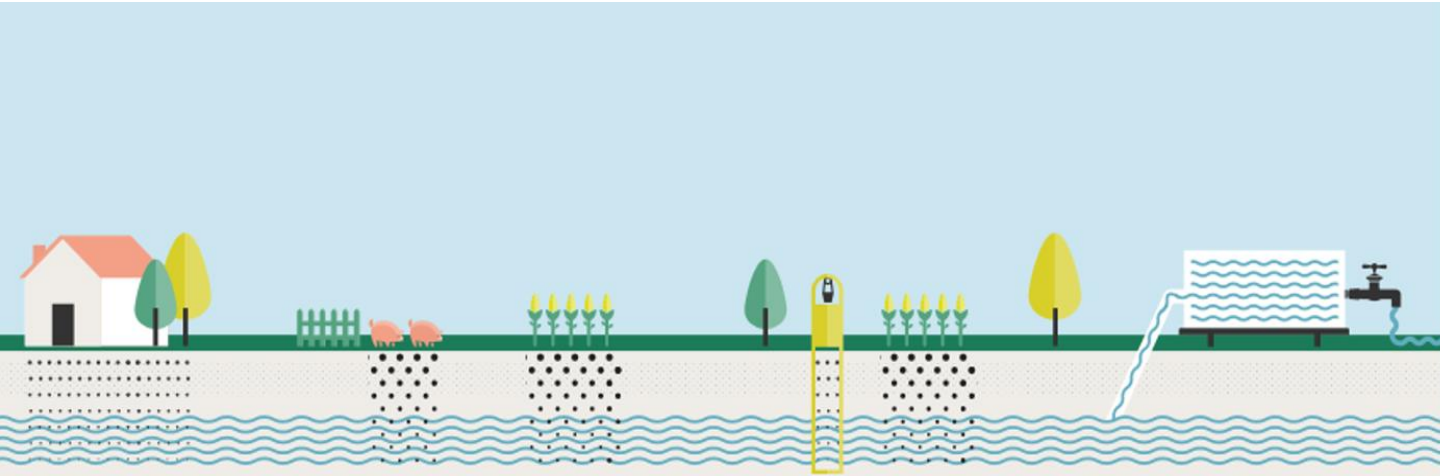
Life SPOT

Green solutions for the treatment of contaminated groundwater.

Life SPOT

Layman Report Summary of the project: LIFE18 ENV/ES/00019



The project is co-financed by the European Commission through the LIFE Spot project.

Coordinator: IRTA Institut de Recerca i Tecnologia Agroalimentàries

Project Duration: :
01-JUL-2019 to 30-JUN -2024.

Total Project Budget:
2,179,363 €.

European Union Contribution:
1,195,896 €

Partners:
IDAEA-CSIC https://www.idaea.csic.es/
EURECAT https://eurecat.org/
Protecmed http://www.protecmed.com/en/
Facsa https://www.facsa.com/
Nenuphar

This publication is co-financed by the European Commission through the LIFE Spot project (LIFE18 ENV/ES/000199). The opinions, findings, conclusions, or recommendations expressed in this publication are the sole responsibility of the authors and do not necessarily reflect the views of the European Commission or the LIFE program.

https://lifespotproject.eu

@lifespot2

Life SPOT

Green solutions for the treatment of contaminated groundwater.

Layman Report Summary of the project: LIFE18 ENV/ES/00019.

1

The challenge to solve

Groundwater has significant strategic value, especially in rural areas. In regions like the Mediterranean arc, a significant portion of the population relies on this water resource.

For example, although 35% of the drinking water in Spain comes from groundwater, in populations of less than 20,000 inhabitants, this percentage rises to over 70%.

Groundwater is used in agriculture and for the daily consumption of people and animals. However, the population growth in recent decades, along with the intensive use of farmland and farms, has brought negative effects on the quality of this water resource. Fertilizers, pesticides, antibiotics, and other substances have infiltrated into the soil, contaminating this water.

To date, one in ten European wells is not suitable for consumption due to high concentrations of nitrates (>50 mg/L), pesticides (>0.1 µg/L), and/or antibiotics. This figure rises to four out of ten in the case of Spain. Additionally, climate change and persistent droughts do not help this situation.

2

The objective

For small communities and farms, treating groundwater poses a significant challenge due to the high costs of the solutions currently available on the market.

They need alternative, green, and sustainable technologies that can treat groundwater in a clean, safe, and more economical way.

The aim of Life**SPOT** project is to promote the sustainability and resilience of animal farming and tourism sectors in rural areas through nature-based solutions and algae waste valorization

Innovative and green technology

Biomass valorization

Nitrate removal

Treated groundwater

Pesticide and antibiotic removal

Microalgae

3 Where?

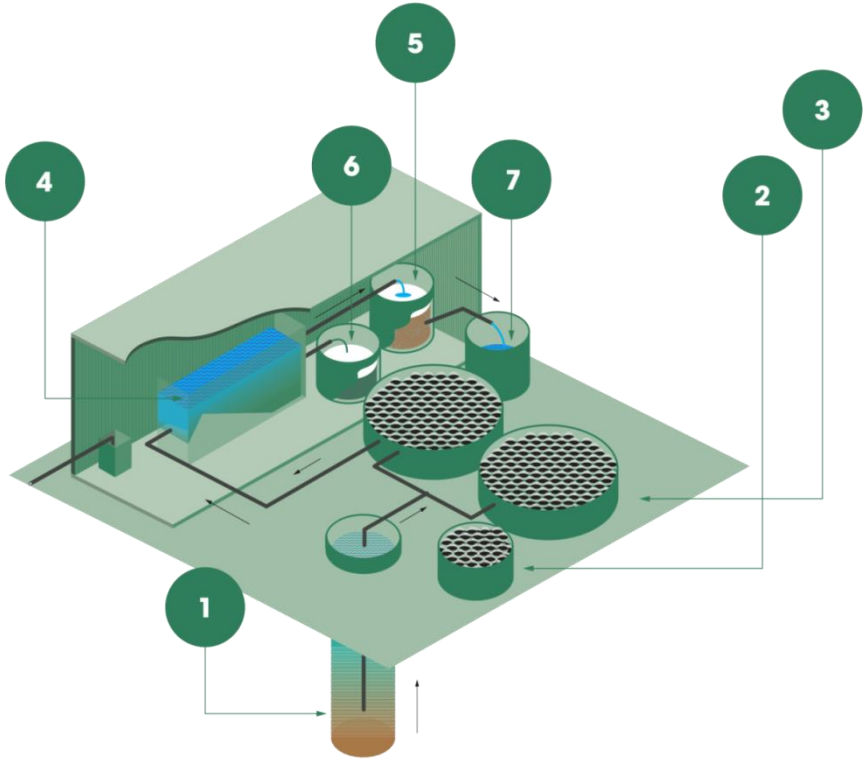
In **Caldes de Montbui**, a small municipality in Catalonia, the application of manure for agricultural fertilization in nearby cereal fields has led to the contamination of groundwater by nitrates and antibiotics. This has resulted in nitrate levels exceeding 400 mg/L and antibiotic levels of 0.2 µg/L.

En **Nules**, another rural town located in the Valencia Community, the contaminants were the chemical fertilizers and pesticides used for years in the citrus fields (nitrates at 100 mg/L and pesticides >0.2 µg/L).

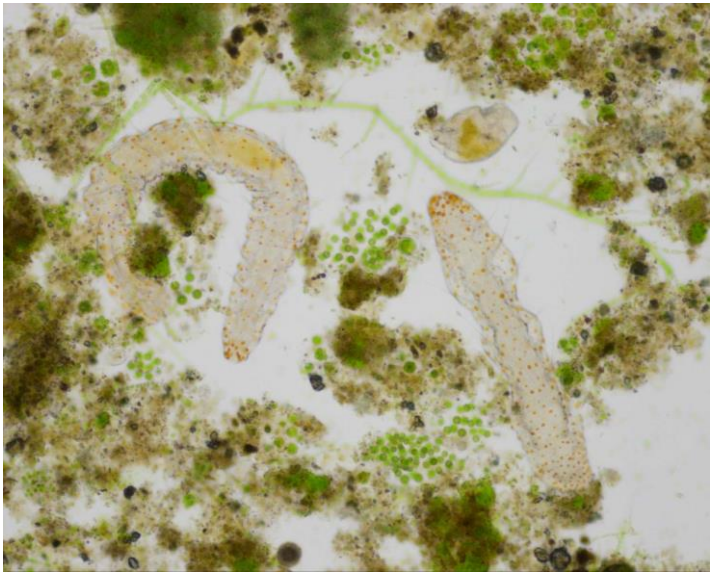
4 Technology.

Innovative solutions like those offered by the LifeSpot project for the treatment of contaminated groundwater, developed by scientists and companies, and based on the sustainable use of microalgae and lignocellulosic biomass.

1. Polluted groundwater
2. Photobioreactors
3. Photobioreactors
4. Dissolved air flotation system
5. Biofilter
6. Biomass
7. Treated water



→ Direction of the water treatment process.
Dirección del proceso de tratamiento del agua.



Thanks to these specialized green algae, we were able to reduce groundwater contamination to meet the European safety standards established by drinking water directives.

"We offer plants for the treatment of contaminated groundwater."

We offer affected populations and communities plants for the treatment of contaminated groundwater. Bioreactors with microalgae and bacteria that are capable of naturally removing nitrates and other contaminants.

Life SPOT
LIFE18 ENV/ES/00019

" We use solar radiation to break down the molecules of pesticides and antibiotics.".

We use solar radiation in microalgae systems to break down the recalcitrant molecules of pesticides and antibiotics.

With an air flotation dissolution system or simply by decantation to separate the algae or biomass, we recover essential nutrients for agriculture such as phosphorus, adding value to the biomass.

"Biofilters made from cork waste and wood pellets promote denitrification".

Finally, through biofilters formed by cork and wood pellet waste, we eliminate contaminants, facilitating their biodegradation, and promote denitrification processes that lead to the removal of nitrates.

Experimental treatment plants in Caldes de Montbui and Nules.

To test this technology, we installed two of our experimental treatment plants in Caldes de Montbui and Nules, and we conducted a thorough monitoring for two years of the removal of nitrates, pesticides, and antibiotics.

5 The results

We have treated **1200 m3** of contaminated groundwater.

The treated water was successfully used for the consumption of farm rabbits. It was free of microcystins (cyanotoxins).

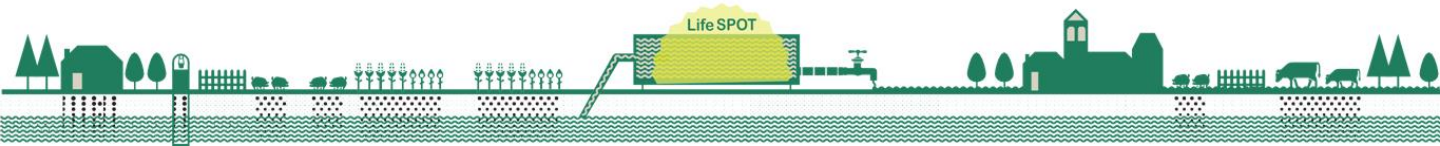
We reduced the nitrates to safe limits set by the European Union **(<50 mg/L).**

The pesticides and antibiotics were reduced by **80** to **90%** (<0.1 µg/L).

The microalgae in the Nules photobioreactor fixed **30 kg of CO_2**, while this value rose to more than **70 kg** in Caldes de Montbui.

We obtained **1200 kilos** of algal biomass suitable for agricultural reuse.

And with a more favorable environmental impact profile compared to other existing technologies, such as reverse osmosis.



6 Dissemination

Dissemination is one of the pillars of any Life project. In this context, the LifeSpot project has emphasized the younger population through videos and children's stories, as well as targeting adults. Some of the project's data are:

More than 5,000 visits to the website.

Attendance at 6 conferences, and organization of 4 events with over 200 participants.

4 open house activities with more than 200 participants.

3 international scientific publications.

3 outreach videos, and a children's story.



7

What are the next steps?

The challenge now is to transfer the technology developed within the framework of the **LifeSpot project** to the water treatment sector.

This will be achieved through:

- **Collaboration** with companies in the sector for the large-scale implementation of the technology tested in the pilots.
- **Training and capacity** building for technicians and operators for the proper use of the technology.
- **Dissemination** of the results obtained in the pilots through conferences, seminars, and specialized publications.
- The establishment of **technology transfer** agreements and licenses that allow for commercial adoption.

In this way, we can ensure that the developed technology has a significant impact on the water treatment sector.

Contacts

Coordinator:

IRTA
Carme Biel
e-mail: Carmen.Biel@irta.cat

Partners:

IDAEA-CSIC
Víctor Matamoros
e-mail: victor.matamoros@idaea.csic.es

FACSA
Rubén García
e-mail: ruben.garcia@grupogimeno.com

PROTECMED
Santiago Vendrell
e-mail: svendrell@protecmed.com

EURECAT
Carme Bosch
e-mail: carme.bosch@eurecat.org

Life SPOT
LIFE18 ENV/ES/00019

https://lifespotproject.eu/