



## Installation of the Life-Aquemfree prototype

Last June, the project partner Novedades Agrícolas completed the construction and installation work for **Life-Aquemfree prototype** components at the IMIDA Finca Torreblanca, experimental farm located in Dolores de Pacheco (Torre Pacheco, Murcia, Spain). This was a key step forward in the project and a significant achievement for all beneficiaries.

The prototype, designed by The University of Murcia and IMIDA, is being used for numerous initial studies and tests and these are being taken into account in the design process for the pilot equipment due to be installed in agricultural farms across the Region of Murcia. As planned, the selection process for those farms and managed by FECOAM has been carried out and the equipment is due to be installed during the first quarter of 2016.

Since last June, project researchers have carried out a number of tests and have monitored how the Finca Torreblanca equipment has functioned in order to optimise and evaluate the process. To this end, ultraviolet radiation probes and a catalyst recovery membrane have been fitted and initial results have been obtained.

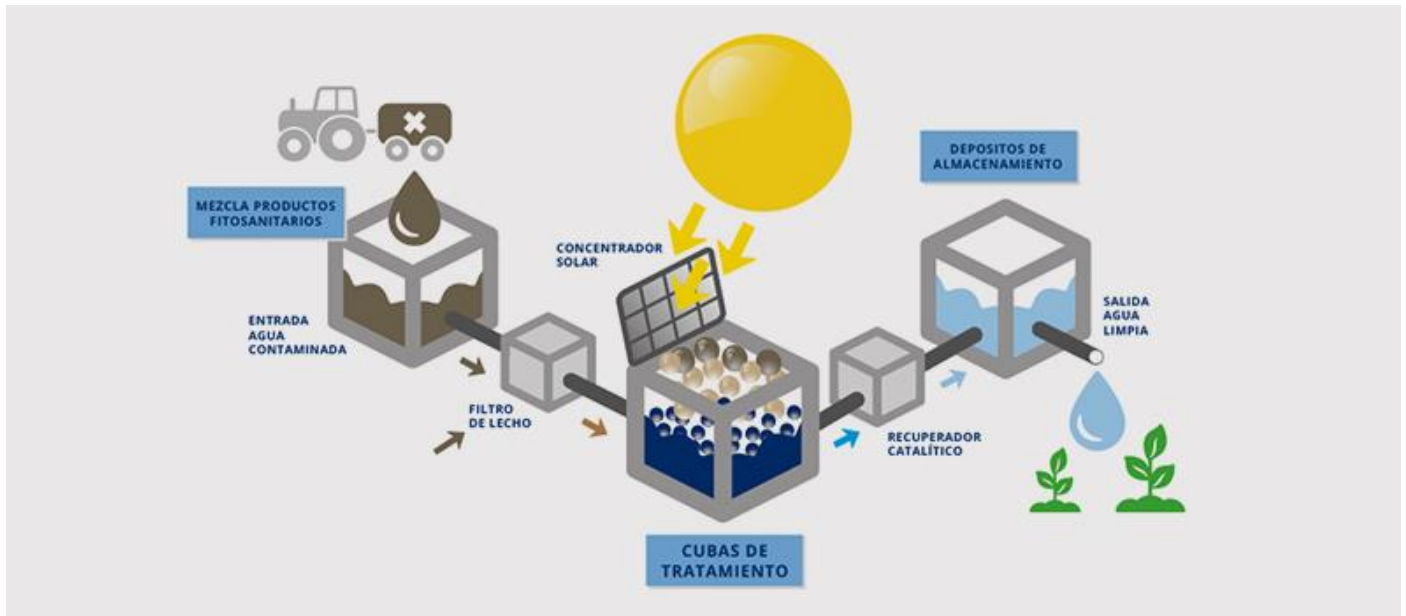


Diagram of the membrane



UVA probe



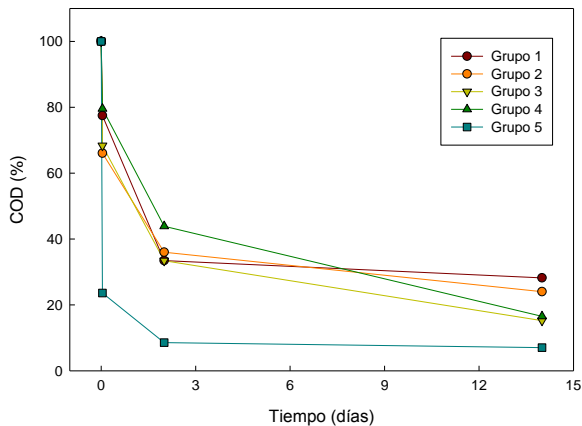


## Progress in tests

Dr José Fenoll, Scientific Coordinator of the project, explains that since June of last year, and following optimisation of the most significant parameters in the photocatalytic process, initial tests with different photocatalytic processes have been carried out using the prototype installed in Finca Torreblanca. The experiments carried out in the months of July and August gave very promising results since the two photocatalytic processes tested (oxidant alone and oxidant plus a semiconductor material such as  $\text{TiO}_2$ ) have led to the complete degradation of practically the entire 42 active materials tested over just a few days' treatment. The tests were repeated during the months of November and December when solar radiation diminished significantly. It is worth pointing out that the 2015/2016 winter in Murcia was atypical since temperatures were above those recorded in previous years. In the second period, total degradation of practically all the active materials tested was also achieved, although the time required in order to eliminate waste in this case was higher than in the test carried out in the summer. Whilst both lines of treatment gave positive results, as previously mentioned, degradation was quicker in tests using the oxidant and titanium dioxide ( $\text{TiO}_2$ ) combination, as was to be expected. However, this treatment has a disadvantage from a practical point of view since it needs an ultrafiltration membrane in order to separate small suspended particles from the titanium dioxide. A membrane of this kind has been added to the prototype and the efficiency of the filtration system when filtering and recuperating the oxide semiconductor has been confirmed.

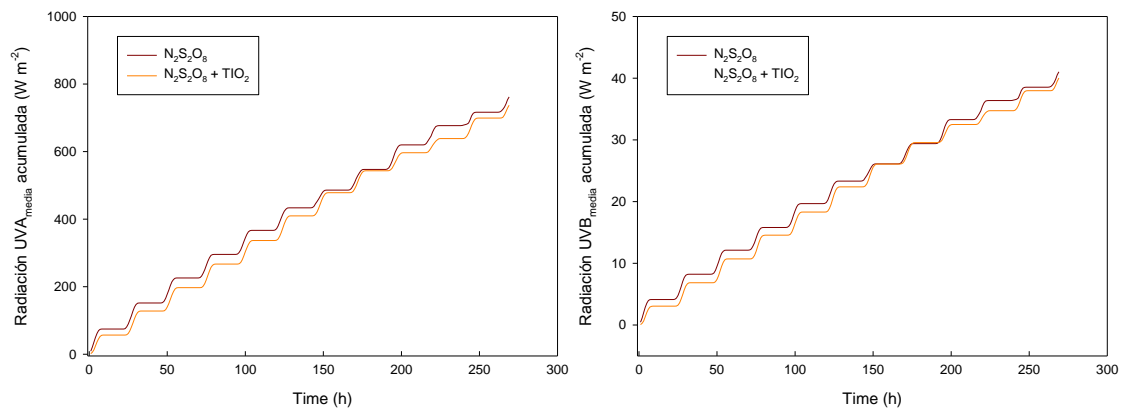
Analyses of the dissolved organic carbon (DOC) in water samples taken during the photoperiod show that the percentages of DOC present at the end of the irradiation period are below 30% for the five groups of pesticides. These levels of DOC present at the end of the tests may be due to the formation of some non-degradable intermediary products during the irradiation period or other organic compounds in products on the market such as adjuvants.

Regarding the prototypes due to be installed on farms, a study will be carried out in order to determine if the quantity of UV radiation accumulated during the photoperiod can be used as an indicator in order to determine the time needed for almost total degradation of pesticide waste in waters used for cleaning and rinsing.



**Figure 7:** Progress of dissolved organic carbon during the photoperiod.

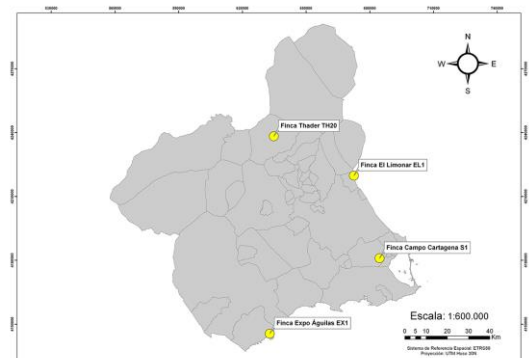
**Figure 8.** Average UVA and average UVB radiation during the tests carried out in the winder using oxidant only and using a catalyst and oxidant combination.



## Selection of pilot farms

Ya han sido seleccionadas las fincas piloto donde se van a instalar los cuatro equipos compactos para el estudio de funcionamiento en condiciones reales. Las fincas seleccionadas tienen las orientaciones productivas siguientes:

- Cieza: Peach
- Santomera: Citrus fruits
- Águilas: Tomato (in greenhouses)
- Campo de Cartagena: Peppers (in greenhouses) and vegetables



## Compact equipment design

As well as the selection of pilot farms, the equipment has also been designed in compact version so that they can be adequately installed. This process is due to begin in the second quarter of 2016.

## Dissemination

### - Visit to the Las Palmerillas Experimental Station in Almería

Members of the LIFE-Aquemfree project from IMIDA visited the Las Palmerillas Experimental Station, a CAJAMAR initiative situated in Almería, Spain. With the aim of establishing contacts with a view to future collaboration, a presentation of the project was given and a discussion on the possible practical uses of the technology took place.

<http://www.life-aquemfree.eu/visita-la-estacion-experimental-las-palmerillas-en-almeria/>

### - Aquemfree in Fruit Logística 2016

The Life-Aquemfree project was present at the 2016 edition of Fruit Logistic held in Berlin.

<http://www.life-aquemfree.eu/aquemfree-en-fruit-logistica-2016/>

### - Participation in the NORIA project closure event

On 3<sup>rd</sup> February, Aquemfree participated in the NORIA project closure event held on 3<sup>rd</sup> February. Water, agriculture and environment sector cooperation in Morocco carried out by universities and research centres from the Mediterranean arc (Spain, Morocco, Italy and Greece).

<http://www.life-aquemfree.eu/participacion-en-el-cierre-del-proyecto-noria/>

### - 1<sup>st</sup> edition of the Rural Issues and Professions for Young People event

On 17<sup>th</sup> November, the first edition of the event to promote rural issues and professions amongst young people (I Encuentro Rural Jóvenes y Empleo) was held in El Esparragal (Puerto Lumbreras, Murcia). IMIDA and FECOAM, partners in the Aquemfree project, were present at the event along with other participants. As can be seen from the photographs, both IMIDA and FECOAM took the opportunity to promote the project.

<http://www.life-aquemfree.eu/encuentro-rural-jovenes-y-empleo/>

### - Present at SeCyT'15

IMIDA recently participated in the Region of Murcia's Science and Technology Week, 2015 (SeCyT'15) with a stand in which the Life-Aquemfree project had a presence.

<http://www.life-aquemfree.eu/presente-en-la-secyt15/>

### - Participation in an event on the LIFE programme

On 16<sup>th</sup> July, we participated in a workshop organised by CETENMA (Technology Centre for Energy and Environment in the Region of Murcia) and the INFO (Murcia Regional Development Agency) on the LIFE programme.

<http://www.life-aquemfree.eu/participacion-en-jornada-sobre-el-programa-life/>

### - Participation in the CMN Agro-food Forum

11<sup>th</sup> June, 2015

A representative of the Life-Aquemfree project took part in this forum held at the University of Murcia

[www.campusmarenostrum.es/foroagrolamentario](http://www.campusmarenostrum.es/foroagrolamentario)

### - Participation in the Innovation and Exportation Forum

4<sup>th</sup> June, 2015.

A representative of the Life-Aquemfree project took part in this forum organised by the Mare Nostrum Campus in Murcia

[http://www.campusmarenostrum.es/actualidad\\_interior/1467/foro-cmn-de-innovacin-y-exportacin](http://www.campusmarenostrum.es/actualidad_interior/1467/foro-cmn-de-innovacin-y-exportacin)

### - Life-Aquemfree included on the EIP Water website

The Life-Aquemfree project was showcased as a reference project on the EIP Water website

<http://www.life-aquemfree.eu/life-aquemfree-referencia-en-la-web-de-la-eip-water/>

### - Participation in the FAME Innova Forum, 2015

Participation in the International Forum of Agricultural Knowledge and Innovation in the Agricultural Technology and Agribusiness Trade Show (FAME Innova 2015).

<http://www.life-aquemfree.eu/participacion-fame-innova-2015/>



## Participation in Congresses

### - 4<sup>th</sup> European Conference on Environmental Applications of Advanced Oxidation Processes, EAAOP4

A poster-type oral presentation was given during the 4<sup>th</sup> European Conference on Environmental Applications of Advanced Oxidation Processes, EAAOP4, held in Athens (Greece) in October, 2015. The presentation included the results of a study of photodegradation on a laboratory scale using artificial light of three tetronic and tetramic acid derivate insecticides (spirotetramat, spiromesifen and spirodiclofen) in water using different titanium and zinc oxides.

<http://www.life-aquemfree.eu/4th-european-conference-environmental-applications-advanced-oxidation-processes-eeaop4/>

### - 5<sup>th</sup> International Conference on “Semiconductor Photochemistry, SP5”

Two poster-type communications were presented at the 5<sup>th</sup> International Conference on Semiconductor Photochemistry, SP5 held in Saint Petersburg (Russia) in July, 2015. In one of them, data from a study of photodegradation using sunlight of three new tetronic and tetramic acid derivative insecticides (spirotetramat, spiromesifen and spirodiclofen) in water using sodium peroxydisulfate, titanium and zinc oxides was presented.

<http://www.life-aquemfree.eu/5th-international-conference-semiconductor-photochemistry-sp5/>

### - LIFE programme events:

<http://ec.europa.eu/environment/life/news/events/index.htm>

### - Horizonte 2020 events:

<http://eshorizonte2020.es/actualidad/eventos>

### - EIP-Agri events:

<https://ec.europa.eu/eip/agriculture/en/content/european-calendar>

### \*For further information:

<http://www.life-aquemfree.eu/>



+34 968 36 67 16

*Coordinator:* Instituto Murciano de Investigación y Desarrollo Agrario y Alimentario (IMIDA research institute in Murcia, Spain)