

# TROJAN UV™

## CASE STUDIES

### Municipal Wastewater



**Plant name:** Las Torres de Cotillas  
**Location:** Murcia, Spain  
**System:** TrojanUV3000Plus™

## UV Disinfection Used to Generate High-Quality Recycled Wastewater for Agricultural Operations in Spain

### PROJECT BACKGROUND

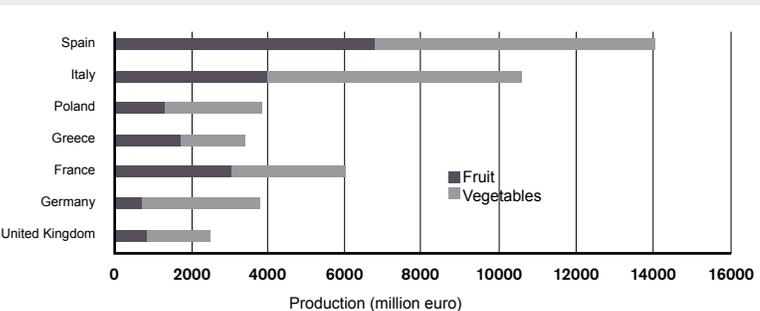
Spain's agricultural sector produces more than 14 billion in exports for the European Union each year (Figure 1) and a large portion of these exports come from the region of Murcia. Demand for water continues to increase in order to maintain this level of production. Advanced wastewater treatment for crop irrigation is an increasingly reliable solution that allows the pace of agricultural production to be maintained without compromising the population's water supply. The European Commission introduced Regulation (EU) 2020/741 (approved by the European Parliament), outlining the minimum

requirements for the quality of treated wastewater reused for non-potable agricultural applications. This regulation is expected to help increase wastewater reuse in Spain, as well as in other EU nations with strong agricultural industries, such as Italy and France.

### LAS TORRES DE COTILLAS – MURCIA, SPAIN

In line with Murcia's master plan for sanitation, it was decided that the wastewater treatment plant in Las Torres de Cotillas would carry out advanced wastewater treatment for end users in the local agriculture sector. This was

designed to help maintain the water supply in the area, both for agriculture and general consumption, and contribute to the environmental recovery of the Segura river by reducing the amount of wastewater being discharged into the water. The plant is managed by ESAMUR (*Entidad Regional de Saneamiento y Depuración de Aguas Residuales*), a public entity for sanitation and wastewater treatment belonging to Murcia's Department of Water, Agriculture, Livestock, Fisheries and the Environment. The plant uses activated sludge with extended aeration as a biological treatment, including a tertiary treatment using additional physico-chemical processes followed by sand filtration.



**Figure 1 —** Summary of agricultural production in Europe (source: Eurostat)

To meet the disinfection requirements of local regulations concerning wastewater undergoing advanced treatments for agricultural use, both chlorine and UV disinfection technologies were considered as options. The technology selected was UV (Figure 2), as chlorine disinfection was rejected due to concerns over the by-products produced by chemical disinfection, such as trihalomethanes (THM) and haloacetic acids (HAA).

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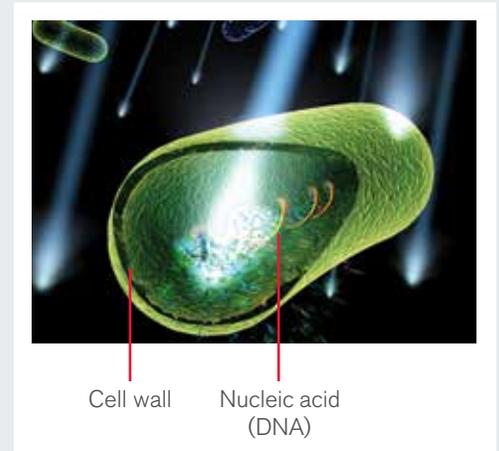
Furthermore, UV disinfection has shown to be effective when treating different pathogens, and chlorine is often not as effective against certain viruses and protozoa (Figure 3).

## THE TROJANUV SOLUTION

To meet the Las Torres de Cotillas plant's treatment requirements, the TrojanUV3000Plus, a highly customized, open-channel UV disinfection system was selected. Three banks of UV lamps were installed into the channel, with a total of 168 lamps, providing a dose of >150 mJ/cm<sup>2</sup>. It was concluded that this high dose would be sufficient to meet the demanding design requirements of less than 2.2 coliforms per 100 ml of water to ensure safe reuse. Trojan's experienced team of wastewater experts and engineers have conducted and recorded thousands of UV dose tests on wastewater samples with different characteristics. This vast database ensures TrojanUV systems are designed with reliable and effective UV target doses.

The TrojanUV3000Plus was the most suitable option for Las Torres de Cotillas, as treatment requirements—such as flow capacity—change frequently. The system's low-pressure amalgam lamps can automatically reduce UV output by a significant amount, thus reducing output by approximately 30%. This is a major advantage during periods when demand for treated water is low. The system's UV output can be lowered to maintain the desired UV dose, while also reducing the power consumption required. As a result, workers at the ESAMUR-managed plant can avoid excessive doses and reduce the system's operating costs.

Furthermore, the system is equipped with ActiClean™, an automatic chemical/mechanical sleeve cleaning system. The cleaning system, which operates without disrupting disinfection, prevents fouling from accumulating on the protective quartz sleeves surrounding the UV lamps. This ensures the sleeves are clean, maximizing the amount of UV energy transmitted from the lamps to the water.



Cell wall      Nucleic acid (DNA)

**Figure 2** — UV light breaks down the protective cell walls of various pathogens and damage their genetic material (DNA), preventing them from reproducing and causing infections

	UV	Chlorine
Are disinfection by-products formed?	No	Yes
Virus disinfection	Effective against most species	Effective against most species
Protozoa disinfection	Effective against most species	Weak against <i>Cryptosporidium</i> species (e.g. <i>Cryptosporidium parvum</i> )
Contact time	Seconds	Minutes

**Figure 3** — Table comparing chemical and chemical-free disinfection technologies

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