BIOVITAE®

# SANITIZES
# PROTECTS
# ILLUMINATES

# SANITIZES PROTECTS ILLUMINATES

Biovitae is a patented LED sanitizing technology that uses a combination of wavelengths of the visible spectrum without UV, which can eliminate bacteria and viruses continuously and safely for people and animals.

A light that sanitizes air and surfaces without interrupting normal daily activities and illuminates the rooms in which it is installed with natural white light.

**Effective on viruses and bacteria, it kills 99.8 percent of Coronavirus within minutes.**

*Independent tests on the technology have shown a reduction of up to 99.8% on SARS-CoV-2 in 60' on surfaces. Independent technology tests on Staphylococcus aureus (MRSA, E.Coli, P.Aeruginosa and B. Atropheus, have shown a reduction of up to 99.9%% in 2 hours on all types of surfaces.

# BIOVITAE®

## SANITIZES
## PROTECTS
## ILLUMINATES

- Eliminates bacteria
- Eliminates viruses, including SARS-COV-2
- Penetrates and eliminates the biofilm
- Reduces odors**
- Reduces the risk of allergies*
- UV free
- For continuous use in the presence of people and animals
- Natural white light
- High energy efficiency

*Active on microorganisms that cause allergies through pollen or dust
**Of bacterial origin

# THE PROBLEM TO BE ADDRESSED

**ANTIMICROBIAL RESISTANCE (AMR) IS ONE OF THE TOP 10 GLOBAL PUBLIC HEALTH THREATS FACING HUMANITY.**

**WHY:**

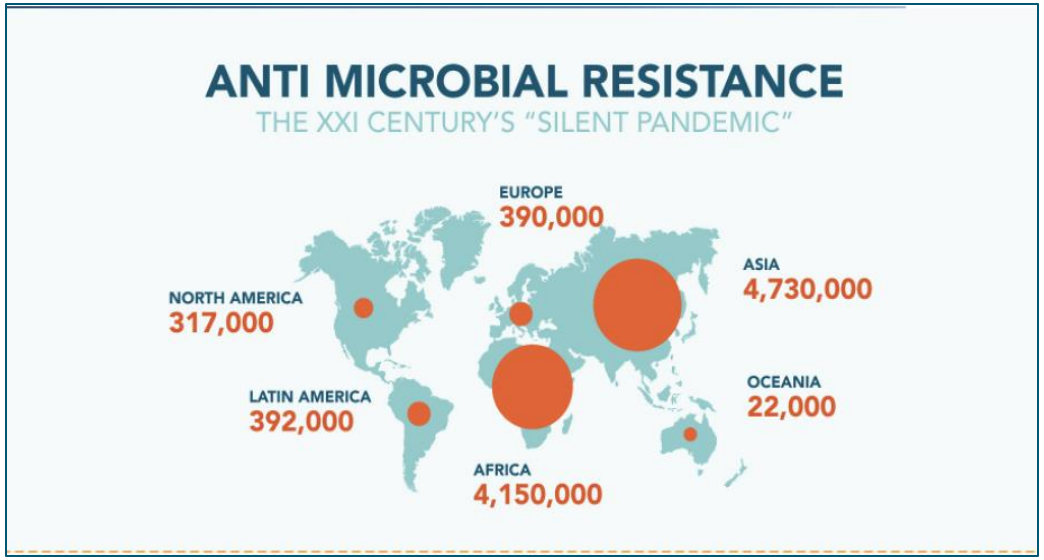
Abuse of antibiotics for inappropriate cures and chemicals for sanitisation/cleaning process

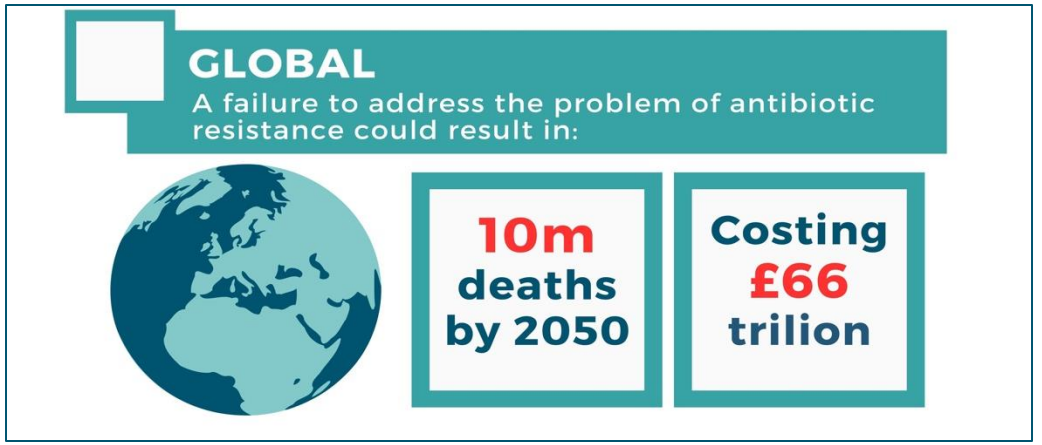
**CONSEQUENCES:**

- **2019**: 1.27 million direct deaths and 4.95 million deaths associated with bacterial AMR
- ***By 2050:*** up to 10 million deaths globally per year - on par with the 2020 death toll from cancer.
- **Economic impact**: next decade gross domestic product (GDP) shortfall of US$ 3.4 trillion annually and push 24 million more people

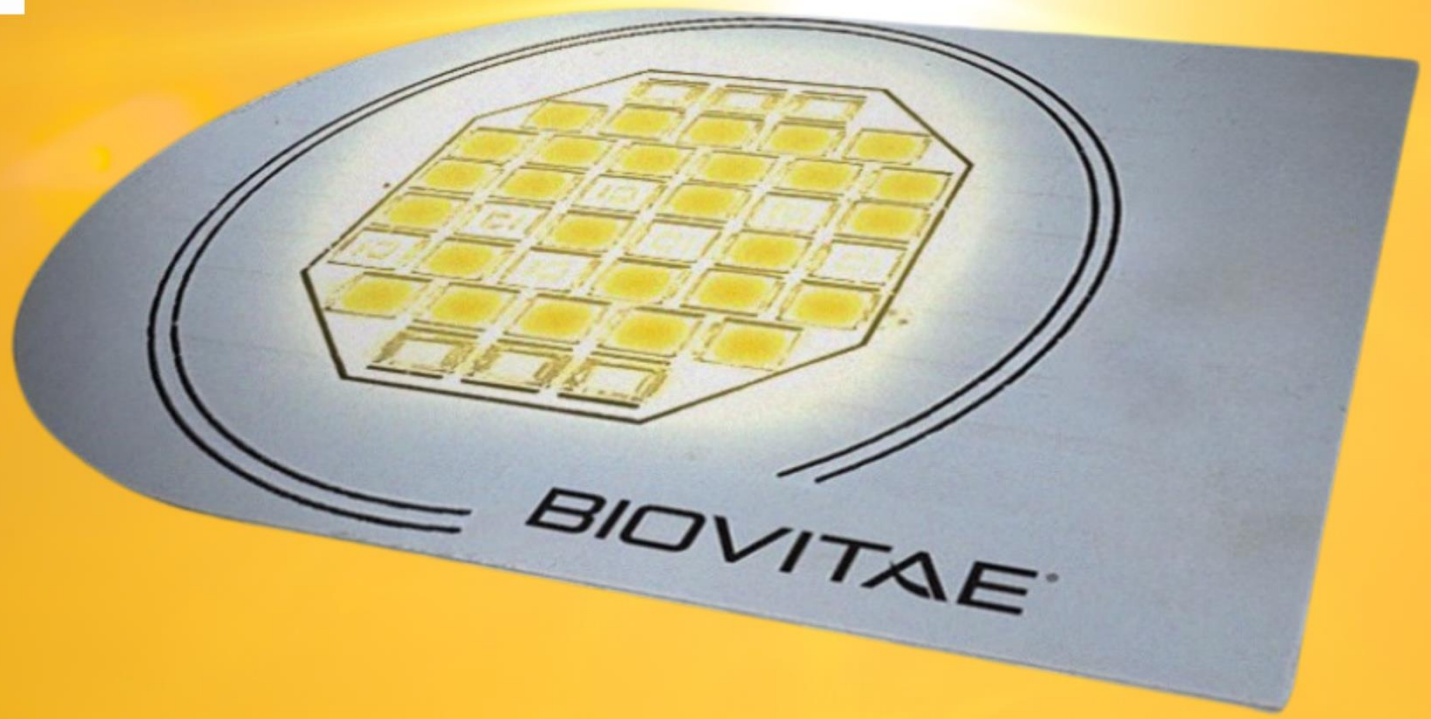
**SOLUTIONS:**

- **Reduce and monitor the use of antibiotics**
- **Use of NPI's cleantech in the daily cleaning and sanitisation processes**



# BIOVITAE, THE LED WITH THE SUN INSIDE



# BIOVITAE,
# HEALTHTECH TECHNOLOGY FOR SAFE, CONTINUOUS AND SUSTAINABLE SANITIZATION

**WORKS ON AIR AND SURFACES, EVEN IN THE PRESENCE OF PEOPLE**

**LED (UV-FREE) NO RISK OF EXPOSURE**

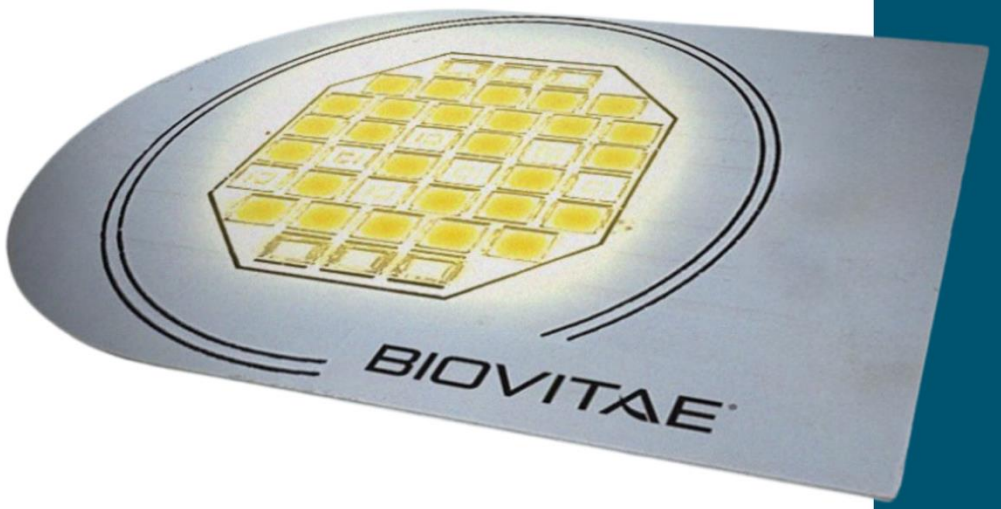
**SANITIZE DURING DAILY ACTIVITIES**

# BIOVITAE HEALTHFUL AND SAFE: HEALTHY AND SAFE ENVIRONM

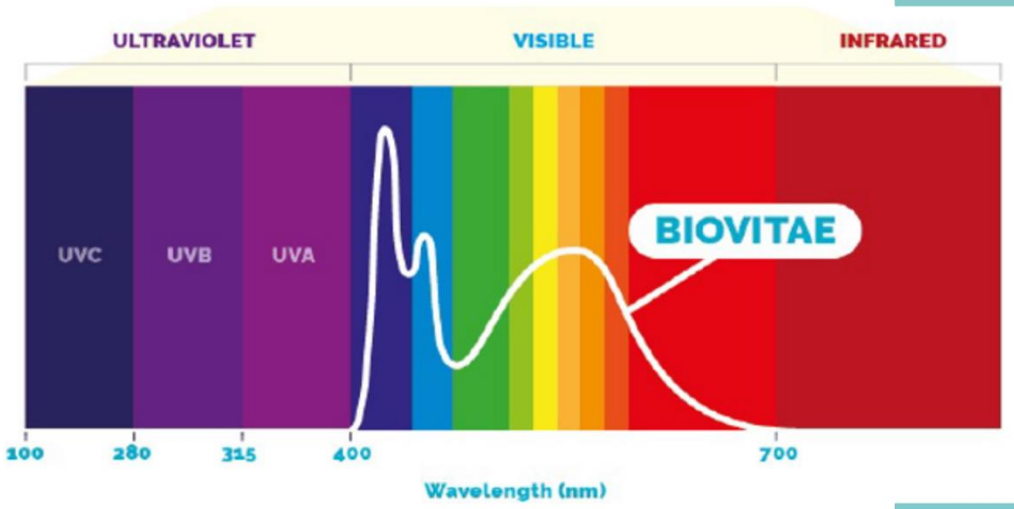
**Only BIOVITAE offers continuous sanitization and contextual lighting of environments in a totally safe way for humans with the same device. Alternatively, it can be used only with the sanitization function for specific applications.**

Neither ultraviolet (UV) light frequencies nor chemical disinfectants nor HVAC systems can guarantee continuous sanitization of air and surfaces in rooms because they cannot be used in the presence of people and are harmful to the environment and living beings.

# BIOVITAE OVERVIEW




**Biovitae replicates the visible spectrum of sunlight with a patented peak in the 400-420nm band (Soret band).**
**It is completely UV free**

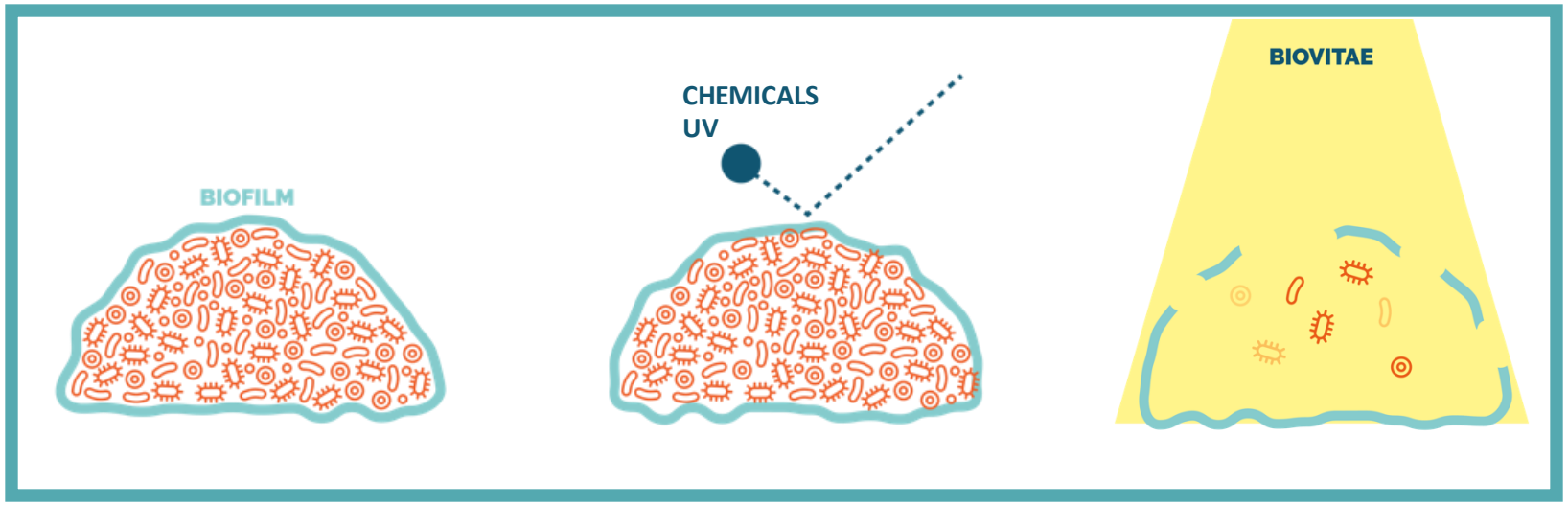



**It has been scientifically proven that the frequencies of the Soret band (400-420nm) are able to eliminate viruses and bacteria, including those protected by Biofilm, through irreversible damage to the membrane**

# BIOVITAE IS EFFECTIVE ON BIOFILM

Biofilm is an invisible gelatinous mass that adheres to surfaces and protects bacteria from environmental stress.
Bacterial cells within the biofilm become more resistant to disinfectants, antibiotics, and immune system attacks.

The bacterial biofilm is **the main cause of antibiotic resistance and infections: Between 60% and 80%* of microbial infections are associated with biofilm formation.**




**CHEMICALS AND UVS ARE NOT ABLE TO ELIMINATE THE BIOFILM, VISIBLE LIGHT CAN PENETRATE IT BUT ONLY THE FREQUENCIES OF BIOVITAE ARE ABLE TO DEGRADE IT AND KILL THE BACTERIA INSIDE IT.**

# SANITIZATION TECHNOLOGIES COMPARED



| | | | SANITIZATION BY LIGHT | | |
|---|---|---|---|---|---|
| | **CHEMICAL SANITIZATION** | **HVAC** | **UV-C** | **SINGLE BLUE 405nm FREQUENCY** | **BIOVITAE** |
| TYPE OF SANITIZATION | Flash and manual | Continuous and passive | Episodic | Episodic | Continuous and passive |
| CONTINUOUS SANITIZATION IN PRESENCE OF LIVING BEINGS | ✗ | ✓ | ✗ | ✗ | ✓ |
| SIMULTANEOUS EFFECTIVENESS ON AIR AND SURFACES | ✗ | ✗ | ✓ | ✓ | ✓ |
| ACTS EFFECTIVELY ON ALL PATHOGENIC MICROORGANISMS | ✗ | ✗ | ✗ | ✗ | ✓ |
| RISK OF USE | Harmful | Safe | Harmful | Medium | Safe |
| ENVIRONMENTAL IMPACT | High | High | High | Medium | Very Low |
| PRICING AND ENERGY CONSUMPTION | Low pricing, requires an operator | Very High | High | Medium - High | Low |

# WHERE

General Lighting

Biosafe Environments




Vertical Applications


CHEMICALS
UV-C
405NM BLU-VIOLET
BIOVITAE

# BIOVITAE IS CLEANTECH

**BIOVITAE is the greenest sanitization system of the future.**

It reduces the environmental impact and guarantees continuous sanitization in the presence of people and animals, with high performance and low consumption.

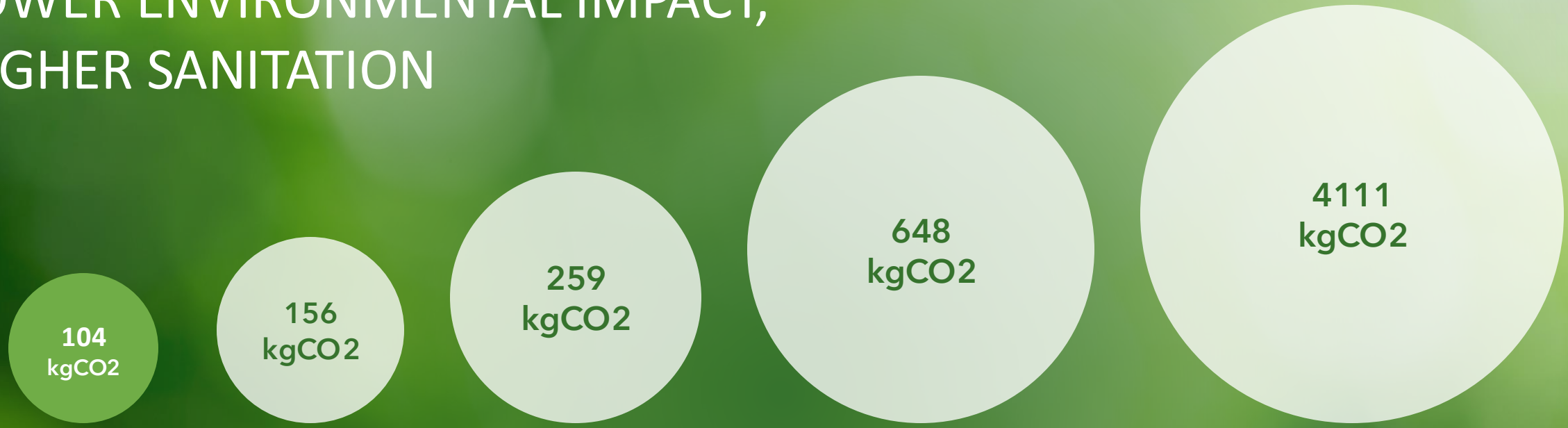
**High energy efficiency class**

**Does not release pollutants**

**No consumables required** until the end of life
**All devices are recyclable** according to the European WEEE Directive

**All-in-one,** built-in sanitization and lighting function **without additional energy required**

# LOWER ENVIRONMENTAL IMPACT, HIGHER SANITATION




| **BIOVITAE**<br>Panel 60x60 | **UV 222nm**<br>R-Zero VIVE | **405nm**<br>Ledtailor P100<br>60x60 panel | **UV 254nm**<br>R-Zero Beam | **HVAC**<br>Media di settore |
|---|---|---|---|---|
| LOWER ENVIRONMENTAL IMPACT OF BIOVITAE % | -50% | -149% | -523% | -3853% |

The CO2 emission intensity (kg CO2/kWh) is calculated as the ratio between the CO2 emissions of public electricity production (as the share of CO2 emissions of public electricity and heat production related to electricity production) and the gross production of electricity. The CO2 emission intensity values of sanitization technologies were calculated as the product of the average CO2 intensity in the European Union and the annual electricity consumption in one year required by the different sanitization technologies.
***Fonte***:https://www.rensmart.com/Calculators/KWH-to-CO2

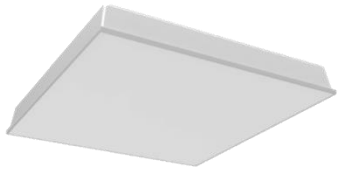
# BIOVITAE SANITIZING LIGHT + IOT – SMART BUILDING

BIOVITAE can be completed with wireless devices to create a **SMART BUILDING** network to be able to manage it remotely from any tablet, smartphone and PC.

# BIOVITAE PRODUCTS

# "ALL IN ONE" DEVICES

## SANITISATION + ILLUMINATION



**BIOVITAE PRO**

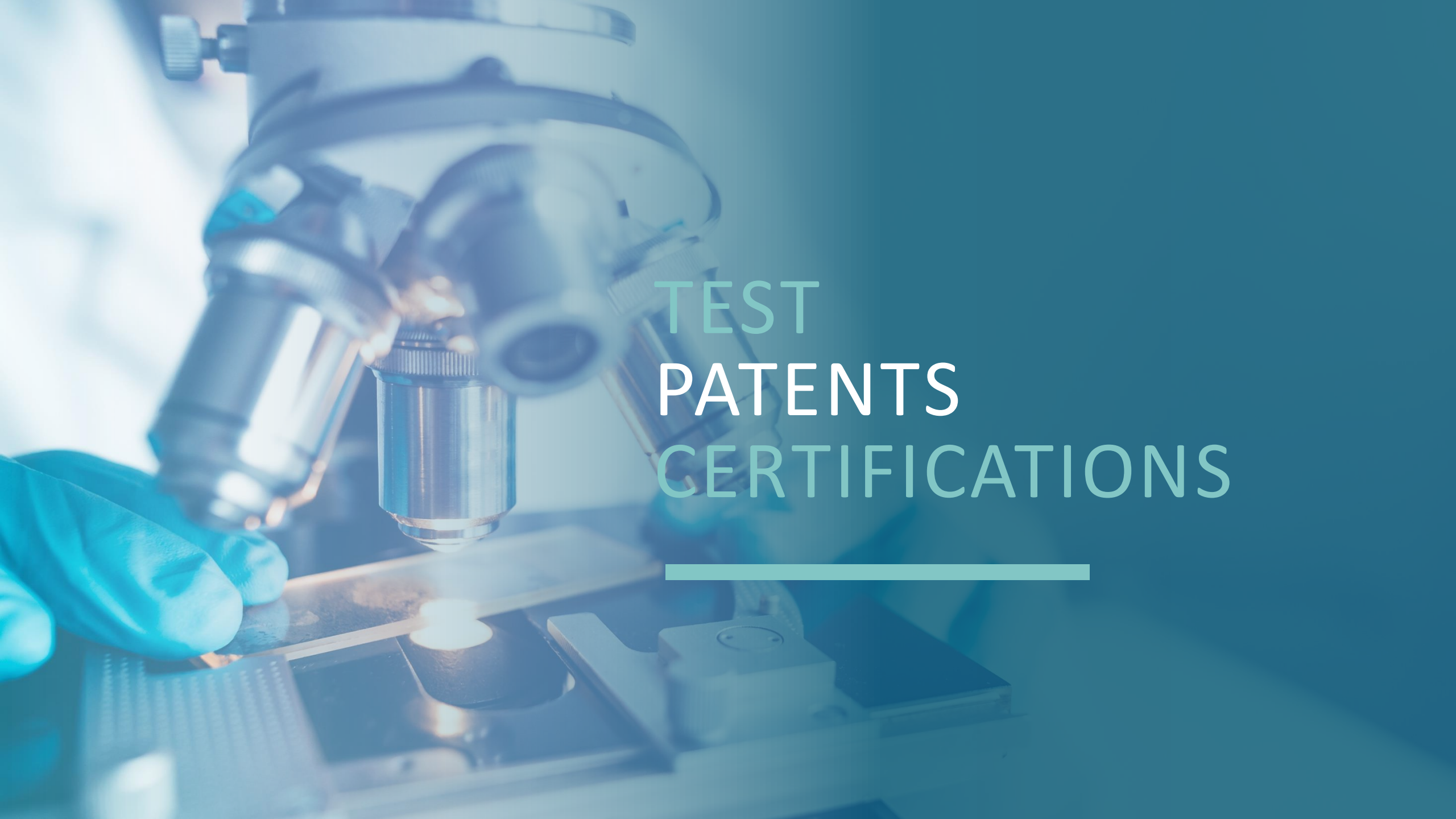
**BIOVITAE LOBBY**

**BIOVITAE ORBIT**


**BIOVITAE DOMUS**

**BIOVITAE GU10**

**BIOVITAE TUBE**


TEST
PATENTS
CERTIFICATIONS

# TEST ON VIRUSES

(in vitro)

- Vaccinia (Monkeypox)
- Chikungunya
- Sars-CoV2
- Yellow Fever

Rapid inactivation of SARS-CoV-2 with LED irradiation of visible spectrum wavelengths

Contents lists available at ScienceDirect

Journal of Photochemistry and Photobiology

journal homepage: www.sciencedirect.com/journal/journal-of-photochemistry-and-photobiology

[a] Scientific Department, Army Medical Center, Rome, Italy
[b] 7th CBRN Defence Regiment "Cremona", Civitavecchia, Italy
[c] Department of Infectious Disease, National Institute of Health, Rome, Italy
[d] Department of Public Health and Infectious Diseases, Laboratory Affiliated to Pasteur Italia-Fondazione Cenci Bolognetti, "Sapienza" University of Rome, Italy
[e] Department of CBRN Protection and Security, Swedish Defence Research Agency (FOI), Umeå, Sweden
[f] Section Viral and Intracellular Pathogens, Bundeswehr Institute of Microbiology, Munich, Germany

# TESTS ON BACTERIA

(in vivo and in vitro)

- E. coli MG1655 (ATCC 700926)
- E. coli, ATCC25922
- S. typhi (Ty21a-ATCC 33459)
- Klebsiella spp.,
- Enterobacter spp.,
- Pseudomonas spp.,
- S. aureus,
- S. microti,
- S.agalactiae
- M.tuberculosis
- E. coli (ESBL/ Carbapenems)
- S. aureus Methicillin (MRSA)
- P. aeruginosa Fluoroquinolones /Carbapenems
- A. baumanni. Fluoroquinolones / Carbapenems
- Klebsiella spp (ESBL/ Carbapenems)

## PATENTS GRANTED

ITALY
IT102016000078746

INDIA

USA
B2

JAPAN

SOUTH KOREA

AUSTRALIA

BRAZIL

ITALY
IT102016000036840

ITALY
02017000047217

ITALY
IT201800005509

## PENDING PATENTS

EPO

RUSSIA

EPO

ITALY
102023000004932

ITALY
102024000005056

TAIWAN

ITALY
102024000019702

ITALY
102024000019753

ITALY
102024000019759

ITALY
102024000019771

## CERTIFICATION, COMPLIANCE AND AWARDS

## AWARDS

Best Innovation
2019

Best Innovation
2020

Best Innovation
2020

Best Innovation
2021

Best Innovation
2023

Best Startup
2023

UK Inward Mission
2024

# SCIENTIFIC COLLABORATIONS

The International Centre for Genetic Engineering and Biotechnology (by UNIDO)

Le Commissariat à l'énergie atomique - France

Scientific Department Italian Military Army

Swedish Defence Research Agency

Bundeswehr Institute of Microbiology Germany

Italian National Agency for New Technologies, Energy and Sustainable Economic Development

intergovernmental organisation for agriculture and nutrition security

Technical Research Centre of Finland

Centro Italiano Ricerche Aerospaziali

Istituto Dermopatico dell'Immacolata

SAPIENZA UNIVERSITÀ DI ROMA

TOR VERGATA UNIVERSITÀ DEGLI STUDI DI ROMA

UCBM UNIVERSITÀ CAMPUS BIO-MEDICO DI ROMA

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

UNIVERSITÀ DEGLI STUDI DI SALERNO

UNIVERSITY OF BIRMINGHAM

# POLICY MAKERS

PATH (Program for Appropriate Technology in Health) is an international, nonprofit global health organization based in Seattle with 1,600 employees in more than 70 countries around the world. PATH focuses on six platforms: vaccines, drugs, diagnostics, devices, system, and service innovations.

Unitaid is a global health initiative that works with partners to bring about innovations to prevent, diagnose and treat major diseases in low- and middle-income countries, with an emphasis on tuberculosis, malaria, and HIV/AIDS and its deadly co-infections

Joint Research Partnership Healthcare Infrastructures is a technology partnership to develop and test new technologies for use in the Hospital of the Future

United Nations program to accelerate, intensify and coordinate global action against AIDS

Launched during the work of the World Health Assembly in Geneva in 2019, the is a UNAIDS initiative to intercept technologies and startups with the highest potential for impact in the healthcare sector

Accelerator launched by global health organization PATH and the Commonwealth to promote the development and implementation of innovations that help public health systems and communities mitigate and adapt to the impacts of climate change

The AMR Innovation Mission UK 2024 is a programme that has as its overarching objective to contribute to the global reduction of antimicrobial resistance ("AMR") by promoting collaboration and joint innovation with UK businesses

# INSTALLATIONS
## BIOVITAE

# VERTICAL APPLICATIONS

**BIOVITAE VERTICAL APPLICATION FOR WHITE GOODS**

- **Prototyping and industrialization** of the Biovitae vertical application for household appliances
- **Validation of** efficacy of the integration of Biovitae into dishwashers through tests conducted under real-world conditions: **reduction of the microbial load and of bad odours**
- **Presentation at IFA 2024 international trade fair in Berlin** of the new line of dishwashers **I-PRO SHINE** with Biovitae technology
- **Commercialization of HAIER products - BIOVITAE INSIDE** is scheduled for Q2 of 2025

NEW LINE OF **DISHWASHER Brand I-PRO SHINE** WITH **BIOVITAE TECHNOLOGY** PRESENTED AT IFA 2024

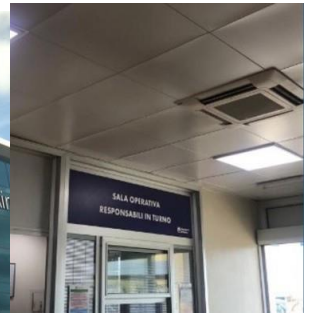
Key Players Haier

# HEALTHCARE



**IDI (Istituto Dermopatico dell'Immacolata)**
Rome, Italy

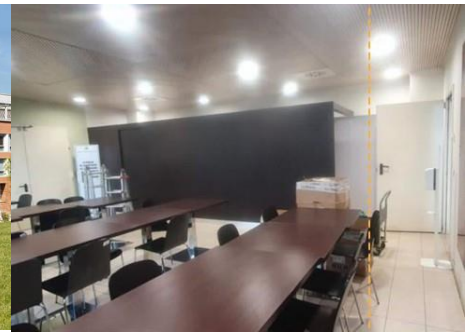
**Outpatient clinic** Court of Auditors


**ADR –** Emergency Hospital , Fiumicino, Italy

# HEALTHCARE

**Montevergine Hospital** Operating Cardiology Room
Campania



**University Campus Biomedico**

.

# EDUCATION

**Moscato High School** – Sant'Antimo, Italy

**University Of Camerino** –Camerino, Italy


**Dublin City University –** Dublin, Ireland

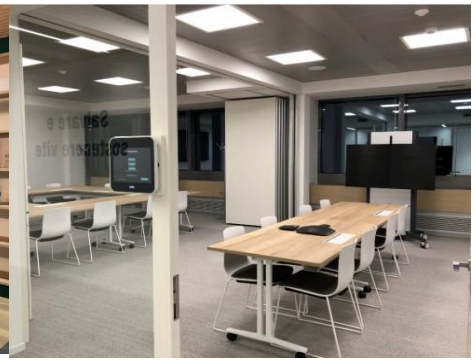
# EDUCATION

**Il Calore delle Coccole Kindergarten**–Ottati, Italy

**St. Walburg Elementary School –** St. Walburg**,** Germany

# OFFICES AND BUILDINGS

**Prefecture**– La Spezia, Italy



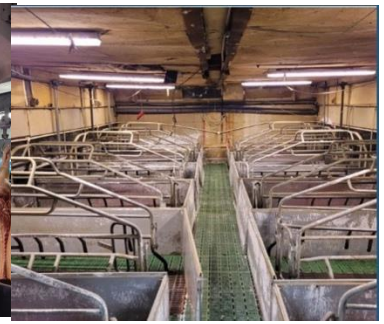
**Pharmaceutical Headquarter**–Rome, Italy


**Lazio Innova Hub –** Rome, Italy

# LIVESTOCK AND FOOD PROCESSING




**La Granda Factory**– Genola, Italy



**Irish Piggery**–, Ireland

**Dairy Torricelle** – De Vivo Agriculture factory- Salerno, Campania

# SUPERMARKETS

**La Cooperativa- refrigeration project** –
Cortina D'Ampezzo


**COOP**– Bologna, Italy

# COMMERCIAL AND SPORT


**Lavazza Flagship Store –** London, UK


**Sampdoria Football Club**– Genova, Italy

# VERTICAL APPLICATION

**Buses in Germany–** Germany

**Automotive industry–** ongoing

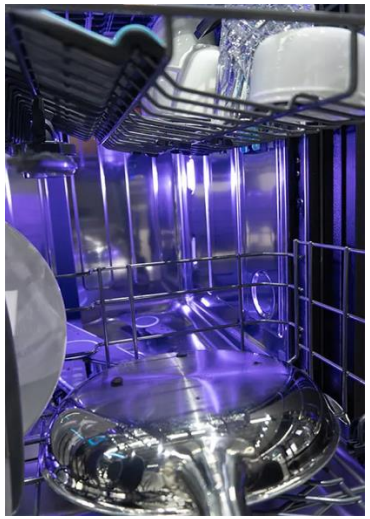
**Rail transport–** ongoing

# VERTICAL APPLICATION



**Poste Italiane – POLIS Project**, Italy

Installazione della tecnologia Biovitae su 1.200 screens of the self-service ticket machines of **Poste Italiane point .**




**Haier – IFA** Berlin 2024

Presentazione della nuova linea di lavastoviglie haier i–pro shine con la tecnologia Biovitae

BIOVITAE®

P&P PATENTS AND TECHNOLOGIES

NEXTSENSE NEXT TO THE FUTURE

**P&P PATENTS AND TECHNOLOGIES S.R.L.**
Via della rotonda 36 00186 Roma
Tel.+39 (0)6 69322721
Info@p-ptech.lt

**NEXTSENSE S.R.L.**
Via della Rotonda 36 00186 Roma
Tel.+39 (0)6 69322721
info@nextsense.it

www.biovitae.it