

UNIVERSIDAD
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USE AND TREATMENT OF WATER IN BIODIESEL MANUFACTURING

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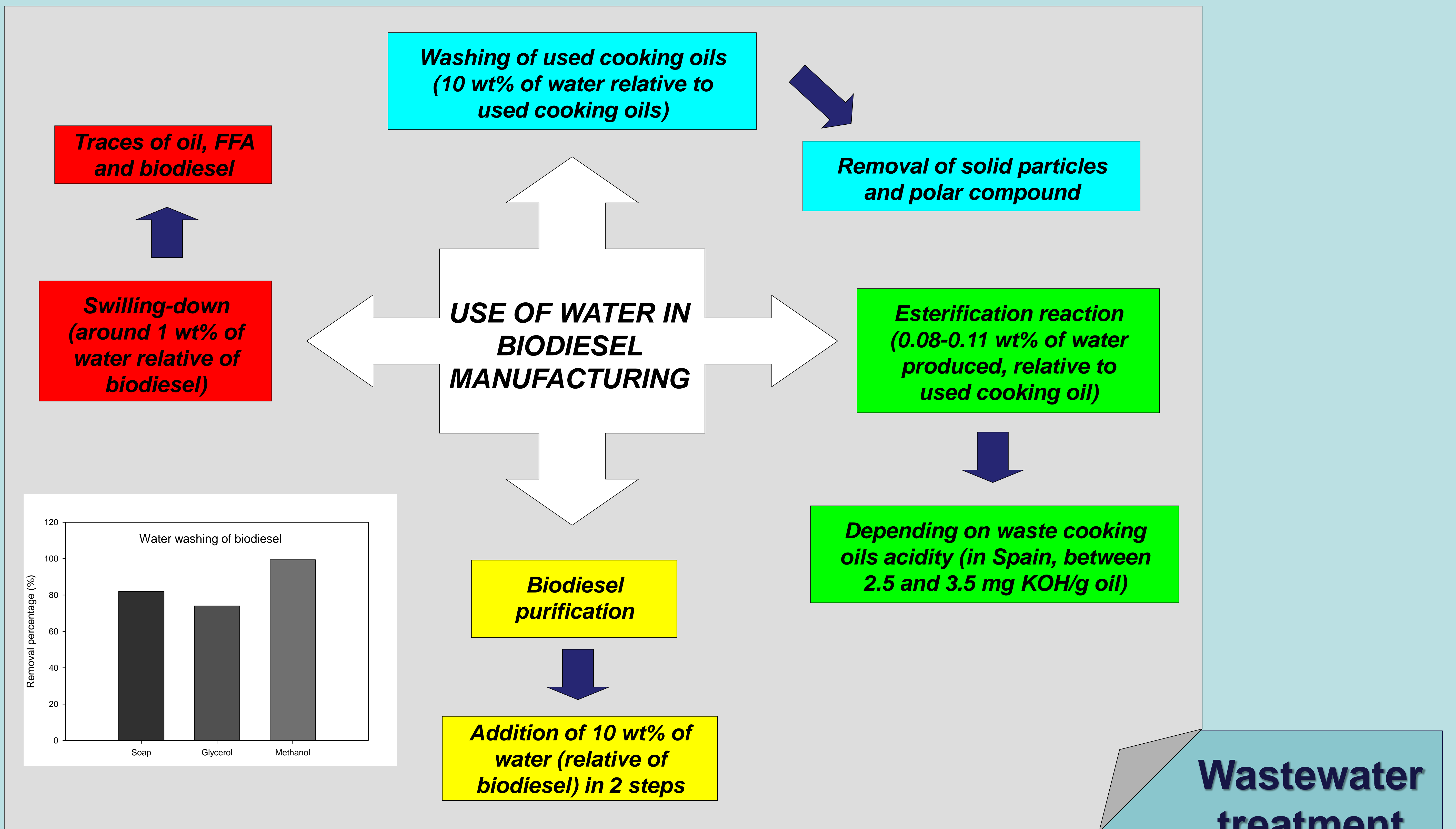
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INTRODUCTION

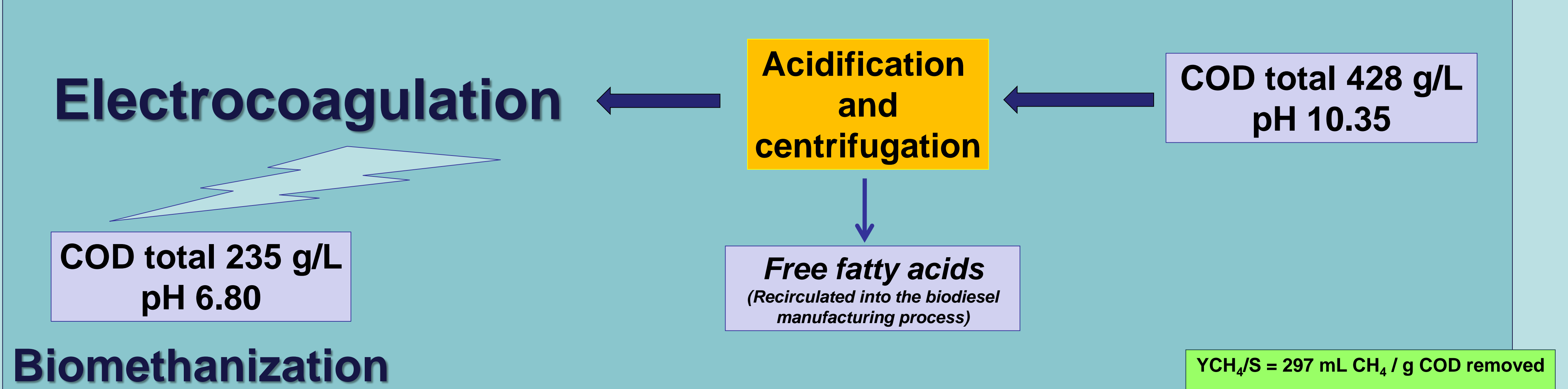
Biodiesel is an environmentally friendly liquid fuel that is less pollutant and more renewable than conventional petroleum diesel fuel (Ma & Hanna, 1999). Water is involved in several steps of biodiesel manufacturing from used cooking oils: washing of used cooking oils, esterification reaction, biodiesel purification and swilling-down. This leads to the generation of large amounts of highly polluted wastewater, which has given rise to environmental concerns associated with its disposal.

OBJECTIVES

The aim of this work was to describe the importance of water in the biodiesel manufacturing process and to evaluate the viability of integrated physical-chemical and anaerobic digestion techniques for its treatment.



Wastewater treatment



EXPERIMENTAL SET-UP

Biomethanization

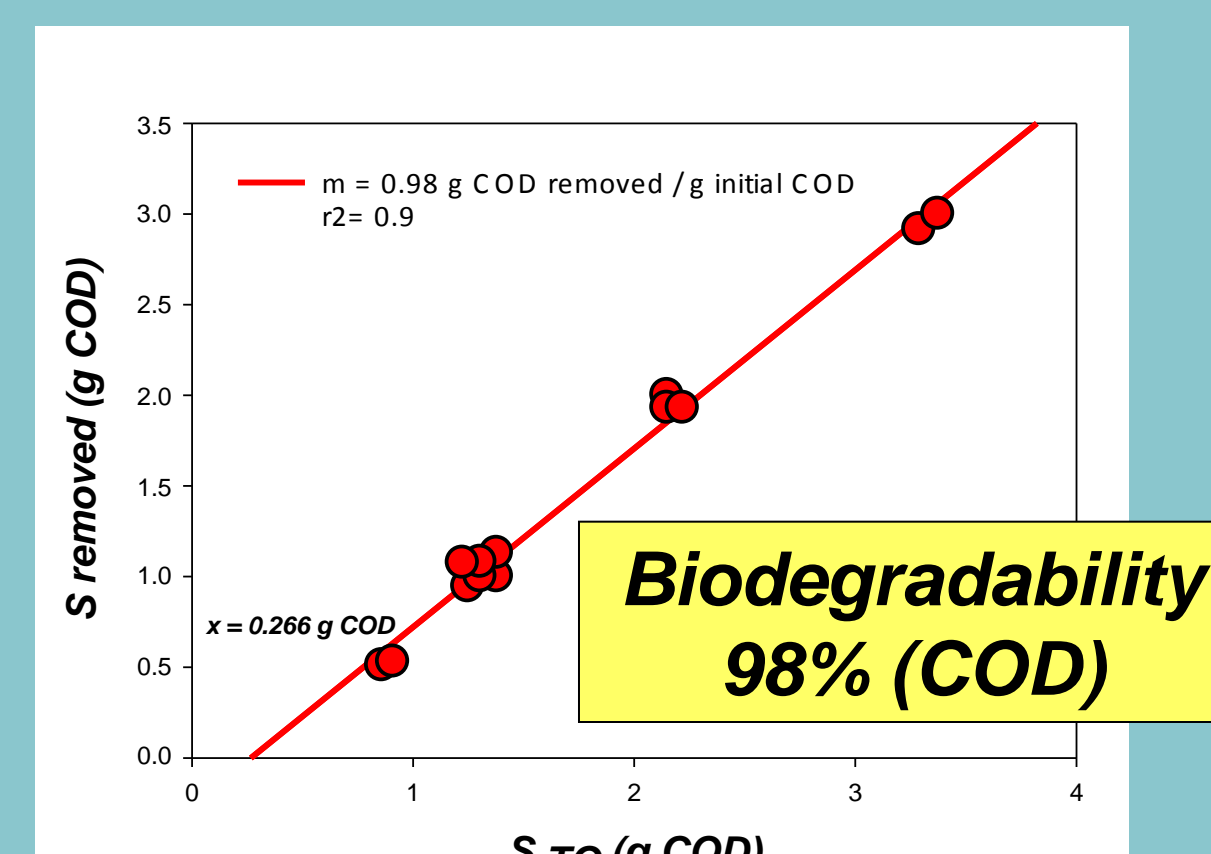
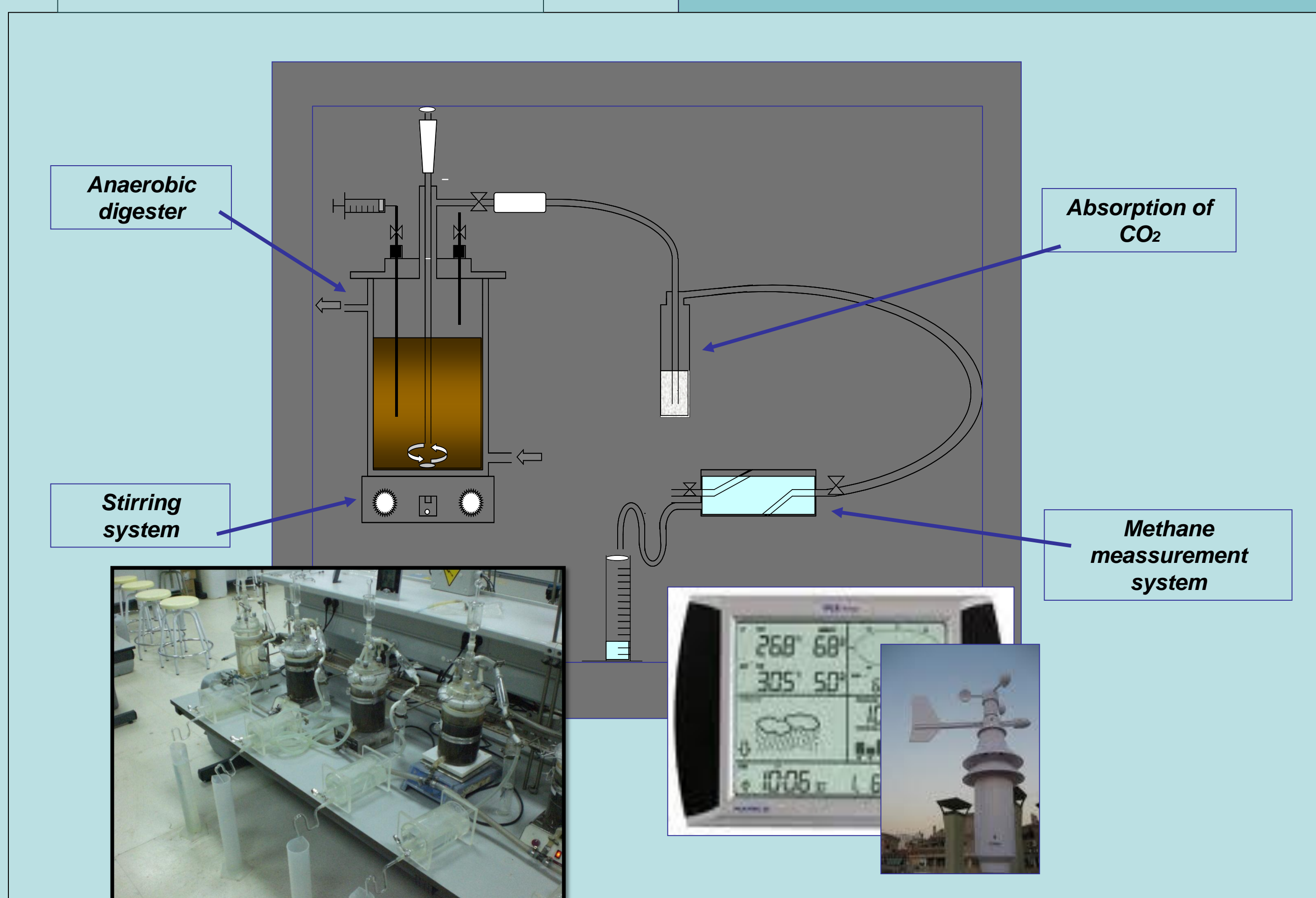


Figure 1. Plot of the amount of substrate removed against the substrate added (S_{TO}) to obtain the wastewater biodegradability.

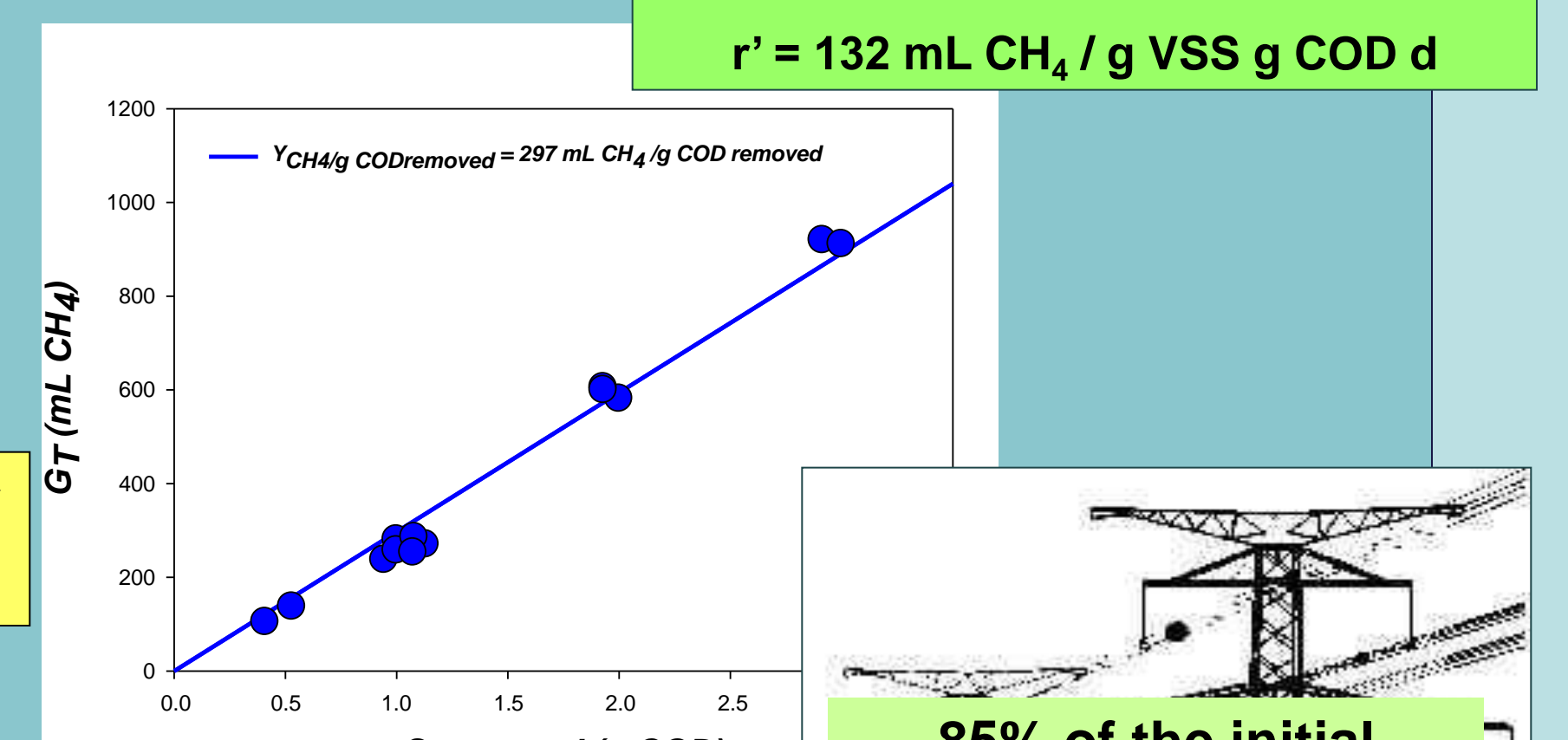
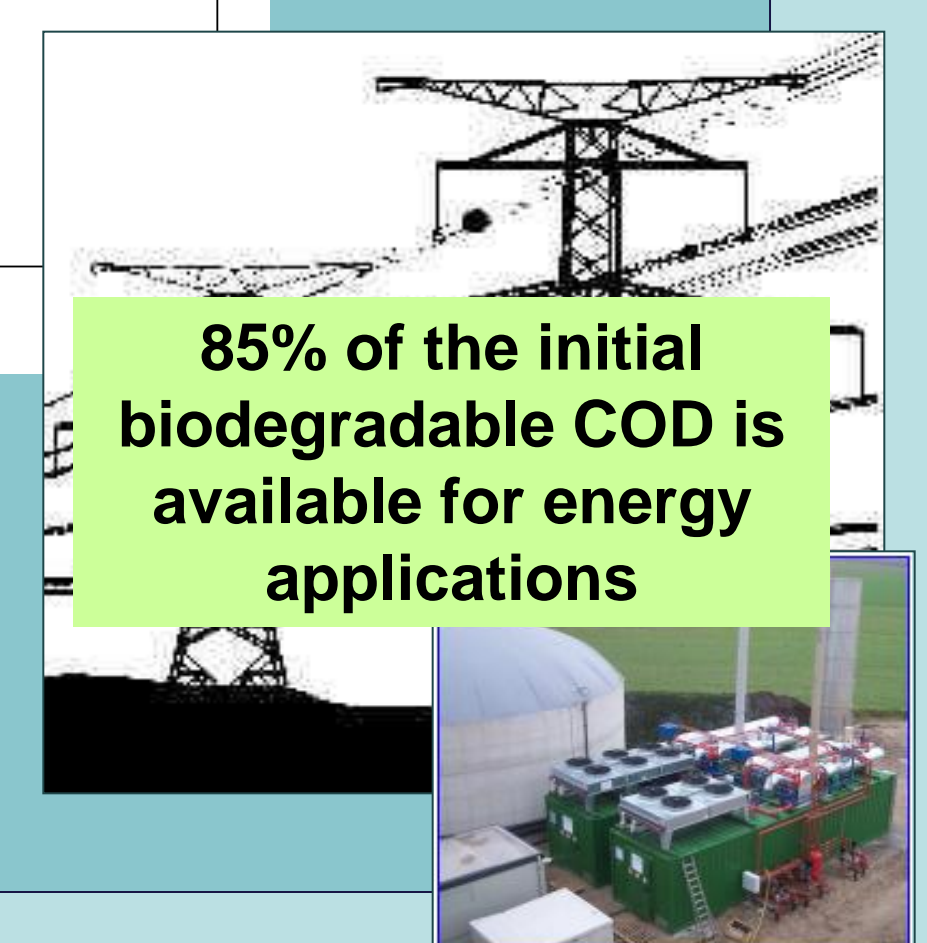


Figure 2. Variation of the experimental maximum methane volume produced (G_T) (1 atm, 0°C) with the COD consumed to obtain the methane yield coefficient of the process.



85% of the initial biodegradable COD is available for energy applications

REFERENCES

-Ma F. and Hanna M.A. (1999). Biodiesel production: a review. Bioresource Technol., 70, 1-15.

CONCLUSIONS

The results obtained with this research indicated that the integration of electrocoagulation and anaerobic digestion processes could be a good alternative for treating wastewater derived from biodiesel manufacturing. This combined treatment allowed reducing the organic load contained in the wastewater as well as producing methane, which is a useful product due to its caloric power (Lower Caloric Power): $35,793 \text{ kJ/m}^3$, equivalent to 9.96 kWh/m^3 .