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## RECYCLES WORKSHOP

Metagenomics and metabarcoding approaches to describe ecological systems and infer their development

5<sup>th</sup>, 6<sup>th</sup> & 7<sup>th</sup> of July 2022

**Expanding the application of biological treatments**

*Albert Bartroli, AERIS*



European  
Commission

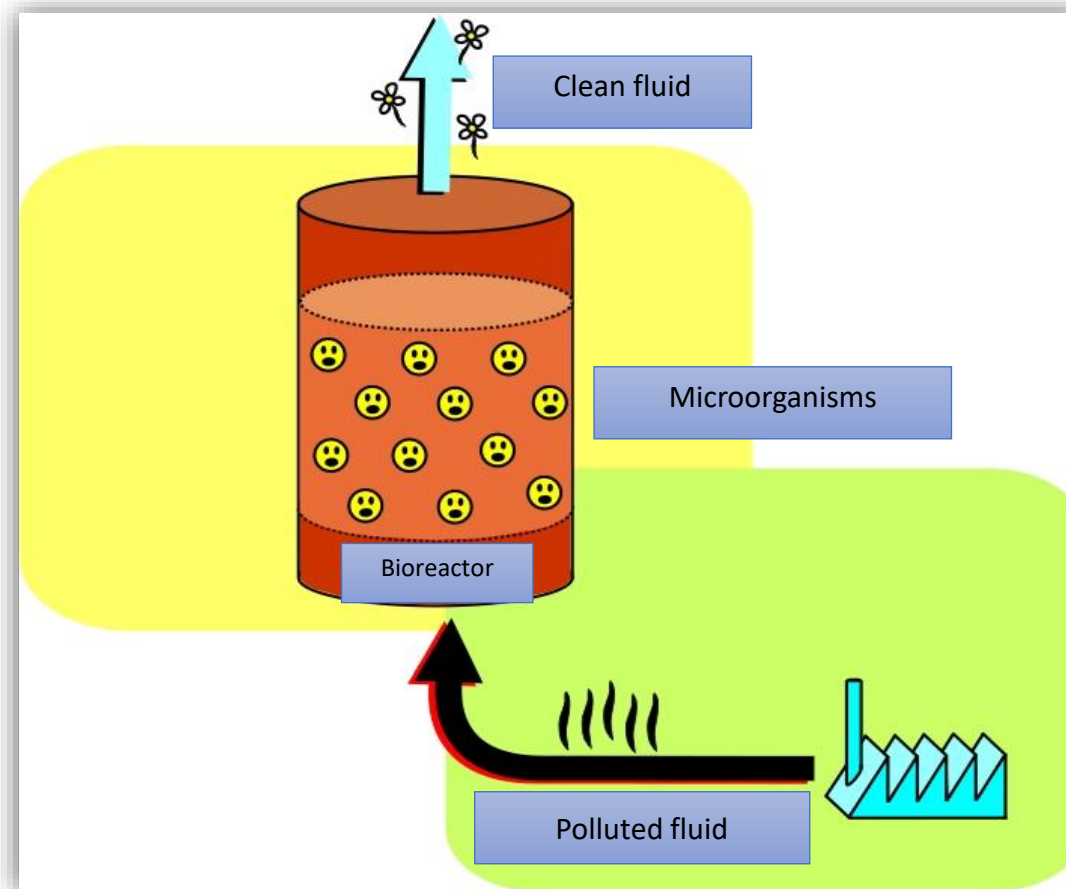


GA: 872053 — H2020 - MSCA - RISE-2019

# Outline



- Efficient
- Economical
- Stable
- Ecologic



# 1. C – VOC's removal from gas



## 2. C-COD



Flow rate: 2 m<sup>3</sup>/d

[COD] > 30000 mg/L

T: 36°C



Actual “water” (a mixture of inks and glues, actually) to be treated



### 3. C-COD



The COD and colour **removal efficiency is > 95%**

The system produces enough biogas to maintain its operation: **Zero energy consumption!**

The investment cost was recovered after **1.2 years**



## 4. N-Nitrogen removal from wastewater



### Pros

- Oversize

### Against

- Inhibition
- Temperature

Glutaraldehyde



## 5. N-Nitrogen removal from wastewater



Glutaraldehyde

## 6. S-H<sub>2</sub>S in Biogas



### **BIOTRICKLING FILTERS:**

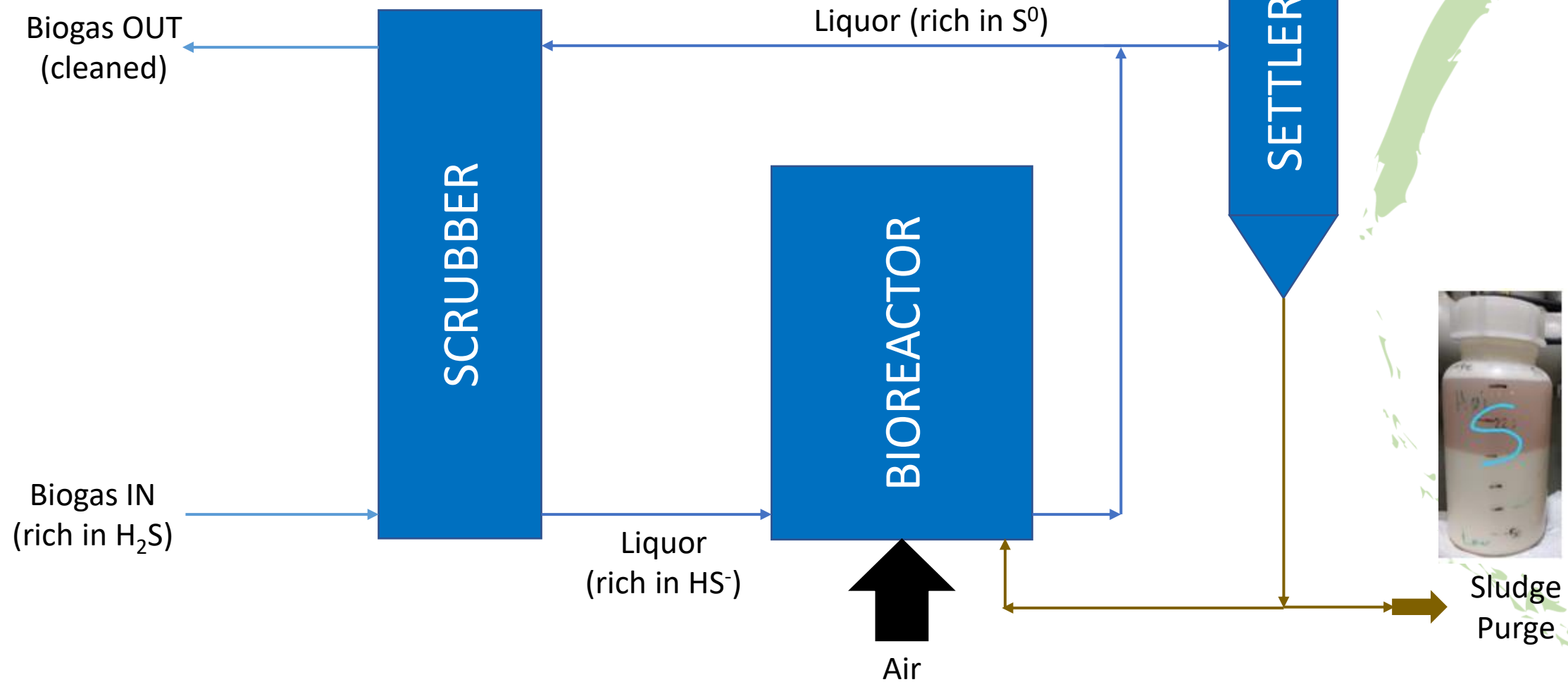
- Valid for H<sub>2</sub>S < 4.000 ppm<sub>v</sub>
- More compact (One reactor)
  - Lower investment cost
- Low reagent consumption



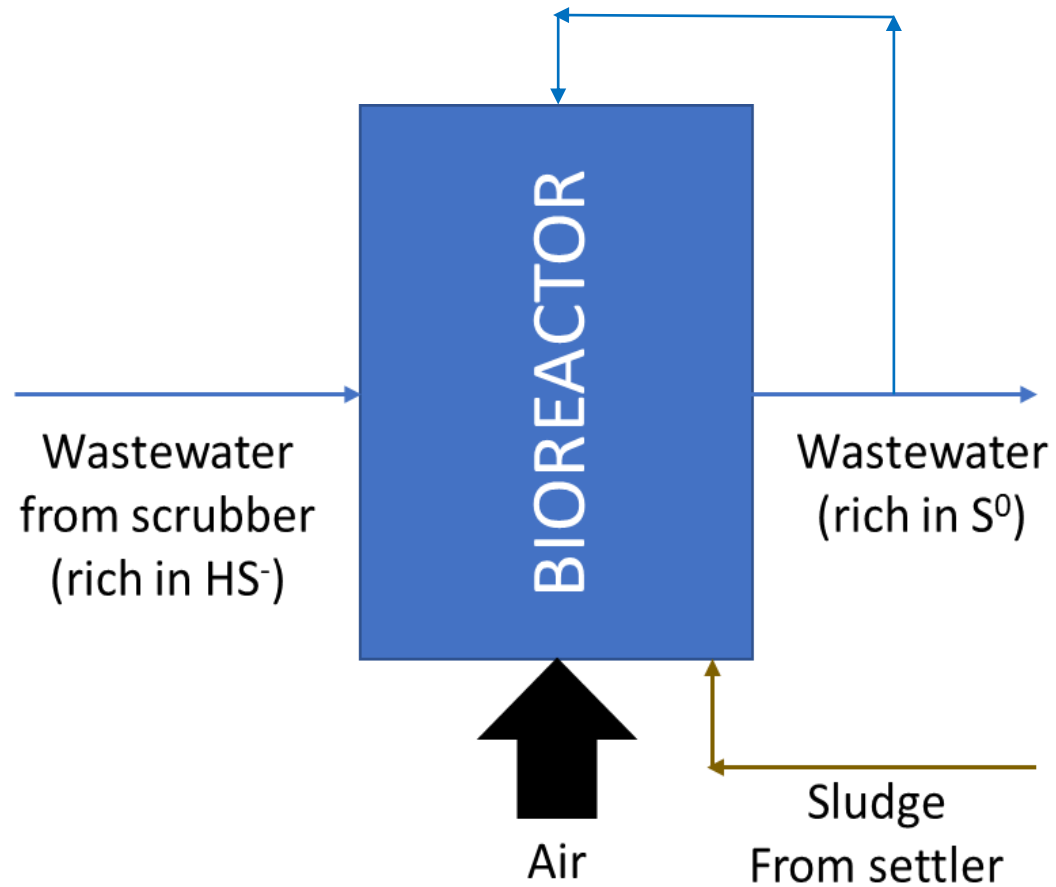
- Valid for any H<sub>2</sub>S concentration
- Valid for higher biogas flow rates
  - No biogas dilution
- No Sulphur accumulation in packing material
  - Lower reagent consumption



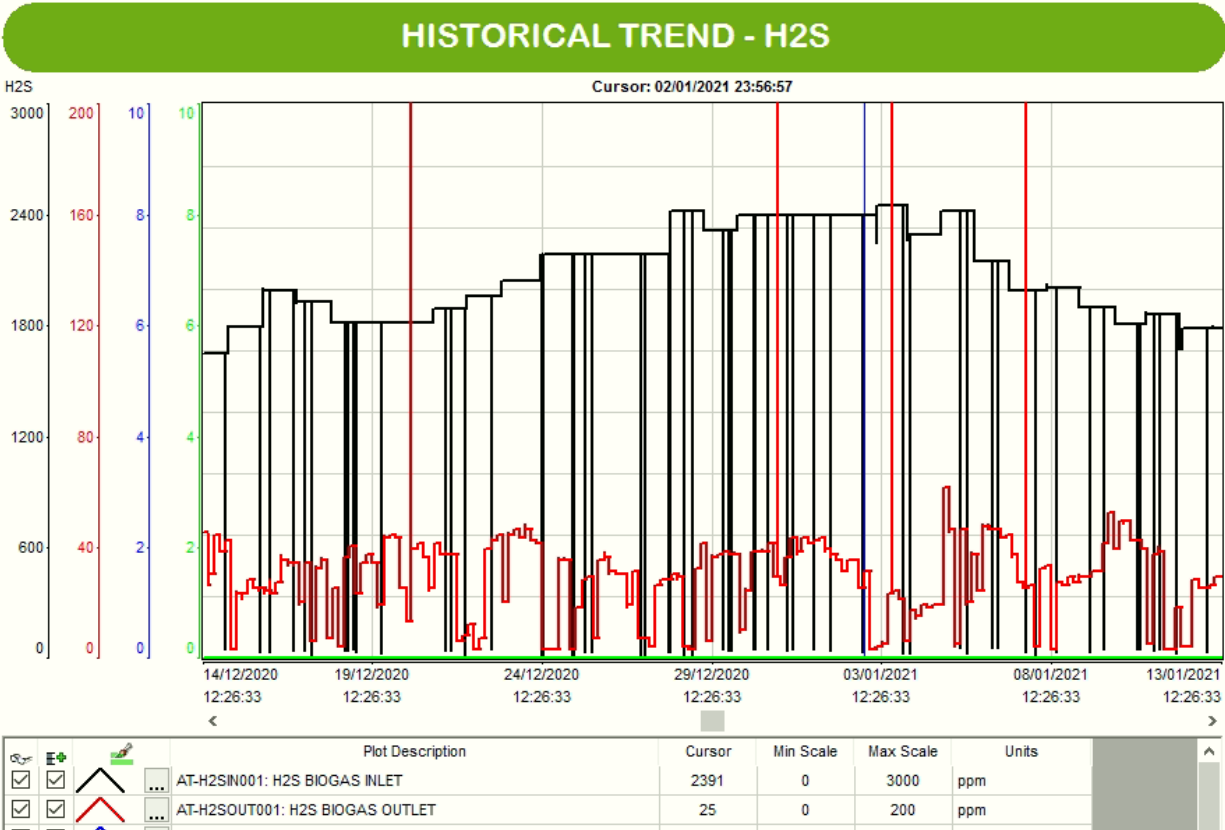
## 7. S-H<sub>2</sub>S in Biogas



## 8. S-H<sub>2</sub>S in Biogas



# 9. S-H<sub>2</sub>S in Biogas





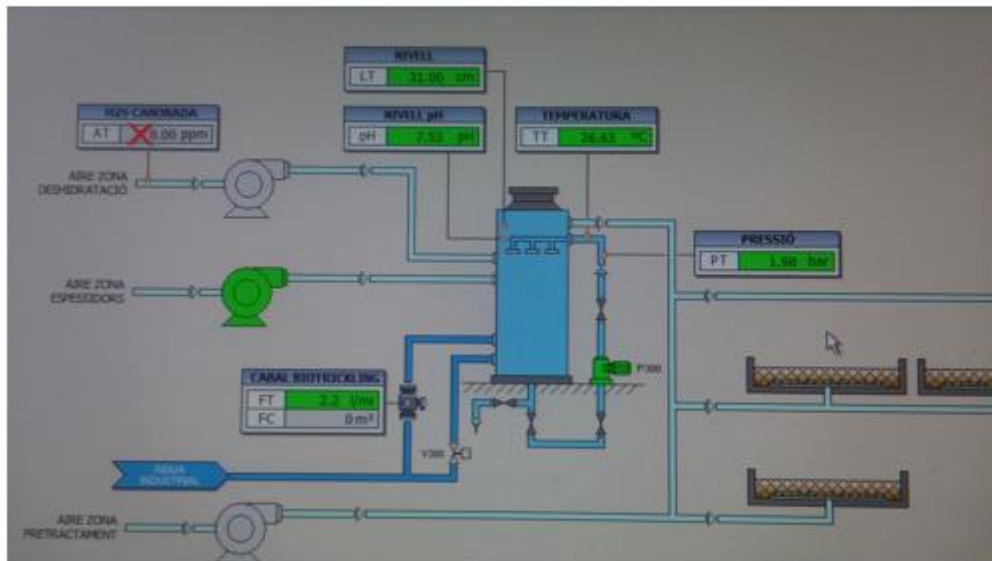
## 10. S-H<sub>2</sub>S in Biogas



Location	Flow (m <sup>3</sup> /h)	[H <sub>2</sub> S] (ppmv)	Technology	Efficiency (%)
MSW Ecopark (Portugal)	2,000	2,500-3,000	BTF	>95
MSW Landfill (Spain)	100	2,000-3,500	BTF	>98
Wine Industry (Spain)	250	4,000-5,500	BTF	>97
Food Industry (Spain)	170	10,000-12,000	BS	>95
Food Industry (Hjørring-Denmark)	1,400	1,000-1,500	BS	>95
Manure Processing (Rødning-Denmark)	4,000	3,000-4,000	BS	>95
OFMSW Landfill (Bologna-Italy)	2,000	250-1250	BS	>95
Manure Processing (Narfyn-Denmark)	3,000	500-2,500	BS	>95
Manure Processing (Midtfyn-Denmark)	3,000	500-2,500	BS	>95
Manure Processing (Holsted-Denmark)	3,000	500-2,500	BS	>95
Manure Processing and food industry waste (Videbaek-Denmark)	5,000	1,500-3,000	BS	>95
Manure Processing (Vaerst-Denmark)	5,000	1,000-5,000	BS	>95
MSW Landfill (Knockharley-Ireland)	2,100	3,750-7,500	BS	>95

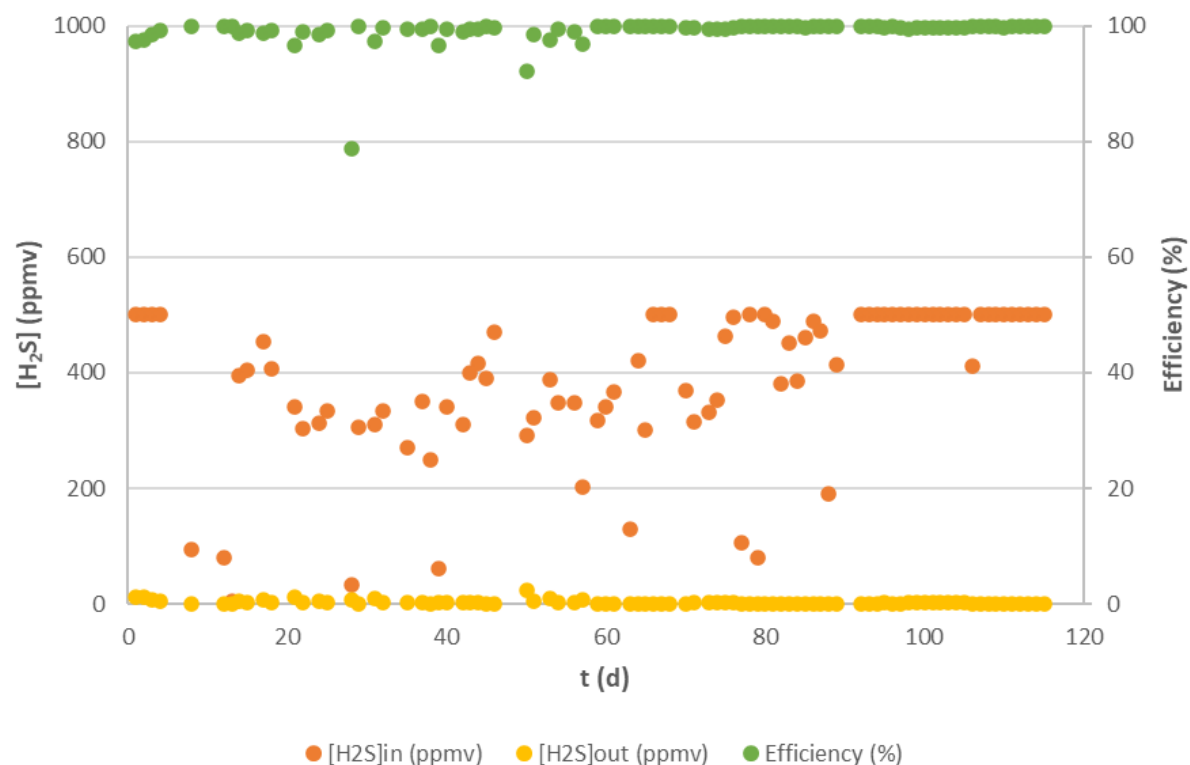
BTF: Biotrickling filter; BS: Bioscrubber

# 11. S-H<sub>2</sub>S deodorization



Flowrate = 3500 m<sup>3</sup>/h  
50 < [H<sub>2</sub>S] < 800 ppmv  
2,4 m (d) x 7,1 m (h)

## 12. S-H<sub>2</sub>S deodorization



[H<sub>2</sub>S]<sub>in</sub> > 389±130 ppmv  
[H<sub>2</sub>S]<sub>out</sub> = 2,1±3,6 ppmv  
RE > 99,2±2,5 %



## 13. S-H<sub>2</sub>S deodorization



- Deodorization requires a comprehensive approach
- Biological systems can remove >99% of soluble odorous compounds
- Costs are minimal
- No chemicals used



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