



European Association for the Development of Renewable Energies, Environment and Power Quality

# STUDY OF THE ENERGY RECOVERY OF SLAUGHTERHOUSE WASTE. THE CASE OF TENERIFE

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MAC 2014-2020  
Cooperación Territorial

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Heterogeneous Catalyst  
Research group (CaHe)  
University of La Laguna

## INTRODUCTION



- Dumping on landfill
- 1,000 Gg of CO<sub>2</sub>-eq
- Limited surface of island
- 1,292 t/year
- Energy dependence

### Animal by-products:

- Slaughterhouses wastes from the meat industry.
- Their correct management are particularly important to ensure the safety of the human and animal food chain.
- Increase each year because according with FAO in 2029 there will be an **8% increase** in developed countries.

### Anaerobic digestion:

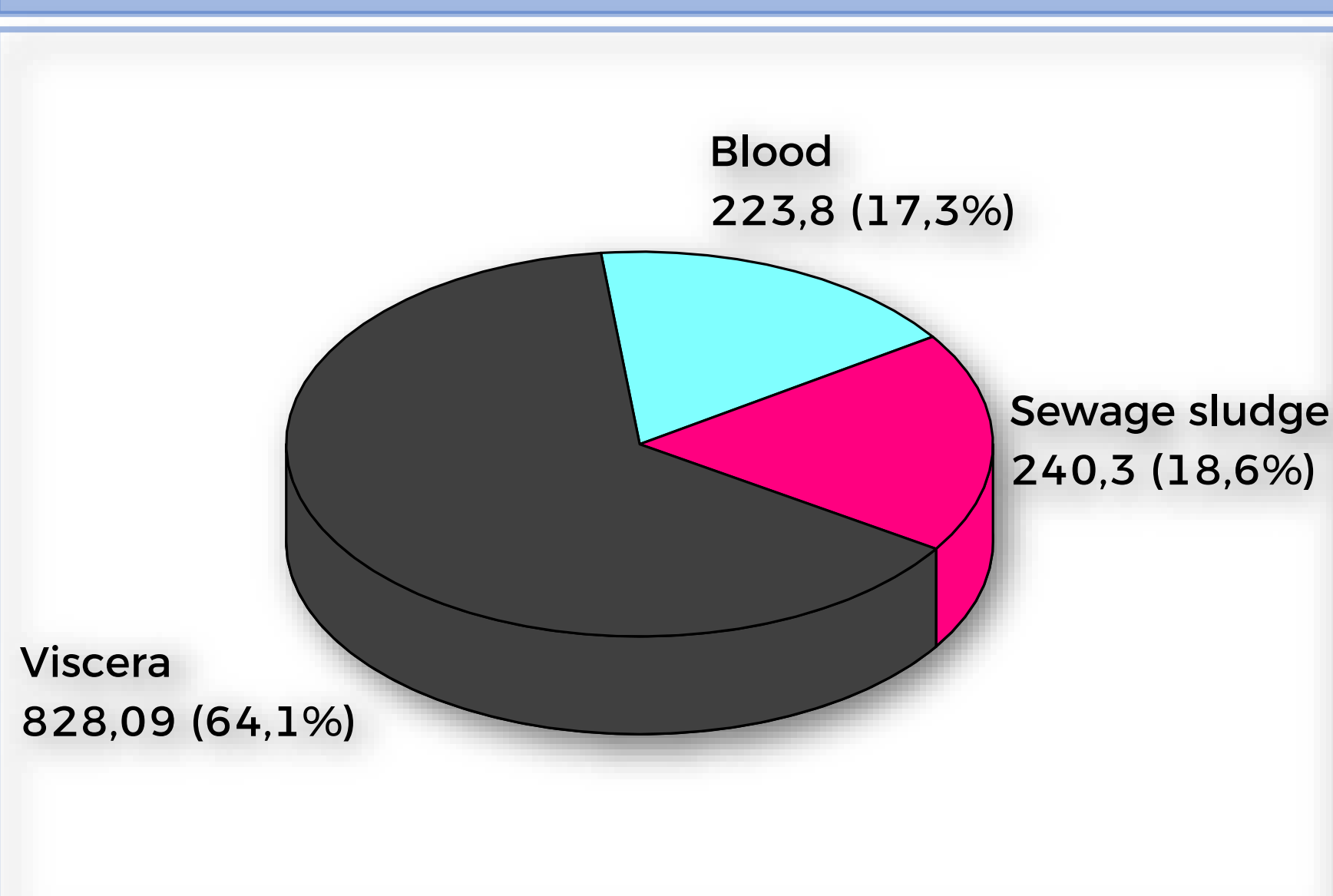
- A bioconversion process
- Appropriate for biomass sources containing more than 50% moisture.
- Converts waste into biogas and biofertilizer
- Waste-to-energy technology
- Manageable renewable energy

## OBJECTIVES

- Quantification of slaughterhouse wastes (SW)
- Biogas potential
- Energy potential of SW in Tenerife

## METHODOLOGY

### Generation of slaughterhouse waste in Tenerife, tonnes



### Slaughterhouse waste



Particle size reduction

Pasteurisation at 70 °C for 1 hour

Prepare samples and add chemical compounds

Gas quantification

Gas composition



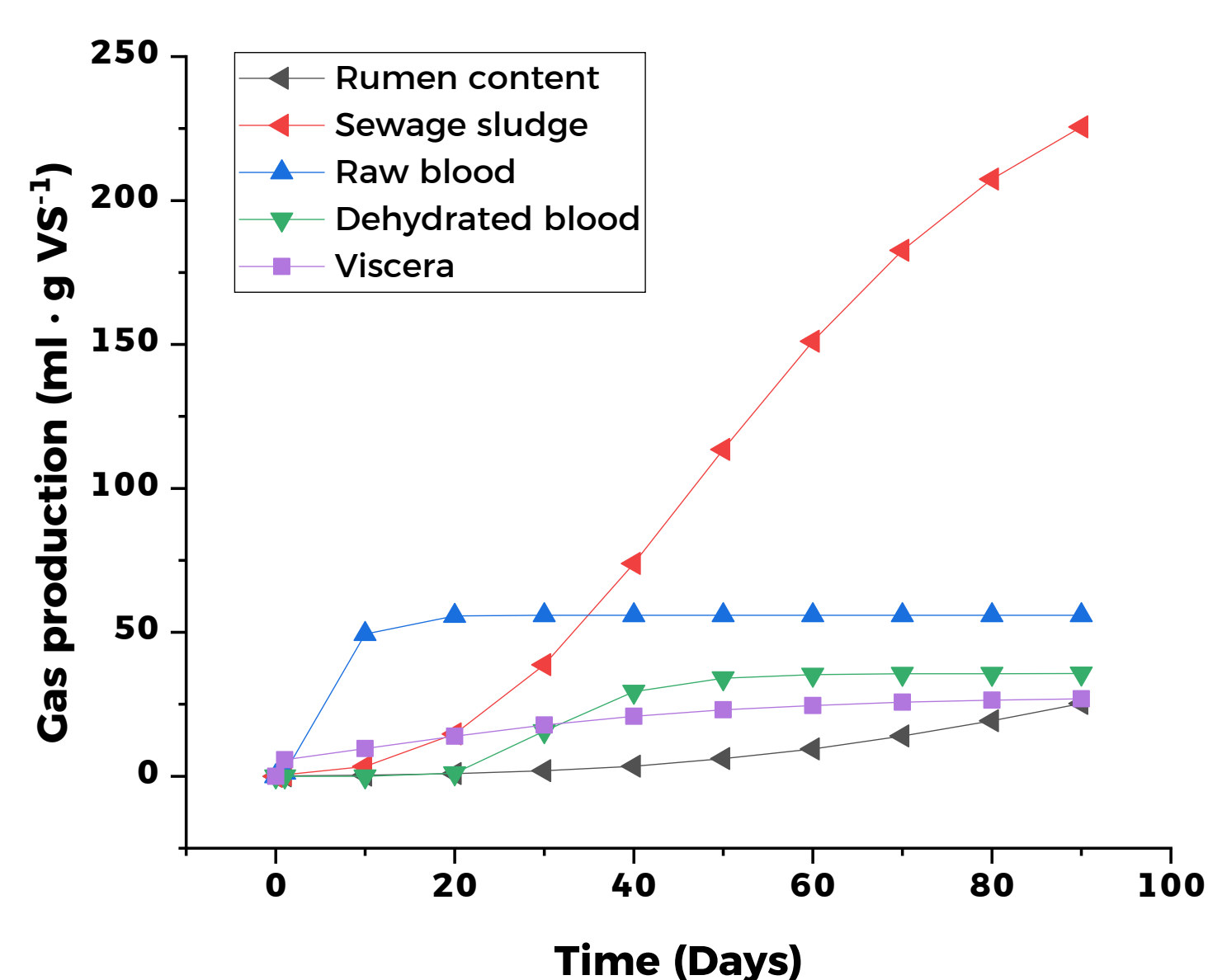
## RESULTS

Anaerobic digestion is a suitable process for slaughterhouse waste. The sample with the highest production of biogas is sewage sludge, followed by rumen content and mix of all kind of wastes (V+RB+SS). The most interested is the codigestion of mix all kind of wastes, which can be generated **4,800 kWh/year** of electrical energy and **24,753 MJ/year** of thermal energy.

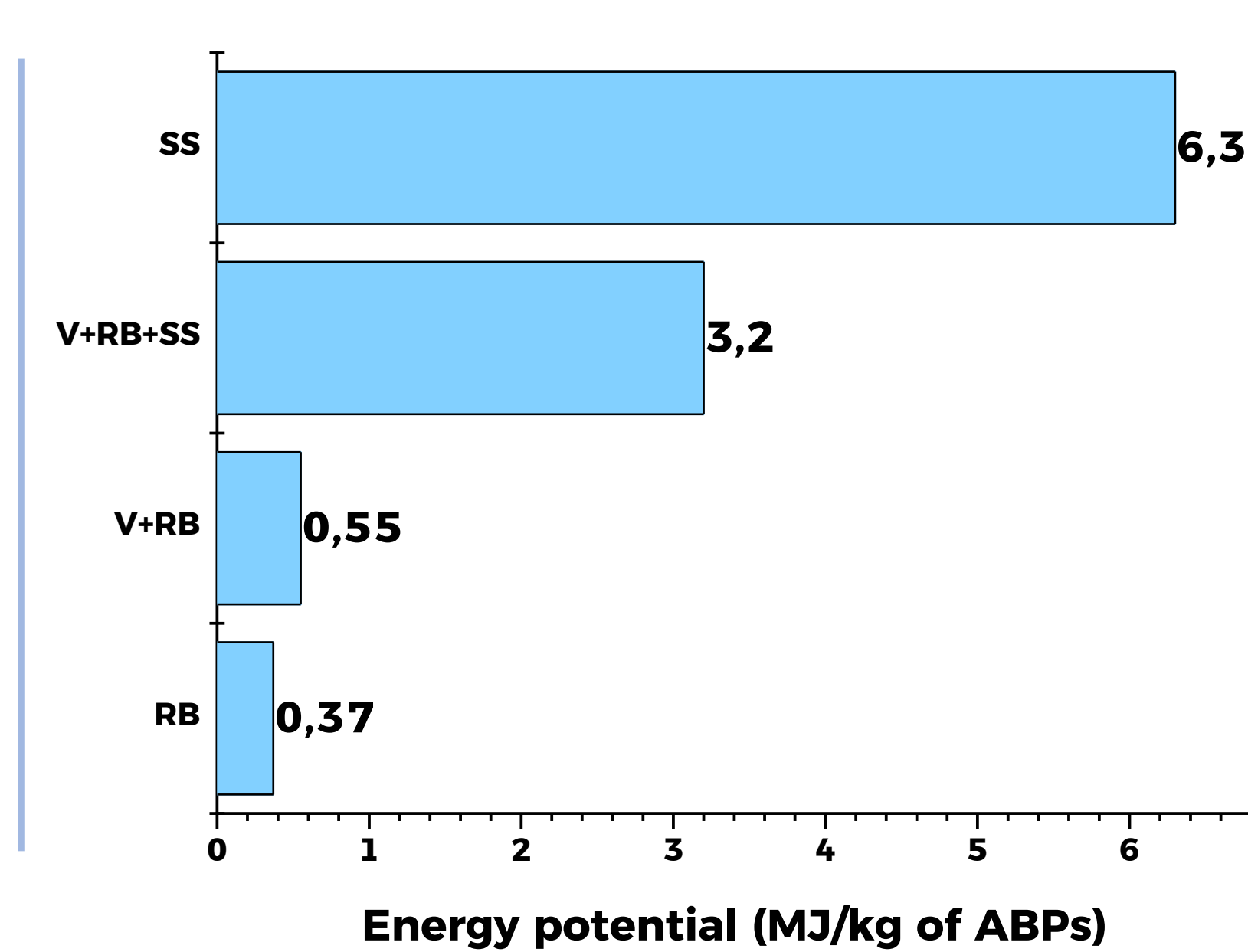
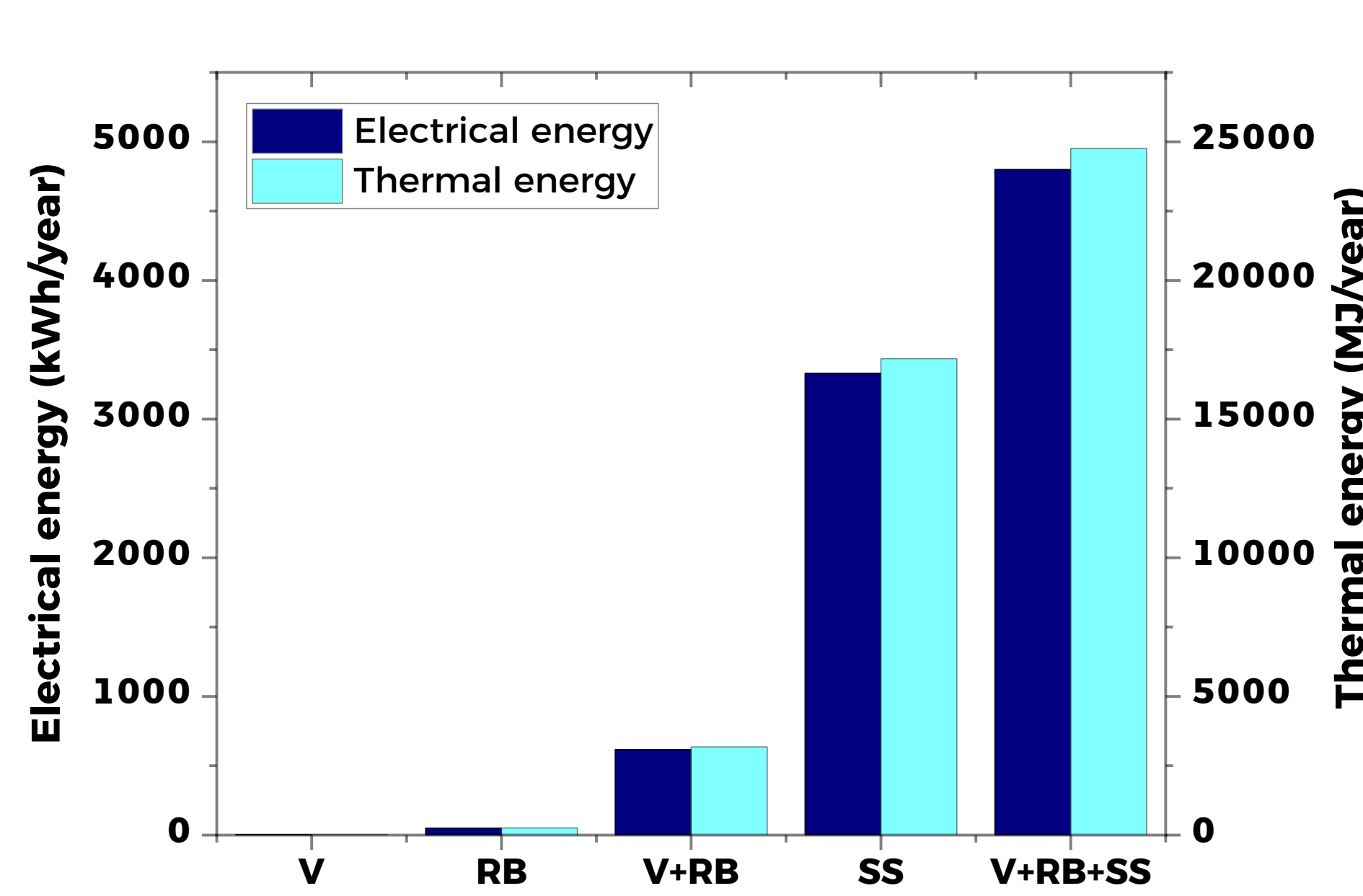
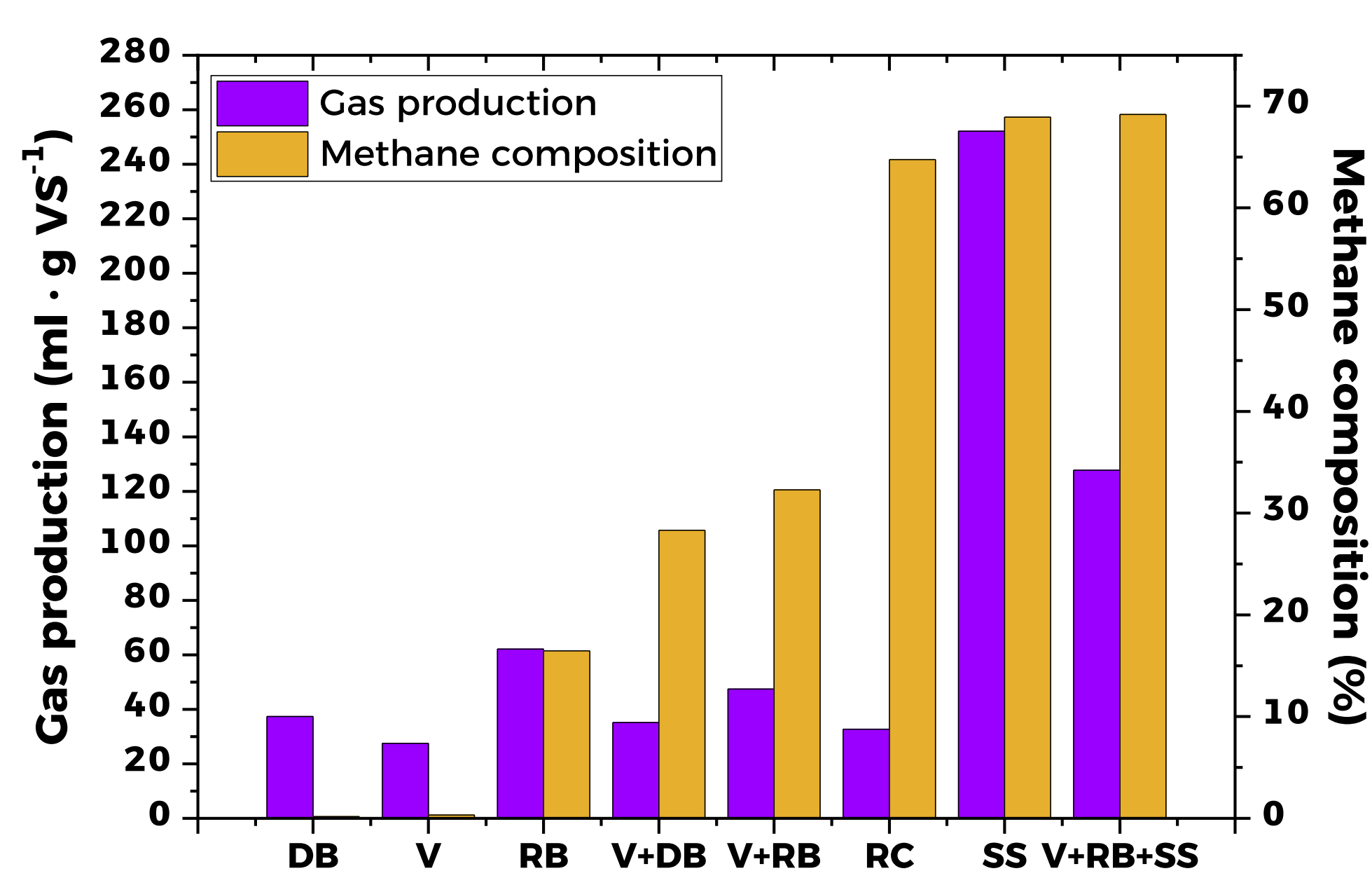
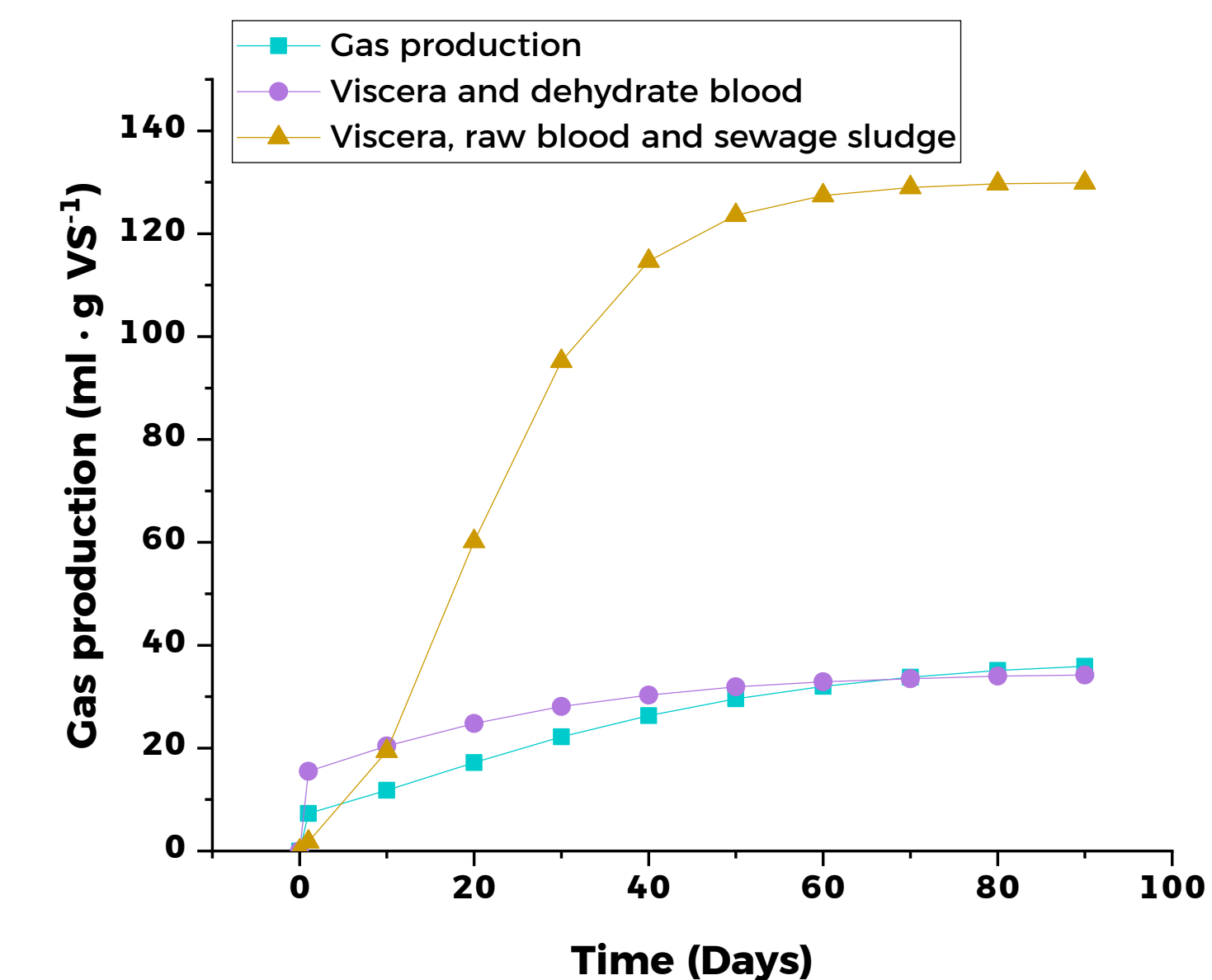
### Samples analysed

Monodigestion	Codigestion
Raw blood (RC)	Viscera with raw blood (V+RB)
Sewage sludge (SS)	Viscera with dehydrated blood (V+DB)
Raw blood (RB)	Viscera with raw blood and sewage sludge (V+RB+SS)
Dehydrated blood (DB)	
Viscera (V)	

### Monodigestion



### Codigestion



## CONCLUSIONS

- The animal by-products have a potential for energy recovery through anaerobic digestion. As a result, this process is an approach to the treatment of waste dumped in landfills that avoids transport and landfill emissions and the financial expenses of paying an agent to carry out the transport of the goods. In addition, the blood does not have to be submit to a thermal process because it doesn't improve the co-digestion of ABPs and energy would be wasted.
- A mixture of most animal by-products generated in Tenerife, with an estimation of 1,292 t for 2019, and the proportion analysed in this work generates a biogas production of 127.71 mL · g VS<sup>-1</sup>. Furthermore, animal by-products will generate an average of **4,800 kWh year<sup>-1</sup> of electrical and 24,753 MJ year<sup>-1</sup> thermal energy**.
- Overall, this alternative treatment of animal by-products converts this waste into a resource as energy recovery to supply the meat industry's energy demand, turning this industry into a more sustainable and self-sufficient industry, favouring the circular economy.

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