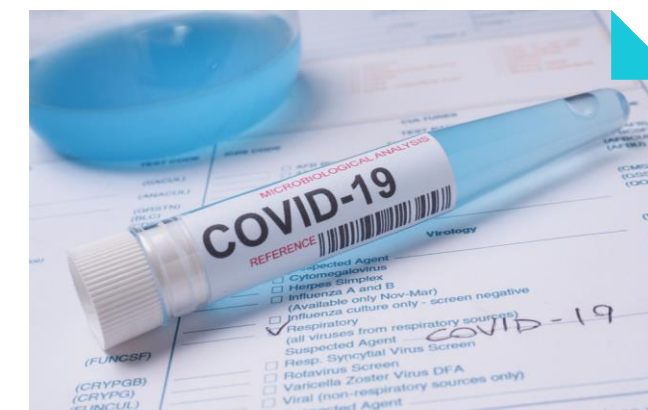


## Research applications



### B.EL.D™ Research

- Aptasensing
- Immunosensing
- Biological sensing
- Enzymatic sensing
- Direct detection
- Point-of-care diagnostics



### CoV-B.EL.D™

- Rapid
- Portable
- Digital



## INDUSTRY APPLICATIONS

- food & beverage preparation factory
- pharmaceutical industry
- health facilities
- hospitality
- laboratory
- cosmetics

## Benefits

- ✓ **real-time results** directly in the app & dashboard
- ✓ **portability and easy-to-use**
- ✓ high **sensitivity and specificity**
- ✓ **rapid** results
- ✓ **cost effective**



- ▶ Detects heterotrophic organisms, such as bacteria, within an environmental sample.

# B.EL.D™ Value Proposition



Unlock a **new level** of **efficiency, accuracy, and convenience**

- ✓ ensure that your production environments are **hygienic** and **comply** with **stringent quality standards**
- ✓ **identify** areas of potential contamination
- ✓ take **proactive measures**
- ✓ **prevent** microbial growth and **minimize** the risk of contamination-related issues



Microorganism	Sample	ATP Result	BELD Result
Enterococcus	10 <sup>6</sup>	X	✓
	10 <sup>7</sup>	✓	✓
	10 <sup>8</sup>	✓	✓
Listeria	10 <sup>6</sup>	X	✓
	10 <sup>7</sup>	✓	✓
	10 <sup>8</sup>	✓	✓
E.coli	10 <sup>6</sup>	X	✓
	10 <sup>7</sup>	✓	✓
	10 <sup>8</sup>	✓	✓
Salmonella	10 <sup>6</sup>	X	✓
	10 <sup>7</sup>	✓	✓
	10 <sup>8</sup>	✓	✓
Mix	10 <sup>6</sup>	X	✓
	10 <sup>7</sup>	✓	✓
	10 <sup>8</sup>	✓	✓

## Technical Specifications

<b>Package content</b>	BELD device, Power adapter, Cable USB-C, Screen-printed carbon electrodes (SPE) 10pcs, Quick Start Guide, Warranty Card
<b>Functions</b>	The B.EL.D Kit is an all-inclusive ultra-high, ultra-selective screening system, used to analyze any substance according to the potentiometry principle
<b>Electrode</b>	8-channel Carbon screen printed electrodes
<b>Device power input</b>	5VDC USB-C. Max. charging current 0.5A
<b>Casing</b>	White PC Makrolon® 2858, UV Stable (medical grade)
<b>Wireless interface</b>	Bluetooth® 5.2 with BLE, NFC-A
<b>Power adapter</b>	Input: 100-240VAC50/60Hz. Output:5VDC, max2A USB-A.
<b>Device life duration</b>	Warranty: 2 years, Battery warranty: 1 year
<b>Dimensions</b>	130 x 80,3 x 29,9 mm
<b>Battery</b>	1000mAh Li-polymer

# White papers

- Newly Developed System for the Robust Detection of Listeria monocytogenes Based on a Bioelectric Cell Biosensor
- A Cell-Based Bioelectric Biosensor for Salmonella spp. Detection in Food
- Newly Developed System for Acetamiprid Residue Screening in the Lettuce Samples Based on a Bioelectric Cell Biosensor
- Development and performance characteristics evaluation of a new Bioelectric Recognition Assay (BERA) method for rapid Sars-CoV-2 detection in clinical samples
- A cell-Based Biosensor System for Listeria monocytogenes Detection in Food
- Assessment of Cypermethrin Residues in Tobacco by a Bioelectric Recognition Assay (BERA)
- Neuroblastoma Cell-Based Biosensor
- Development of a Portable, Ultra-Rapid and Ultra-Sensitive Cell-Based Biosensor for the Direct Detection of the SARS-CoV-2 S1 Spike Protein Antigen





# CONNECT WITH US

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