



DAVID: Innovation & circular economy against Covid-19

The collaborative project DAVID, selected in the Conecta Covid 2021 programme of the Galician Innovation Agency (GAIN), whose funds are aimed at facing the pandemic and contributing to the promotion of the digital transition of the Galician business fabric



PROJECT OBJECTIVE

DAVID consists of the development of an intelligent mobile laboratory, with clean room conditions and energetically self-sustainable, for the development of surface and skin cleaning products with biocidal activity from recycled oils for the prevention of COVID-19.

APPROACH AND SOLUTION

According to the Ministry of Agriculture, Fisheries and Food (MAPAMA), a single litre of used oil can contaminate up to 1,000 litres of water, which greatly

harms the ecosystem. Every year, about 150 million litres of used food vegetable oil are generated in Spain. With this project, used food oils are recycled, which are then filtered and ozonated in a smart laboratory for the formulation of the biocidal gel.

During ozonation (oxidation with ozone), vegetable oil undergoes a systematic breakdown of its fatty acid chains producing molecules with high healthy value. This helps the process to destroy the residues (non-fat molecules) produced by the cooking of edible oils. The result is a fatty acid in the form of oil that contains antiseptic properties and absence of any contraindications.

OFFSITE CONSTRUCTION OF THE SMART LABORATORY

The whole production process will take place in the intelligent laboratory, an industrialised / modular building developed offsite using innovative techniques (digital twin software), manufacture and assembly of construction elements, materials and construction systems.

The laboratory will be provided with "intelligence" through the digitisation with tools that allow the control of monitoring and predictive parameters. These tools -IoT (Internet of Things), Artificial Intelligence and Big Data- will exploit the data both from the production and general facilities of the laboratory itself, guaranteeing that the parameters are adequate for the production process. The laboratory includes a management platform equipped with cybersecurity.

THE TEAM

DAVID is born from the union of biotechnology, IoT (Internet of Things), Big Data, recycling and above all, innovation. Its name, DAVID, stands for:

- ✓ D-esinfección
- ✓ A-ceite
- ✓ co-VID

DAVID's team is formed by:

- **KeyBiological** - Project leader and ozone oil peroxidation officers
- **BFlow** - Oil Filtering
- **Soltec Ingenieros + Versa Real Projects** - management, design and construction of the mobile smart laboratory from the reutilisation of shipping containers
- **Perfect Numbers** - Automated and remote control with big data for the mobile laboratory
- **INNPLICA** - Applied Innovation (innovation consultancy)

SOLTEC INGENIEROS' ROLE

Our team, Soltec Ingenieros, together with our spin/off Versa Real Projects as partners for the construction of the modular container-laboratory, are responsible for:

- The creation of a modular and mobile laboratory customising, reusing a maritime container, with the control of the parameters of habitability and registration of use, and with the possibility of varying its size in a modular way.

- Investigating the possibility of providing the modular laboratory with self-sustainability through renewable energies (photovoltaic), and determine in which scenarios the energy independence of the module would be possible. The laboratory will also have the categorisation of buildings of high efficiency and almost zero-energy consumption.
- Providing the modular laboratory with intelligence through the analysis and control of the environmental conditions of its different compartments (raw material warehouse / finished product and production), in order to correlate different quality parameters to optimize production.
- Developing a methodology that allows analysing the complete life cycle of a sustainable industrialised modular building through 4.0 technologies. Conception, project, industrialised construction, on-site implementation, operation and maintenance, end of life and recycling components.
- Calculation of the life cycle analysis of the sustainable industrialised modular laboratory, from which objective and quantified data will be obtained regarding the carbon footprint, water and energy consumption, and the generation of waste throughout the life of the building.
- Developing a digital laboratory management platform (energy, predictive maintenance facilities, presence control, and cybersecurity).

Once validated with the DAVID project, this modular smart laboratory with clean room conditions could be extrapolated to other uses (hospitals, pharmaceuticals, biotech, electronics...).

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