UNIVERSITÉ DE SHERBROOKE

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BIOLOGICAL REMOVAL OF HYDROGEN SULPHIDE FROM LANDFILL SITE BIOGAS

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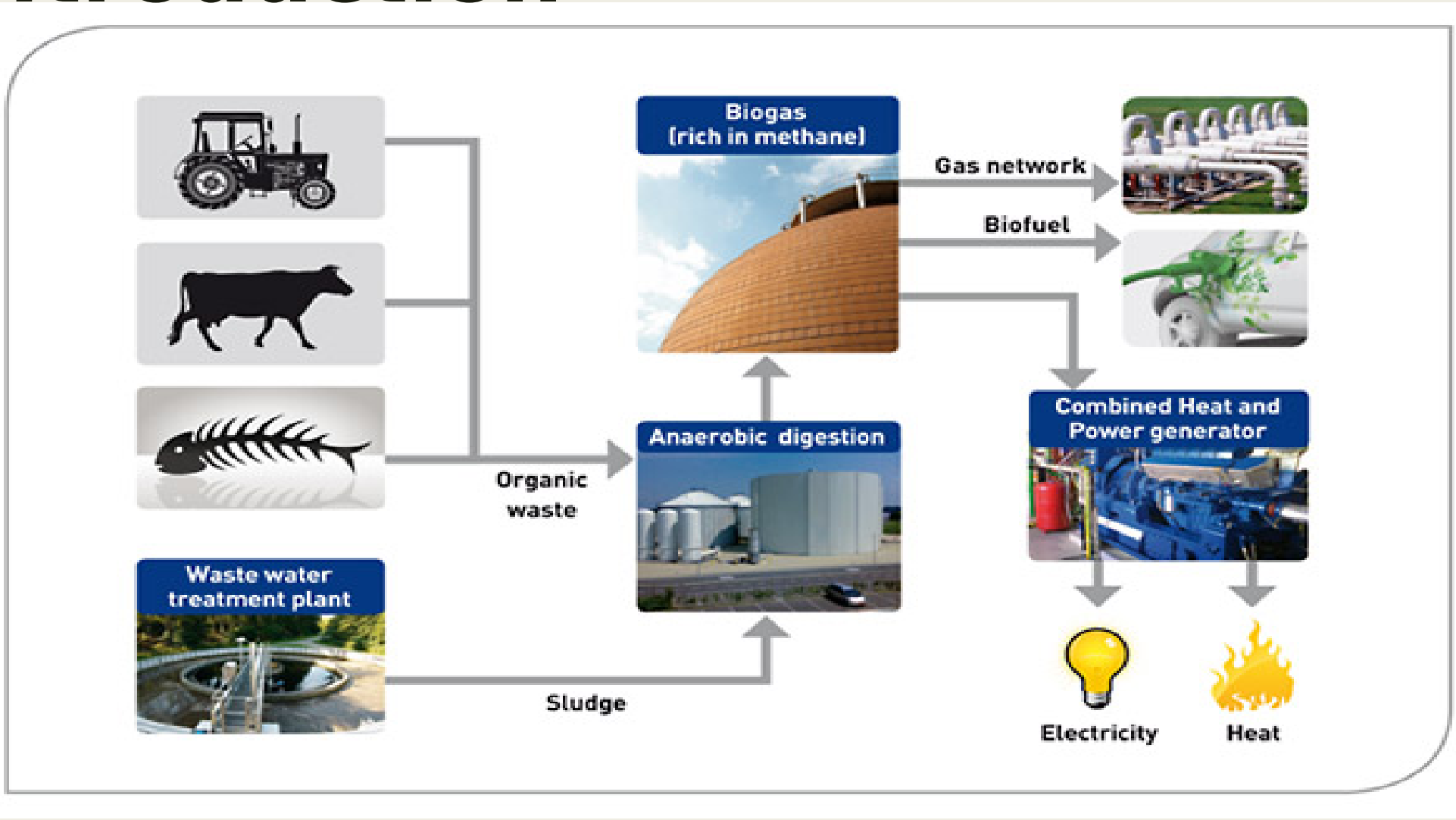
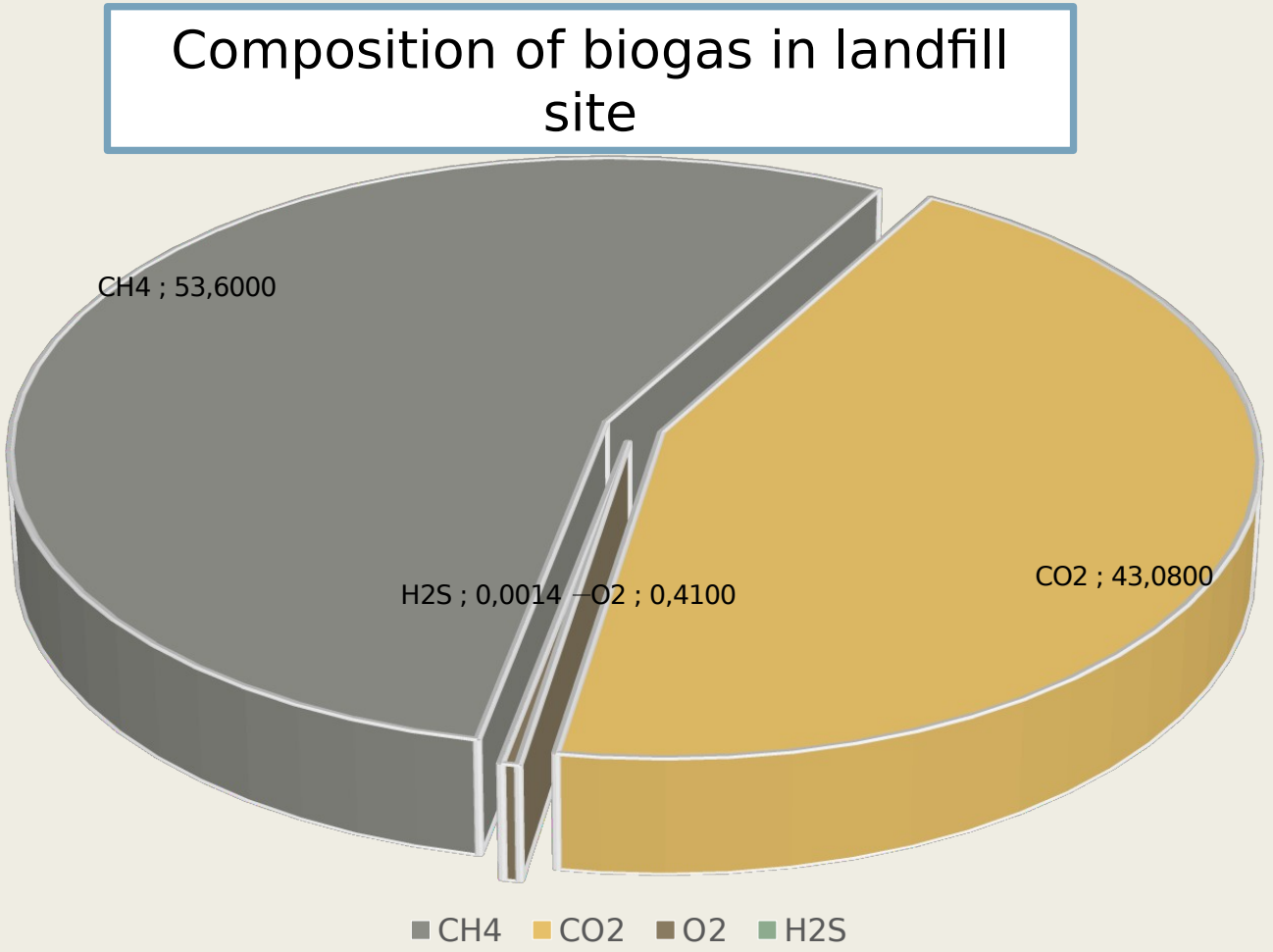
Outlines

- Introduction
- Study objectives
- Materials and Methods
- Results
- Conclusions

Introduction



Introduction



Introduction

Background and problem justification

Valoris

CRB Innovations Inc.

Anaerobic digestion

Biogas:
CH_4
CO_2
~~H_2S~~

hydrogeneration

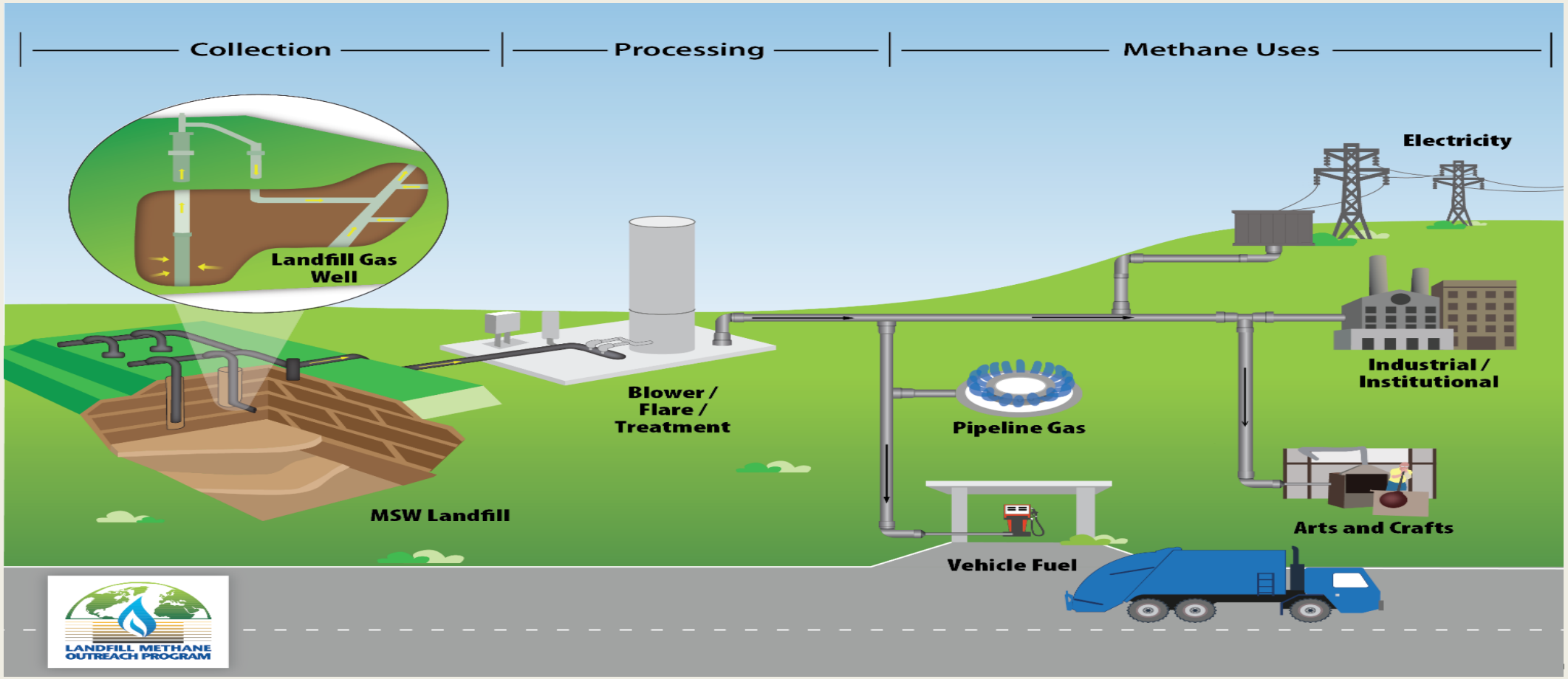
Bio-methanol

Reforming

Bio-hydrogen

Introduction

Background and problem justification

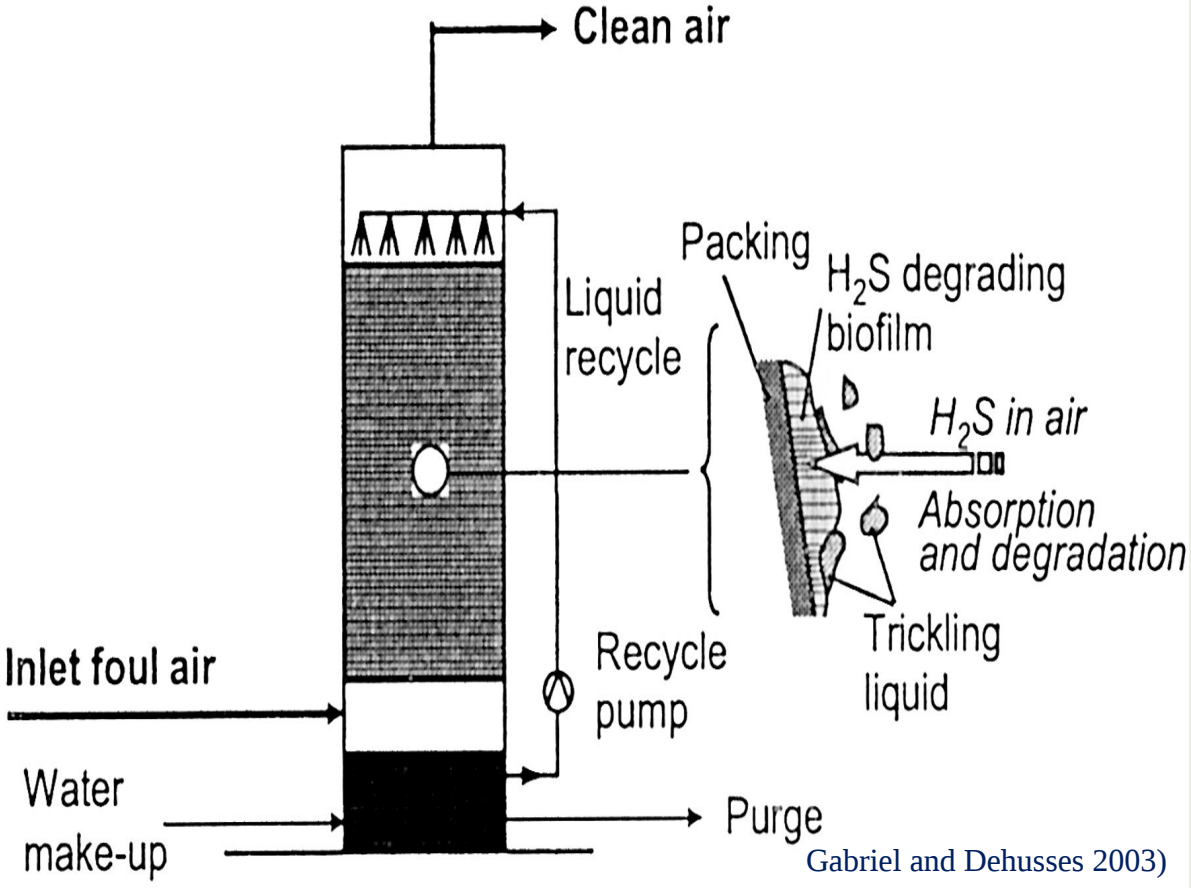


Study objectives

- Determine the performance of the lab Scale biofilter for removing the H_2S contained in the synthetic biogas.
- Remove the hydrogen sulphide from real biogas by biological oxidation process.

Materials and Methods

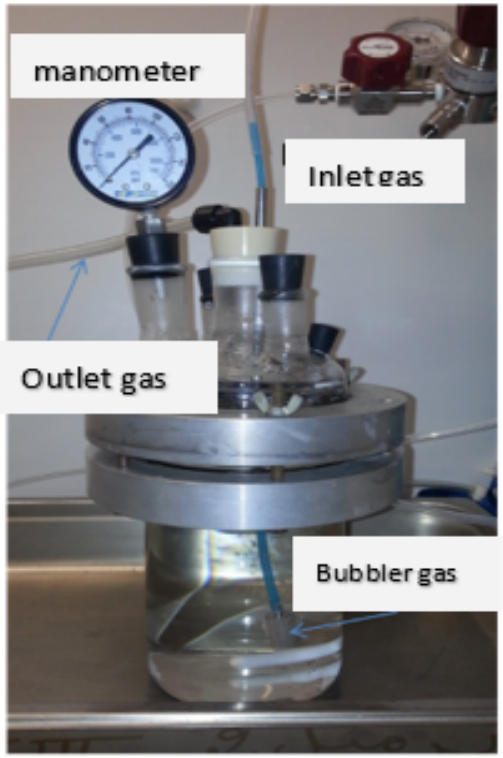
Biological Hydrogen Sulphide Removal Techniques



Gabriel and Dehusses 2003)

Materials and Methods

Laboratory scale bioreactor



Bioreactor

H_2S gas bottle

humidifier

Reactor

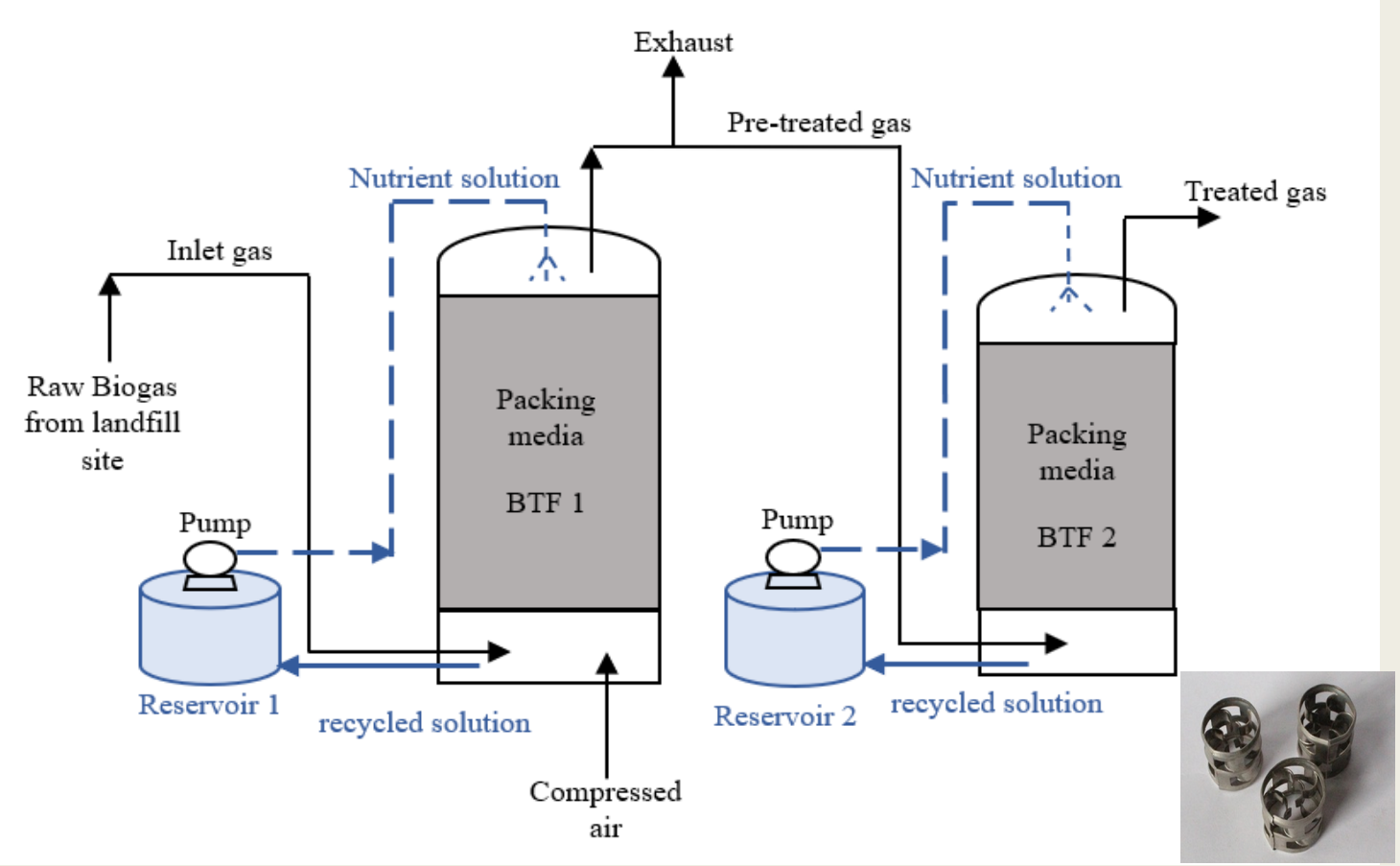
gas mixer

Total reduced sulfur analyzer

Operation conditions	
Volume (L)	1
Flow rate (L/min)	0.5 - 1
EBRT (min)	1 - 2
H_2S (ppmv)	735 – 2000
CO_2 (%)	20
Air (Humide)	Balance

Materials and Methods

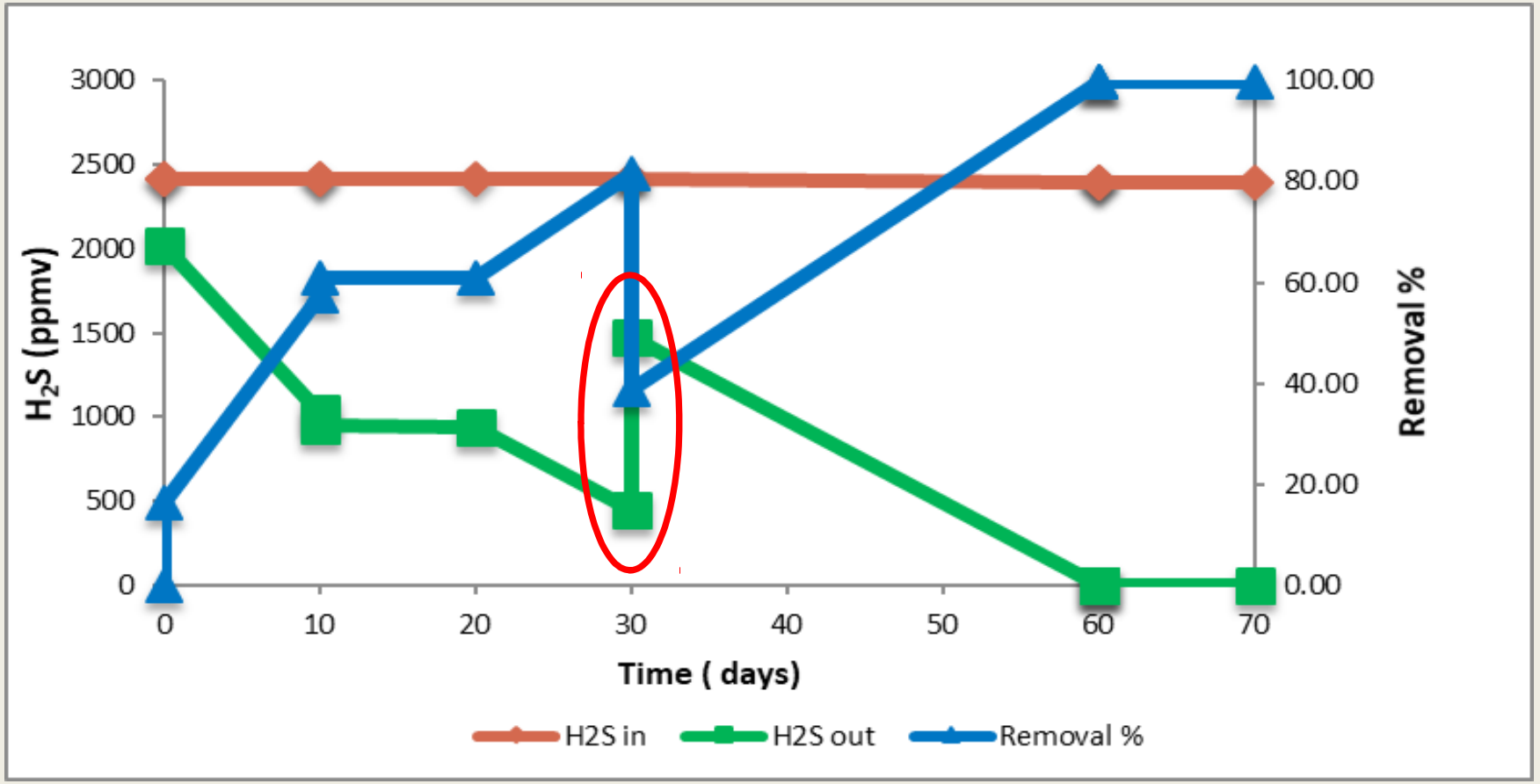
Pilot scale bioreactor



Operation conditions		
	BTF1	BTF2
Volume (L)	110	25
Flow rate (L/min)	2.3	1.2
HRT (min)	3.9	0.9
H_2S (ppmv)	900-1220	100
pH	2	7
Air	4%	--

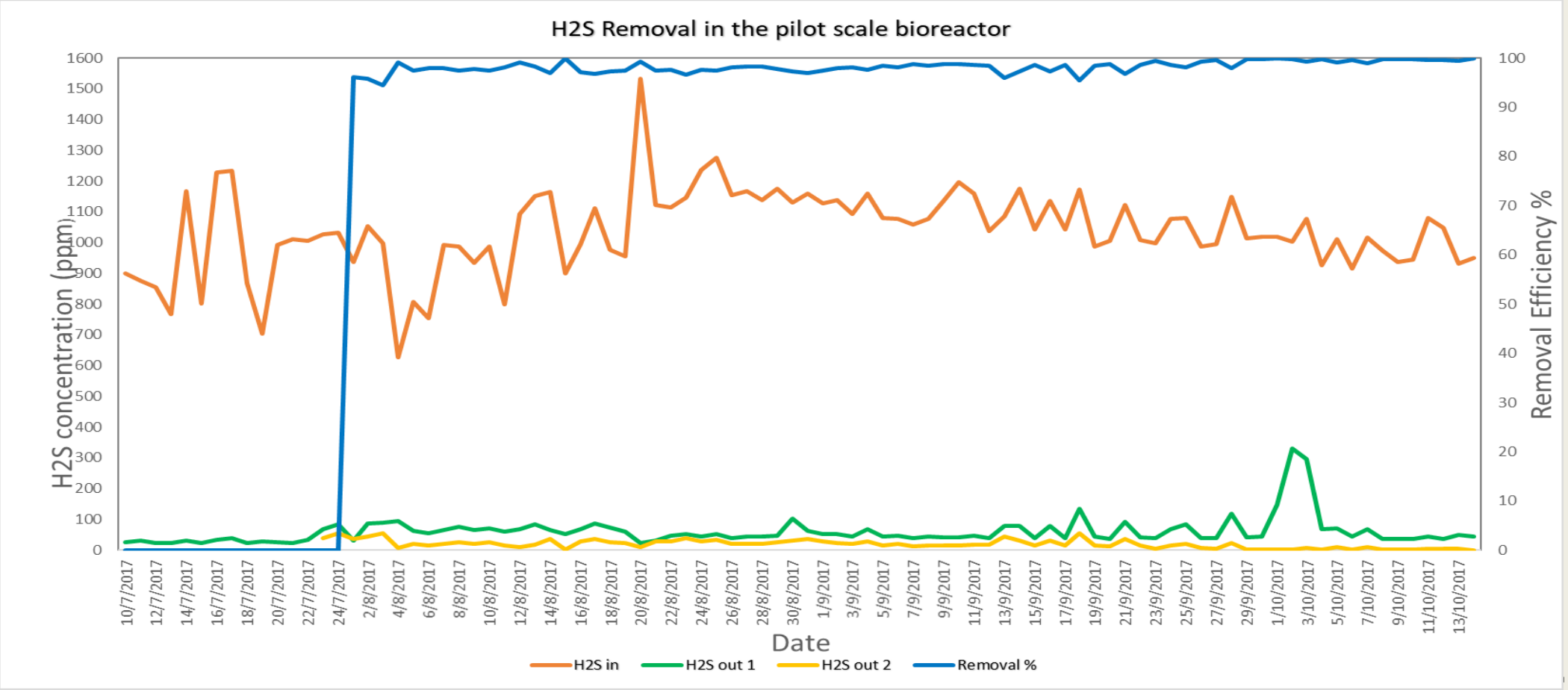
Results

Biodegradation test of H_2S in the laboratory



Results

The performance of the pilot scale biofiltration treatment system on landfill site



Conclusions

- The biofiltration system, containing stainless-steel pall rings as a filter material, removed H_2S with efficiencies ranged between 94% and 97 % for inlet H_2S concentrations at the range of 900 to 1500 ppmv.
- Approximately 50 ppmv of H_2S gas was detected in the outlet gas.
- It was observed that the high concentration of chrome, iron and nickel were leached to the produced liquid. These contaminants came from the packing media used (consisting essentially of stainless steel) and not from the biogas treatment.

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Thank you!

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