

AOTECH

ADVANCED OPTICAL TECHNOLOGIES S.L.

Experts on optical sensors technology



Presentation

Origin:

- Spin-off from the research group Applied Photonics Group (University of the Basque Country)

Company mission:

- To apply photonic solutions to all kinds of industries.

Own technology:

- Integration of spectroscopy-based sensors in food processes.
- Biosensors development for food, water and healthcare sector.
- Chemical baths monitoring system.

PROBLEM

FOOD INDUSTRY DIGITALISATION

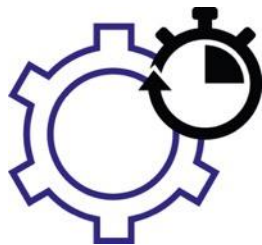
- ✓ Data through advanced instrumentation.
- ✓ Useful information.
- ✓ Real-time production adjustment and improved management.



OBJECTIVES:

✓ Efficiency

Lower production costs, waste and reprocessing; resources optimisation.



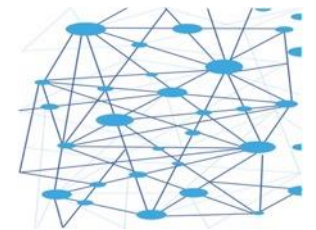
✓ Quality

Quality assurance, consistency, customer satisfaction and loyalty.



✓ Traceability

Origin and characteristics of the raw material assurance and detection of counterfeit products.
Security.



AONIR Platform



- ❑ NIRS based sensors for in-line and real-time food production characterisation.
- ❑ 1 Single device → 2 versions (Contact/Non-Contact).
- ❑ Sending final data to PLC / SCADA / IoT.
- ❑ Calibration development and maintenance service.

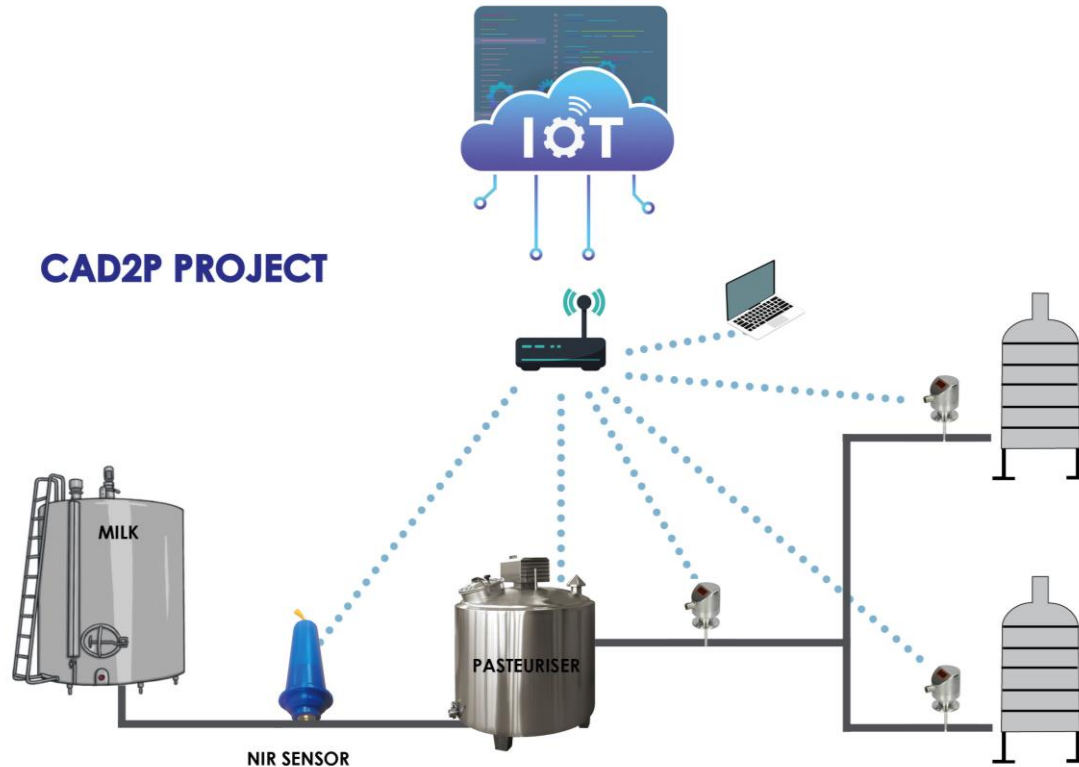


Main Food Applications

- ✓ **Non-destructive** measurements and determination of multiple parameters **at the same time**.
- ✓ Optimal results for **different kinds of products**: liquids, powder, grains, slurries, etc.
- ✓ **Real-time data and in-line** installation.
- ✓ Total quality management from raw materials to finished product → increase product **quality and consistency** with tighter control.
- ✓ **Optimisation** of mixing times / **Monitoring** of fermentation / **Energy savings** in drying process → **Real-time** determination of moisture.

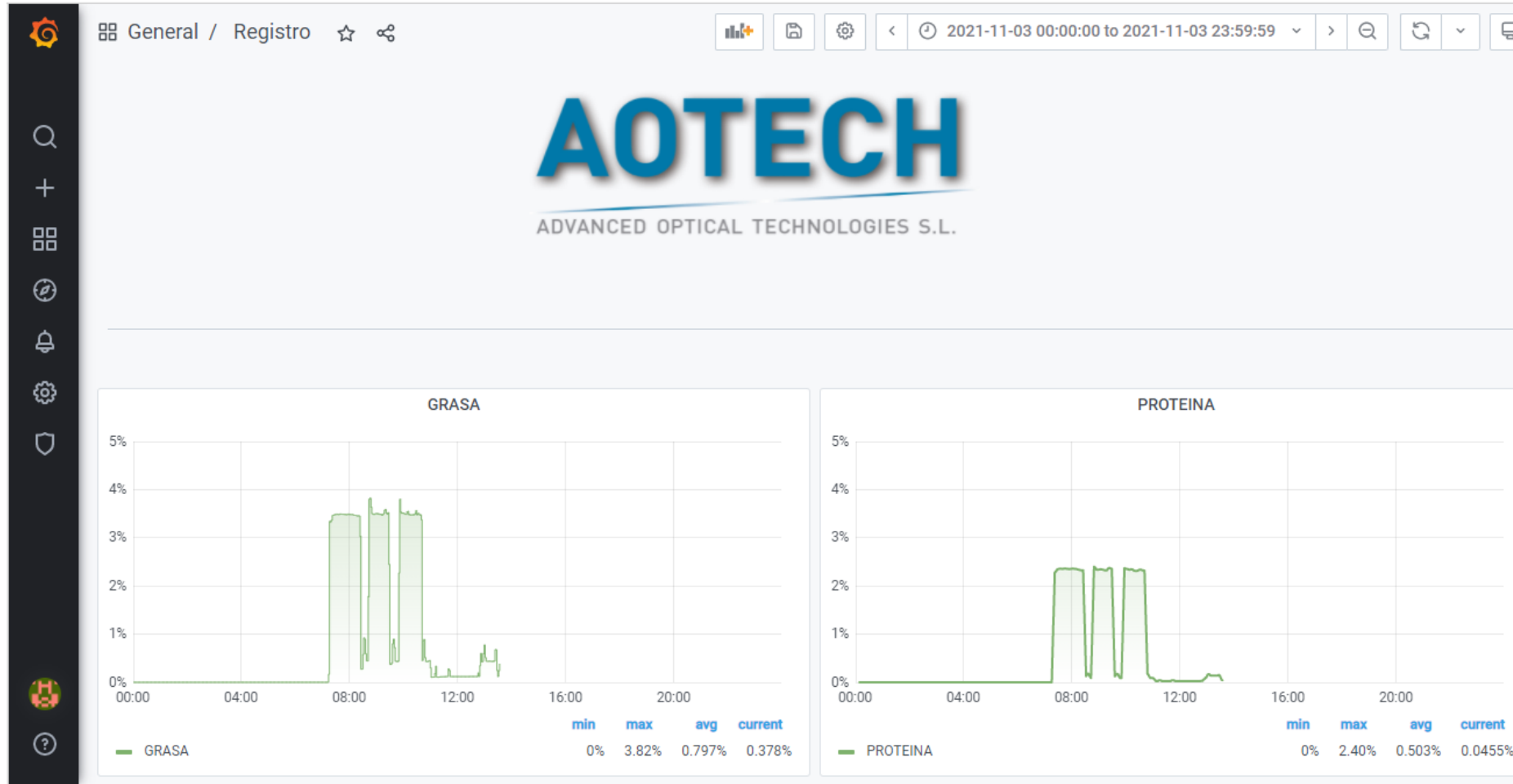


Recipe adjustments for Greek Yoghurt production



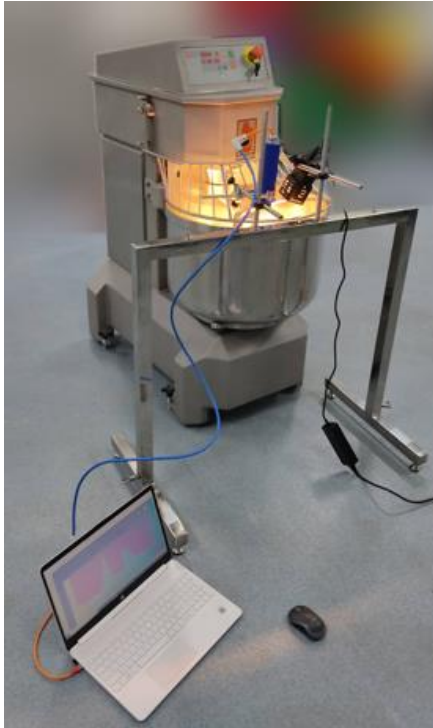
70% reduction in the variability of fat and protein content of the final product.

AONIR Platform



- ✓ DATA COLLECTION
- ✓ REPORTS
- ✓ ALARM SETTINGS

Pilot Projects



Kneading
process
evolution.



Fermentation process characterisation.



In-line monitoring of fat, protein and salt
concentrations.

POCs

OLIVES:

- Pesticide
- Herbicide

MAYONNAISE:

- Fat
- % ○ Protein
- Sugar
- Salt

Olive Oil:

- Cross-contamination with other vegetal oils

Milk Powder:

- Fat
- % ○ Protein
- Moisture

Feeds:

- Fat
- Protein
- % ○ Starch
- Fibre
- Ash
- Moisture

Wine analysis:

- Actual alcoholic strength (%vol)
- Total Tartaric Acidity (g/L)
- pH
- Volatile Acetic Acidity (g/L)
- Reducing sugars (g/L)
- Glucose-Fructose (g/L)
- Malic Acid (g/L)
- Lactic Acid (g/L)
- Relative Density (20C)

Spectroscopy + IoT + Blockchain



TRACEABILITY

Spectroscopy + IoT + Blockchain



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Prueba Blockchain



Producto Manzana: da871c140e3fca66111a4fac85db56496d5bf99aef13e3c56aec678ad27ef8ac

CODECONTRACT SL CERTIFICA que a 27/2/23 se ha registrado satisfactoriamente la prueba realizada por Eneko Perez (AOTECH). Dicha Prueba se desglosa a lo largo del presente certificado.

Información de la prueba

Raíz de la prueba: 9294e4b9d92c230258020a8d8ae84d95af0dc46cc37ba0aa1b4e8895e2ad98ed

Huella digital de la prueba: da871c140e3fca66111a4fac85db56496d5bf99aef13e3c56aec678ad27ef8ac

Código de verificación: 14a448484ded13024fe4a213d9b6e4599855dbfa87a1f7bb8249a2b418b9c097

Fecha: 2023-02-27 14:32:59 UTC

Metadatos de la prueba

Clave	Valor
Producto	Manzana
Azúcar	14,7%
Acidez	0,25%

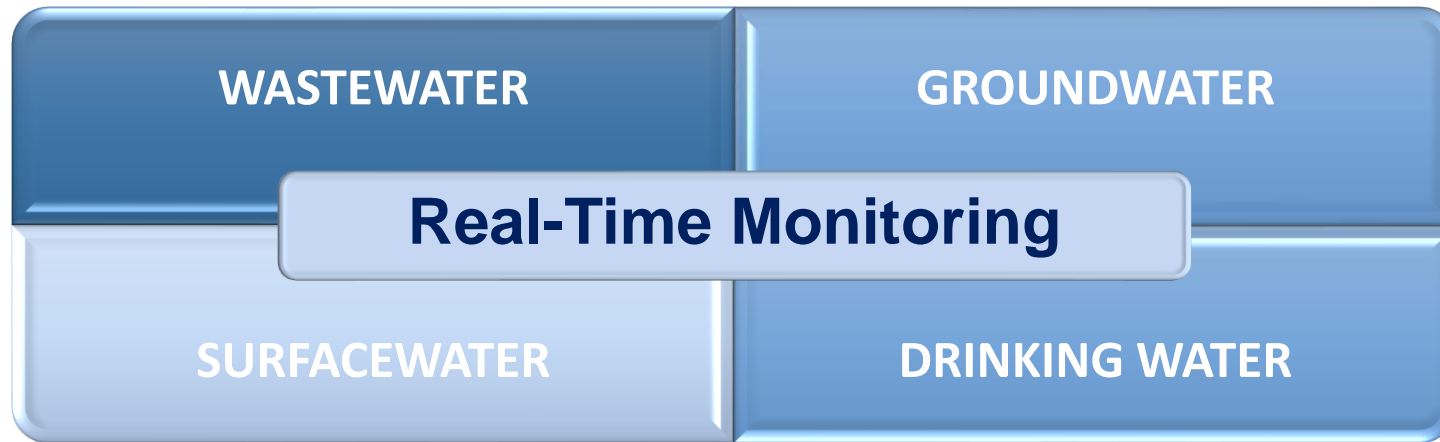
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Este certificado cumple con todas las normativas vigentes descritas detalladamente en las Condiciones de Servicio. CODECONTRACT SL C/ Pérez Galdós 22, 48010. Bilbao (Vizcaya) B-95973996 Inscrito en el Registro Mercantil de Bizkaia al Tomo 5886, Folio 72, Hoja B174144

- ✓ Acidity
- ✓ Sugar contents
- ✓ Firmness
- ✓ Origin



Real-Time Characterisation of Water Treatment Plants and Aquaculture



Real-Time Monitoring of Various Parameters:

- ☐ COD (Chemical Oxygen Demand)
- ☐ Nitrates
- ☐ Nitrites
- ☐ Ammonium
- ☐ Ammoniacal Nitrogen
- ☐ Phosphorus



RT-MonCheBa: *Feasibility study for real-time monitoring of chemical baths.*

Feasibility study. Duration of the project: 01/12/2023 - 31/05/2024

Objective

“Support manufacturing SMEs in adopting advanced technologies to become more efficient and sustainable.”

Mirvat

Optimisation of the control of chemical baths used in surface treatments → reduction of waste and defects in parts.

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Real-time monitoring of the state of the baths through spectroscopy.

RT-MonCheBa: *Feasibility study for real-time monitoring of chemical baths.*

Current situation:

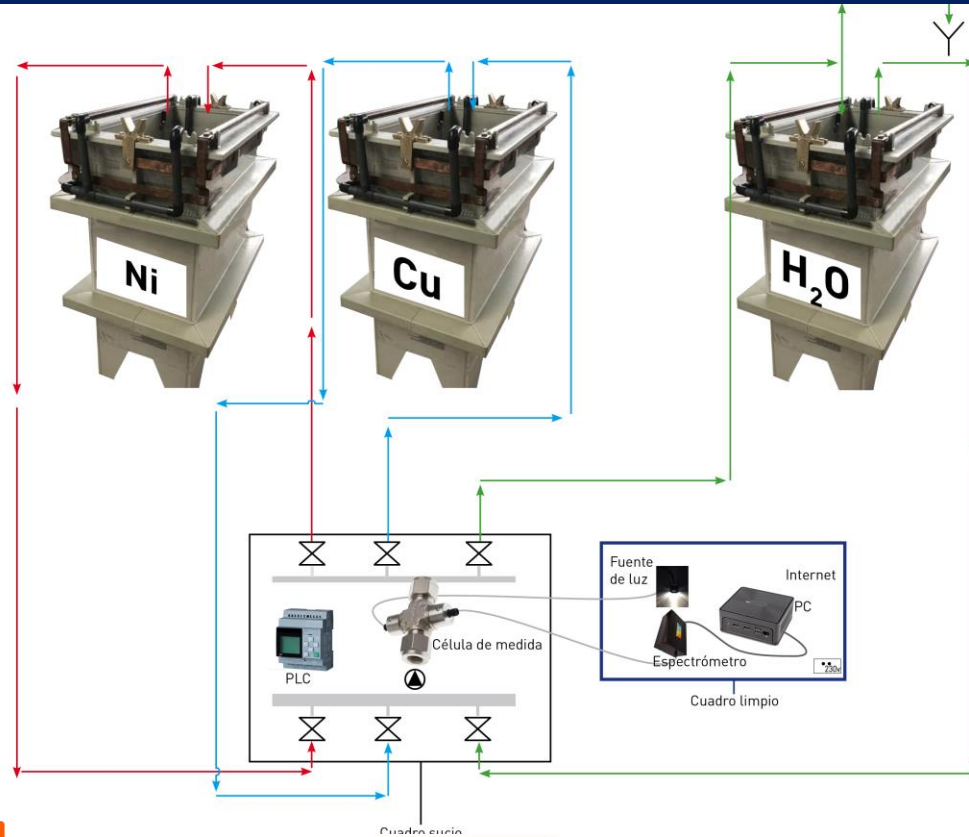
- ❌ Lack of fast and accurate analytical methods at a reasonable cost. ➤ **Inefficiency.**
- ❌ Laboratory measurements: one measurement for each component, each with its own equipment/methodology. ➤ **Slow and expensive.**
- ❌ Time-varying properties of the baths. ➤ **Non-homogeneity in final quality. Increase in defects.**
- ❌ Periodically baths are emptied and reformulated at the discretion of the bath manufacturer. ➤ **High environmental impact. Expensive process.**



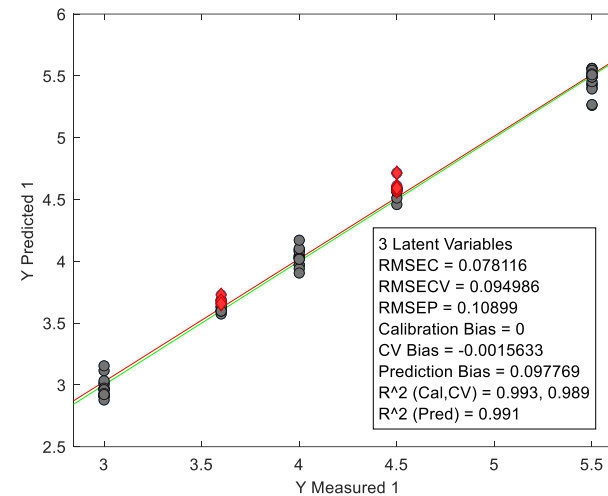
System to be developed: :

- ✓ In-line system and real-time data.
- ✓ Results of multiple analytes with a single measurement.

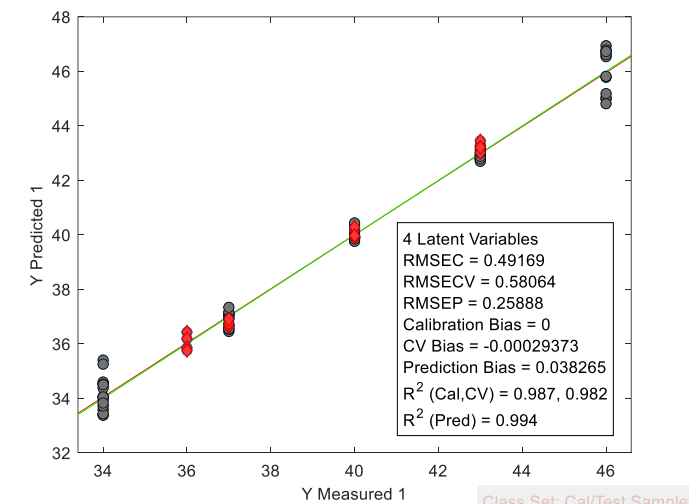
RT-MonCheBa: Feasibility study for real-time monitoring of chemical baths.



➤ Ni Bath



➤ Cu Bath



Class Set: Cal/Test Samples

We are looking for **pilot projects** to help us demonstrate the huge potential of our AONIR platform to achieve more efficient and sustainable production.

In addition, we are looking for partners to form **joint ventures** to collaborate in developing and commercialising specific solutions in different sectors.





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