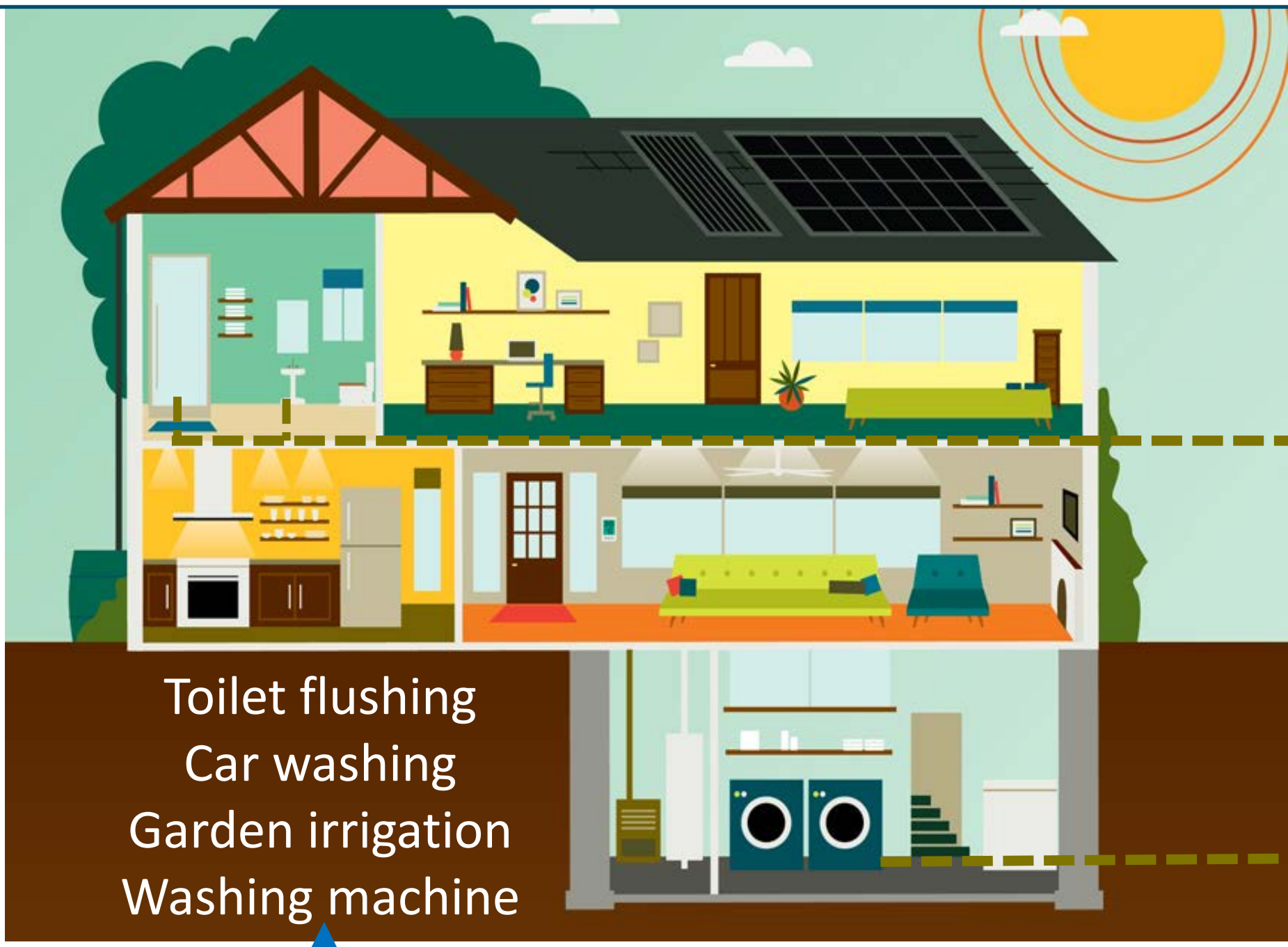




# Decentralised grey-water treatment combining adsorption and electrochemical oxidation

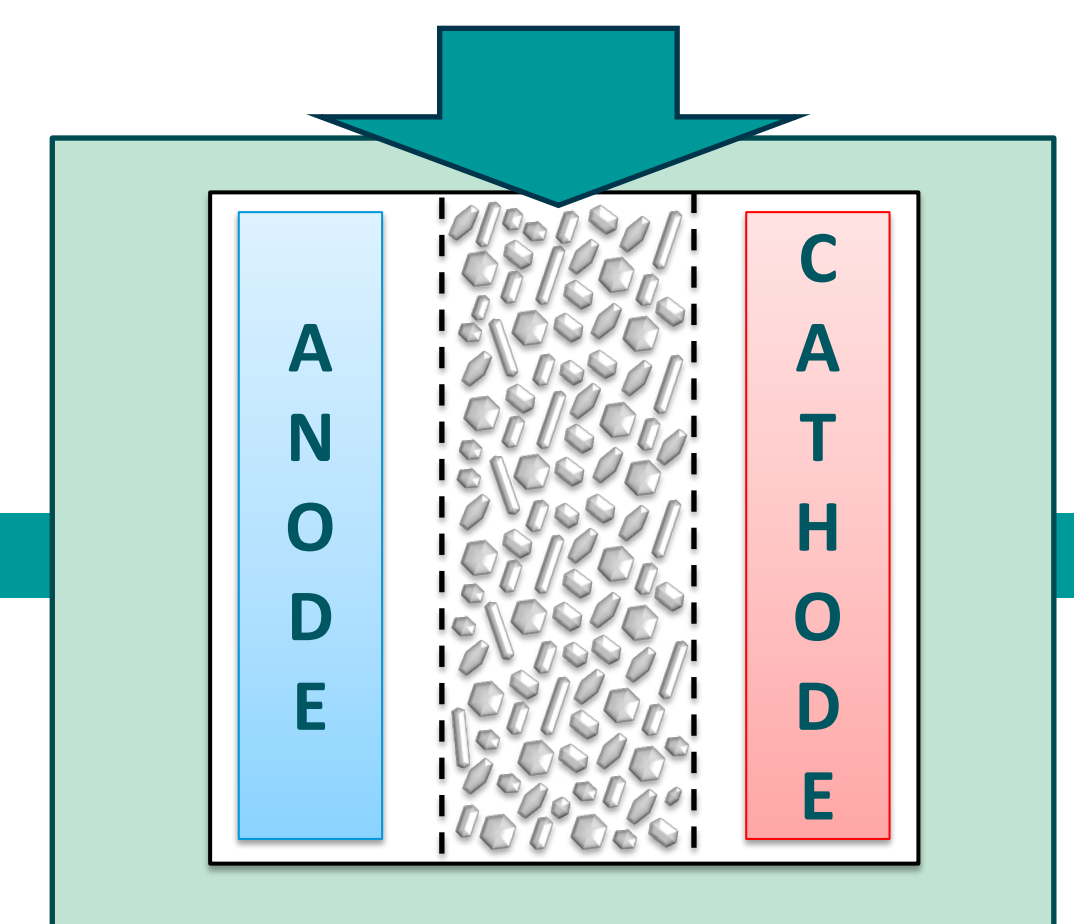
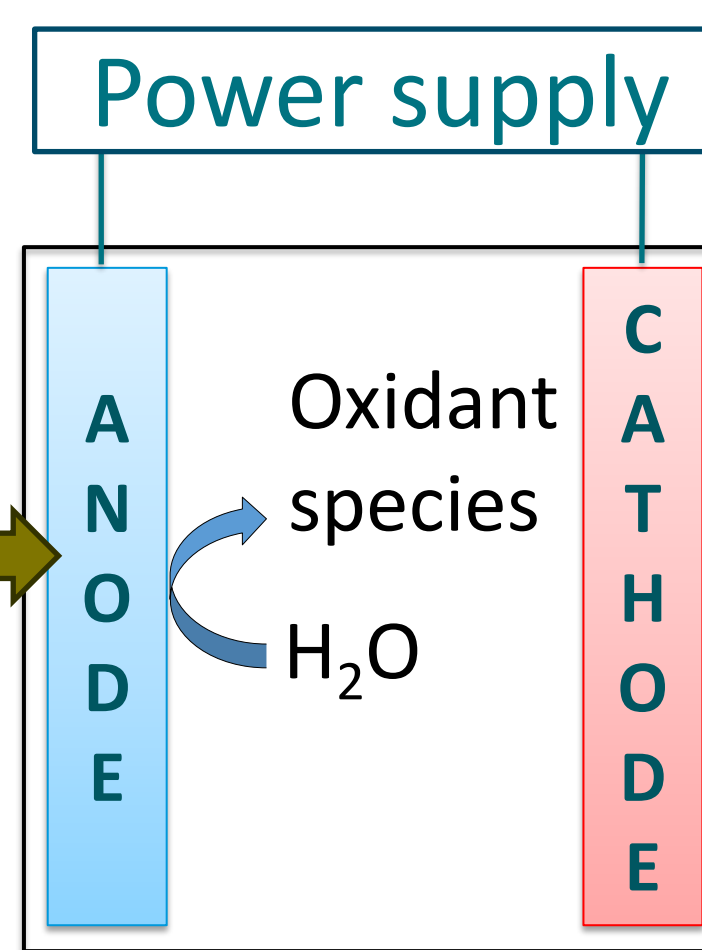
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Greywater represents a **70%** of the total household wastewater production



**Electrochemical oxidation** is an emerging technology that present several advantages to be implemented as a decentralised wastewater treatment system such as its compact design and robustness to deal with variations in the influent composition and flow rate<sup>[1]</sup>.

By adding granular activated carbon (GAC) as a **bed material**, the efficiency can be substantially improved as the effective surface area for electrochemical oxidation is increased<sup>[2-5]</sup>.

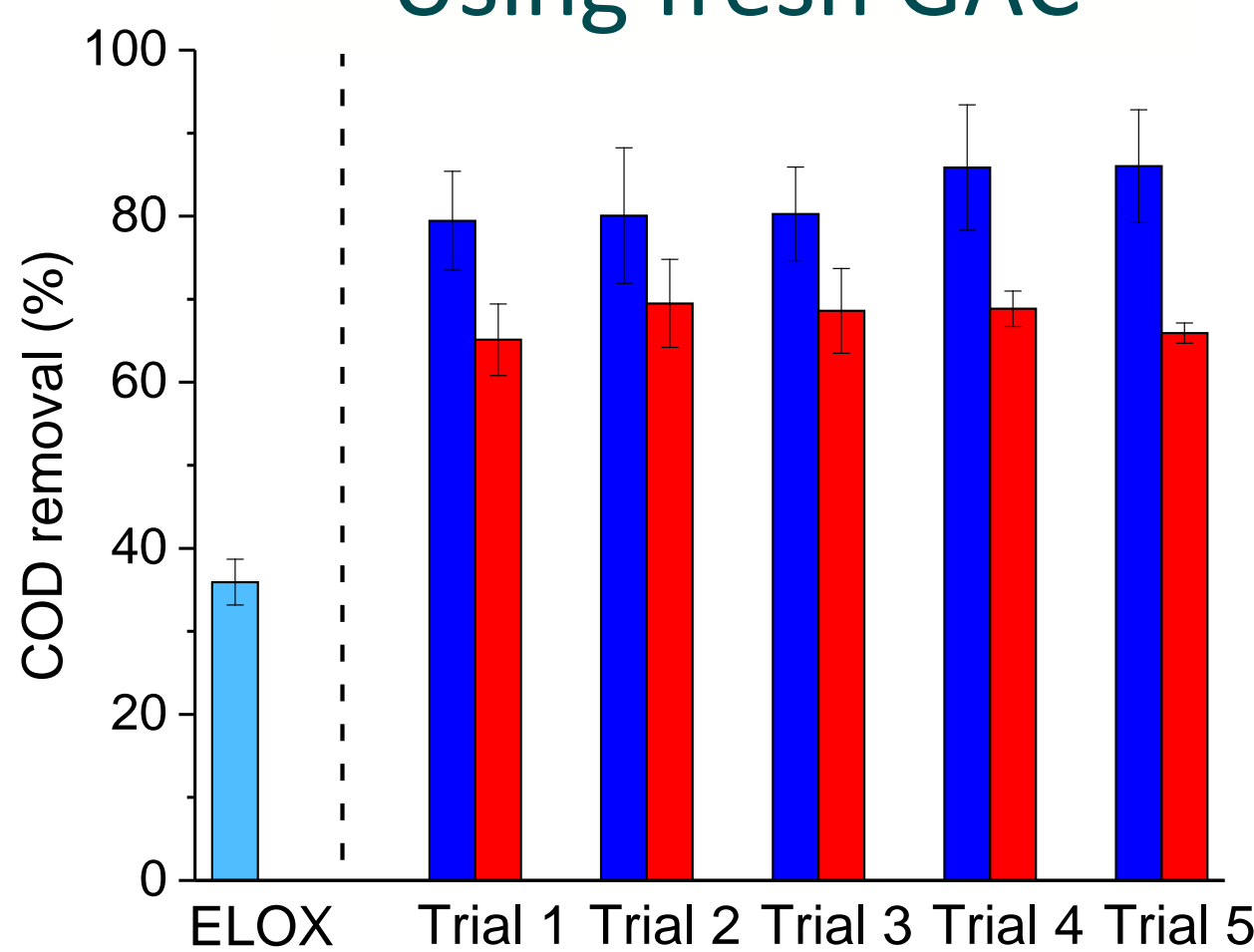


## Results

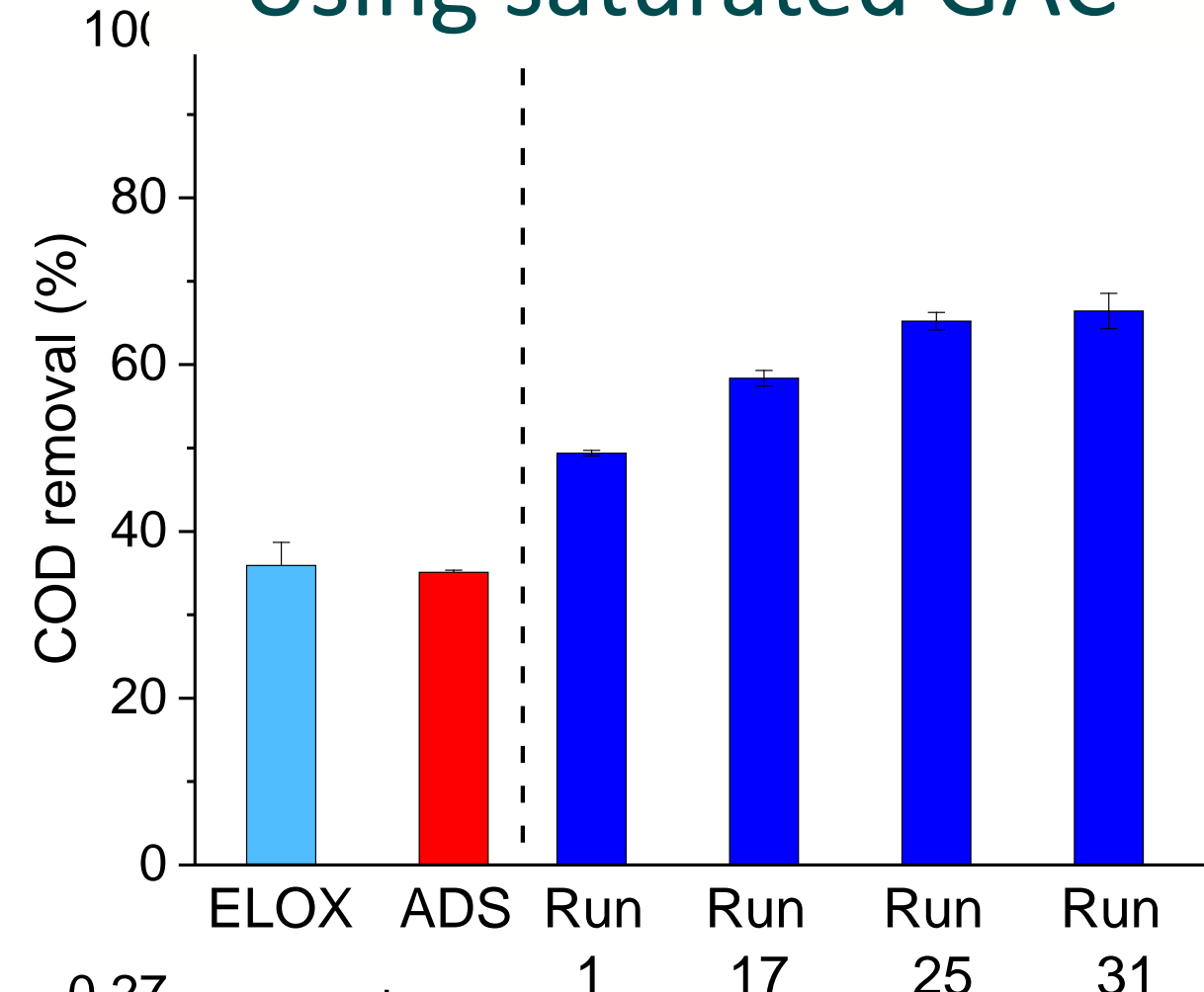
### 1. Treatment of synthetic greywater

■ Electrochemical oxidation (ELOX)  
■ Adsorption onto GAC (ADS)  
■ Combined ADS and ELOX (ADS+ELOX)

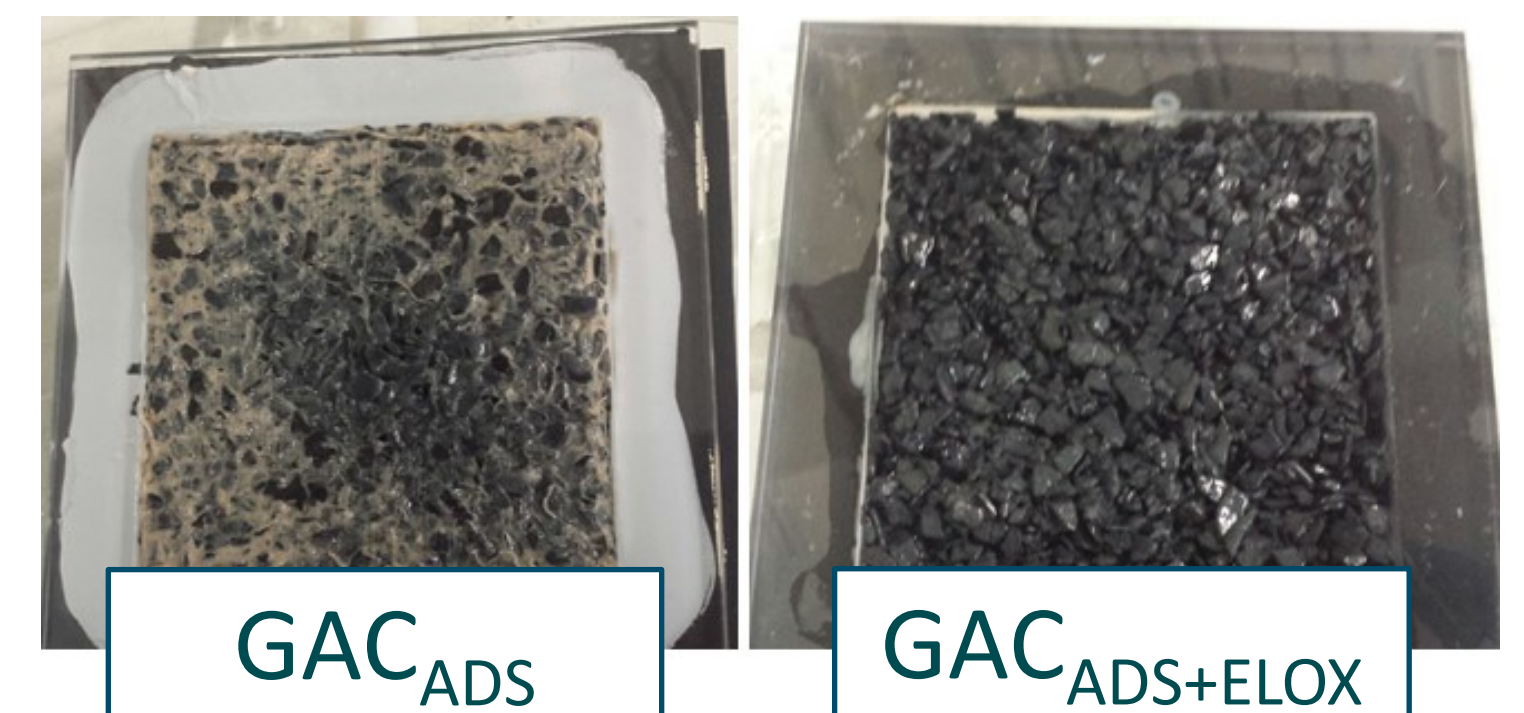
#### Using fresh GAC



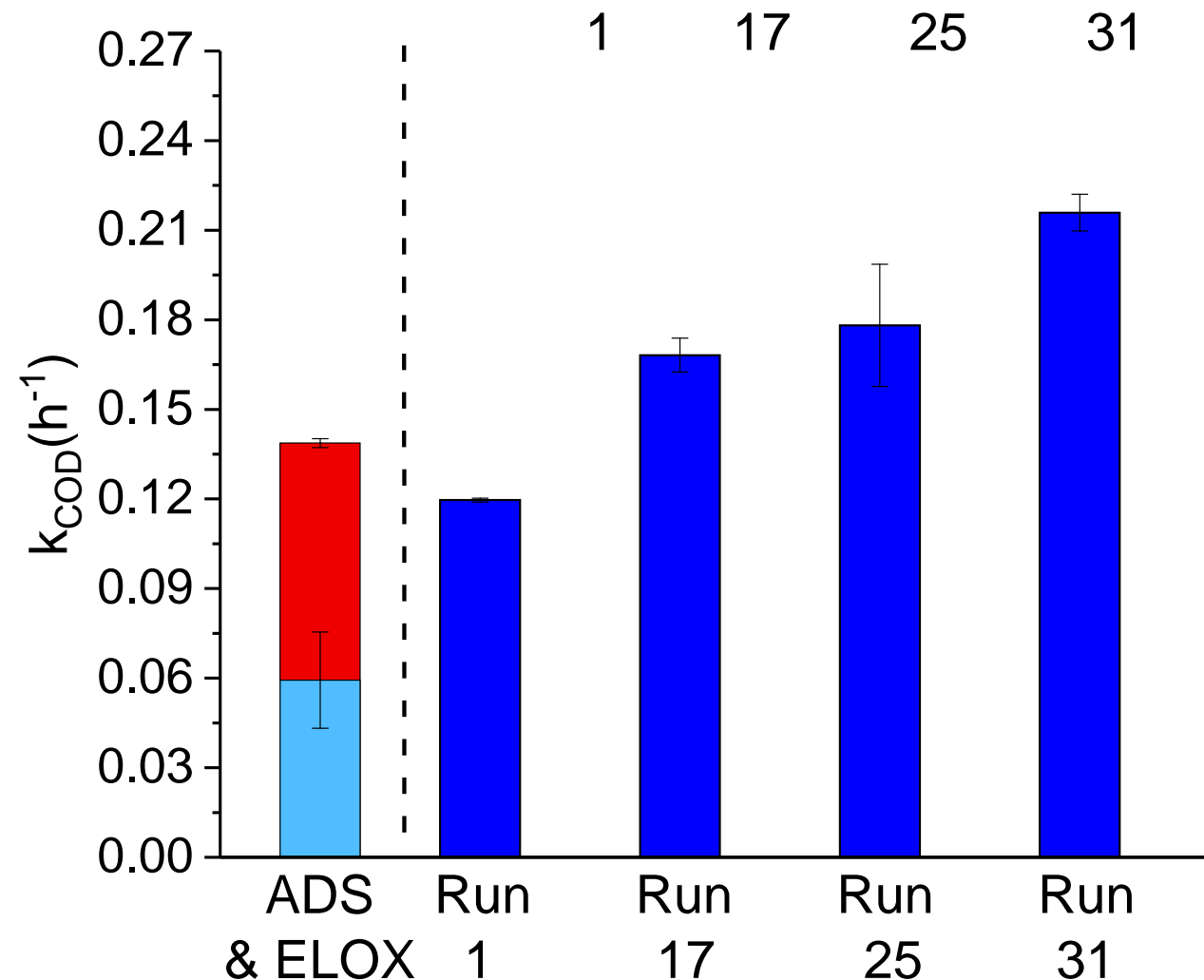
#### Using saturated GAC



### 2. Electrochemical regeneration of GAC



Parameter	Units	GAC <sub>ADS</sub>	GAC <sub>ADS+ELOX</sub>
Turbidity	NTU	2592.7	523.7
COD total	mg L <sup>-1</sup>	11553.0	1946.0
TSS	g L <sup>-1</sup>	7.3	1.2



Positive **synergy** values (36%) indicate an enhanced effect of combining adsorption and electrochemical oxidation in one reactor compared to both processes operating separately.

**Desorption tests** showed that in the ADS+ELOX process, the saturated GAC is being regenerated.

Results demonstrate the potential of the electrochemical oxidation of greywater in a 3D system to be implemented as a decentralised system for the production of reclaimed water.