

## From pond to cup - Tackling the global need for clean drinking water



Since 2013, Bridge Biotechnology have worked in collaboration with **Portsmouth Aviation** and the **University of the West of England** to develop a compact and portable water filtration system capable of delivering clean drinking water at source.

ESOL is a key component of this system and serves two purposes:

- To keep the ultrafiltration membrane completely **free from biofouling**
- To **disinfect** the final water product and provide a **residual kill** protecting the water from recolonization of pathogens after disinfection

The system was trialled in lab based setting first at the University of the West of England and was independently tested and validated by the UK's Health Protection Agency, the University of the West of England (UWE) and Wessex Water Laboratories, meeting Drinking Water Institute (DWI) and World Health Organisation (WHO) standards.

The system has now been commercially scaled up and is fitted into standard 20ft and 40ft containers making each unit easy to transport by road, ship or train.

## Bridge Biotechnology



Bridge Biotechnology is an independent Scottish company based in Carnegie Campus, Dunfermline. We have been testing, developing and commercialising ESOL solutions for the last seventeen years.

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**ESOL Technology –  
Drinking Water  
Disinfection**



## Water Purification

Traditional municipal water purification usually involves:

- Abstraction- taking water out of a water source
- Clarification- making the water clearer by removing the dirt and colour
- Filtration- filtering the water to trap anything floating in it
- Disinfection- killing any pathogens

Mobile water purification involves similar stages but needs to take into account finite power supply potential size restrictions.

## Importance of Disinfection

Water is disinfected to kill any pathogens which pass through the filters and to provide a residual dose of disinfectant to kill or inactivate potentially harmful micro-organisms in the storage and distribution systems

The most common method of disinfection is sodium hypochlorite.

- Chlorine from any source reacts with natural organic compounds in the water to form potentially harmful chemical by-products.
- Has limited effectiveness against protozoa that form cysts in water (Giardia lamblia and Cryptosporidium, both of which are pathogenic).
- volatile nature which causes it to disappear too quickly from the water system
- aesthetic concerns such as taste and odour

## What is ESOL?

ESOL is an emerging disinfection technology, ideally suited to drinking water disinfection. ESOL solution is created in a patented Bridge Biotechnology ESOL Generator using three ingredients; **tap water, salt and electricity**. It looks and feels just like ordinary water, is non toxic and turns back to ordinary water.

Despite this, ESOL is capable of **extraordinary disinfection** and is proven to effectively destroy Legionella bacterium and the biofilm in which Legionella can thrive. When pathogens come into contact with the powerful oxidants in ESOL, electrons are removed with high efficiency from microbial structural compounds, causing the rupturing of biochemical bonds and subsequent loss of function. This is often described as an 'oxidative stress'.

ESOL has major benefits over conventional Legionella disinfectants:

- Broad-spectrum antimicrobial activity
- Rapid disinfection time
- Residual kill of pathogens
- Inexpensive to produce
- Easily accessible raw materials
- On-site or in-situ generation
- Little operator skill to run the generators
- Small energy requirement to produce
- Non toxic/pleasant tasting
- Fully biodegradable

## Added benefits of ESOL

- ESOL is **approved for use in public water supplies** and is on the "List of Approved Products and Processes for use in Public Water Supply" published by the **DWI**
- Scientific study has shown the oxidative effect of ESOL destroys harmful pesticides (acephate, omethoate, and dimethyl dichloroviny phosphate)
- Similarly the oxidative effect of ESOL removes hormones in treated water
- ESOL preventions/controls biofilm. In a study by our partners, the University of the West of England, hydrostatic testing by proved that a dose of 1% ESOL was enough to keep ultra-filtration membranes completely clear of biofilm

## What ESOL products are available?

We have a wide range of user friendly ESOL Generators available for either purchase or lease:

- **Micro ESOL Generators** are compact systems capable of producing 24 litres of ESOL an hour
- **Standard ESOL Generators** come in a range of sizes with ESOL production capacities starting at 60 litres per hour and rising up to a 1000 litres per hour

Bridge Biotechnology also provides maintenance packages for Generators and manufactures ESOL accessories including;

- **Saline bins**
- **ESOL collection tanks**
- **Data logging/monitoring systems**

