

Hydrothermal Carbonization of Anaerobic Digestate from Food Waste – Agro waste in Lesvos Island

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Biomass Streams in Lesvos Island

- Food Waste
 - ✓ Hospitality
 - ✓ Restaurants
 - ✓ Municipal org. fraction
 - ✓ Café (coffee grounds)
- Agrowaste
 - ✓ Olive Trees Pruning
 - ✓ Olive Oil Mill Waste
 - ✓ Livestock Residues
 - ✓ Municipal Pruning
- Local Food Industry
 - ✓ Dairy Residues
 - ✓ Ouzo Distilleries
 - ✓ Slaughterhouse Residues



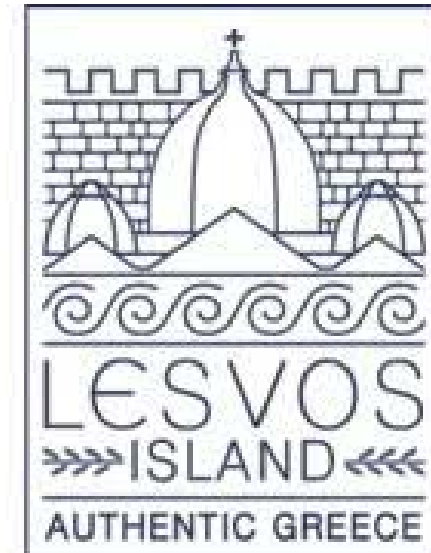
Greece



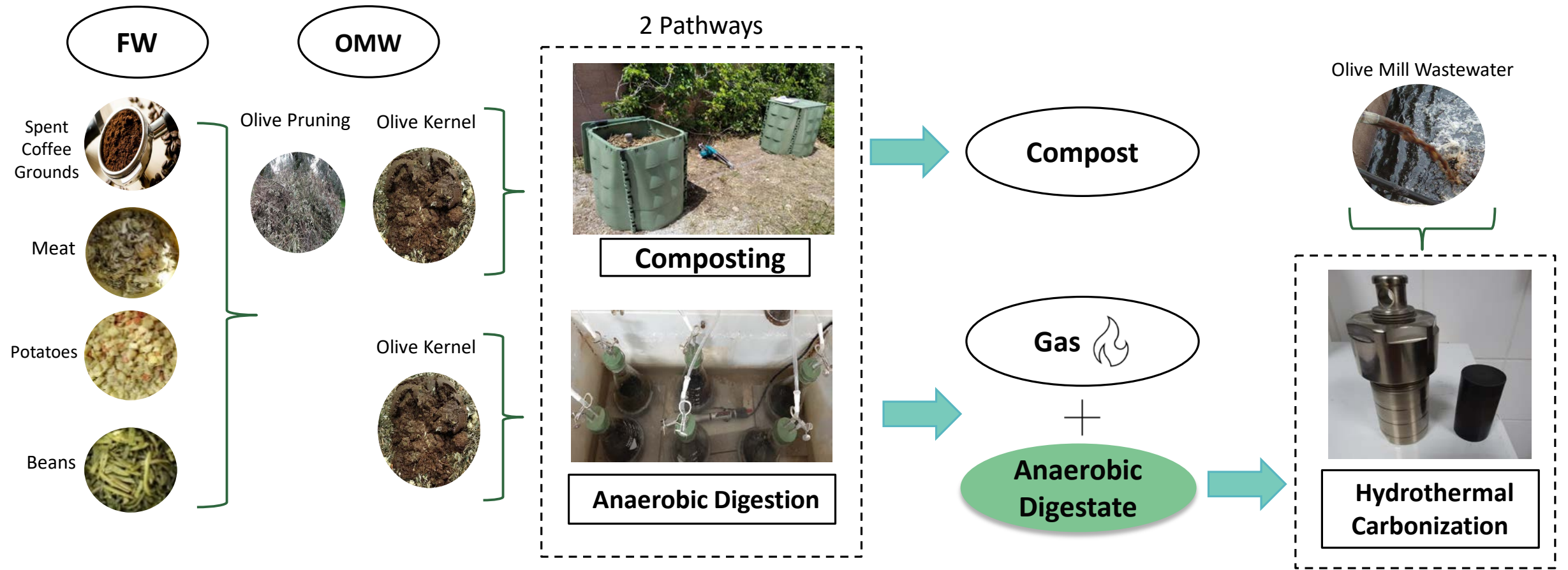
Lesvos Island



Mytilene



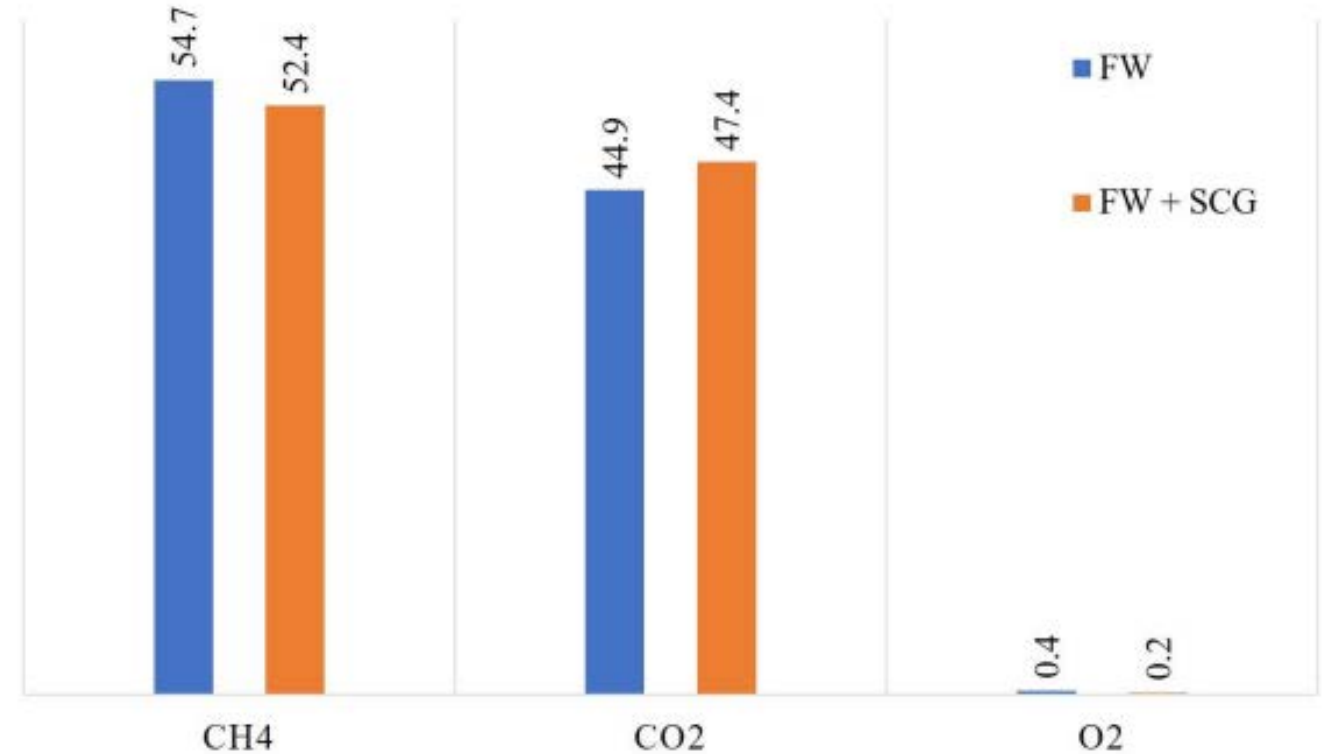
management



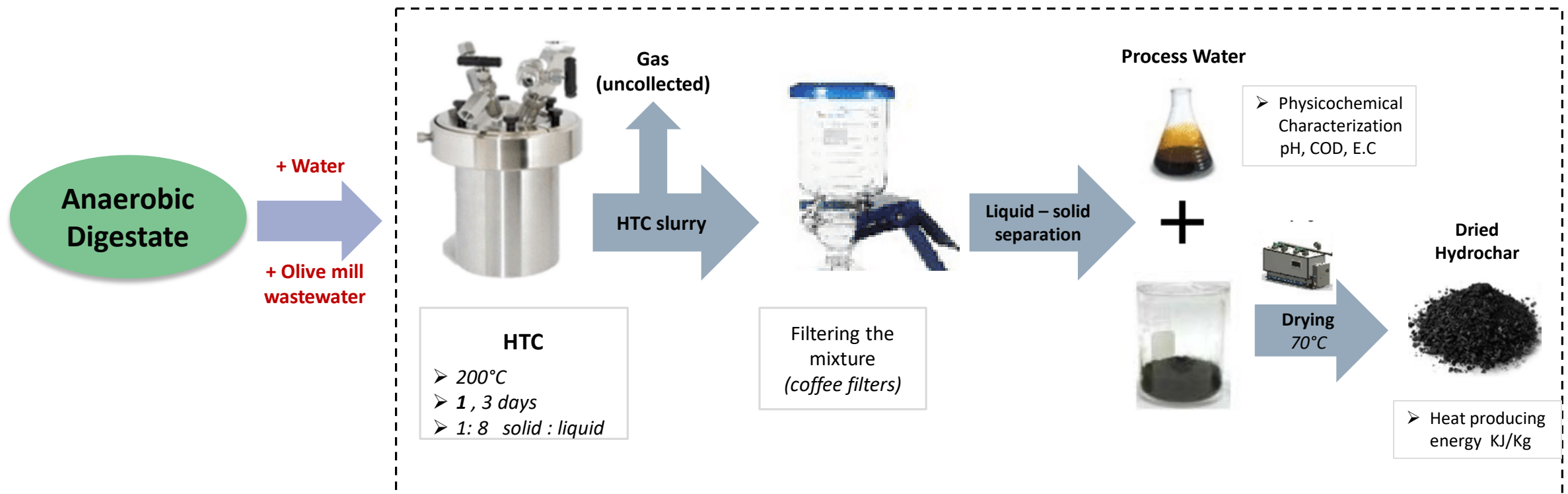
Anaerobic Digestion



Sample ID	Sludge Substrate	Food Waste	Spent Coffee Grounds
0	350 gr	0%	0%
801	350 gr	80%	20%
101	350 gr	100%	0%



Hydrothermal Carbonization HTC



HTC Sampling Materials

Sample ID	Mixture
0K1	Sludge/ OMWW (1 day of HTC)
0K3	Sludge/ OMWW (3 days of HTC)
0N1	Sludge/ Water (1 day of HTC)
0N3	Sludge/ Water (3 day of HTC)
101N1	Sludge + FW/ Water (1 day of HTC)
101N3	Sludge + FW/ Water (3 day of HTC)
101K1	Sludge + FW/ OMWW (1 day of HTC)
101K3	Sludge + FW/ OMWW (3 day of HTC)
801N1	Sludge + FW (80%) + SPG (20%)/ Water (1 day of HTC)
801N3	Sludge + FW (80%) + SPG (20%)/ Water (3 day of HTC)
801K1	Sludge + FW (80%) + SPG (20%)/ OMWW (1 day of HTC)
801K3	Sludge + FW (80%) + SPG (20%)/ OMWW (3 day of HTC)

- 1g of digestate (all the available samples)
- 8 ml H₂O **or** 8 ml Olive Mill Wastewater

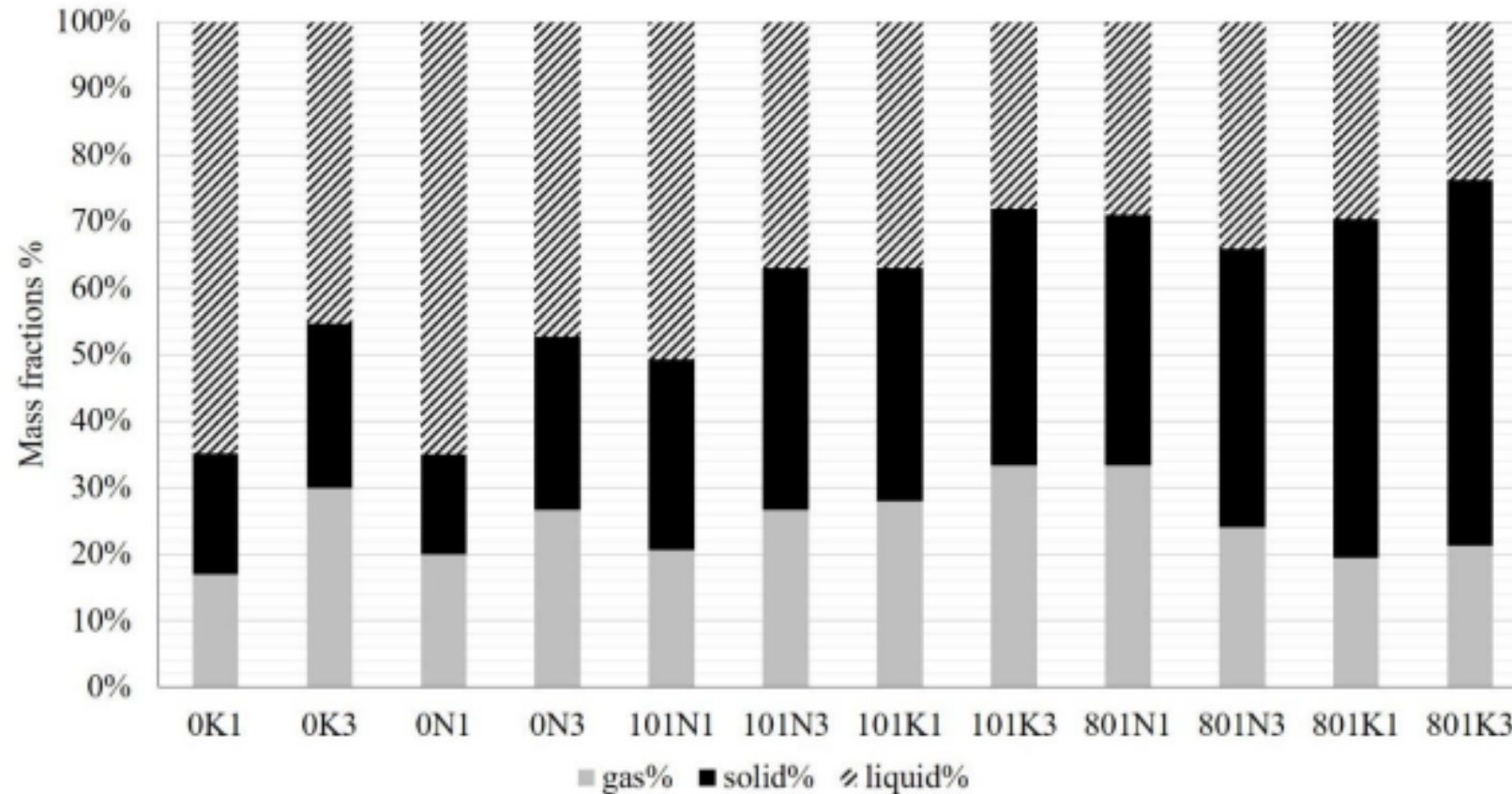


Hydrochar Heating Value

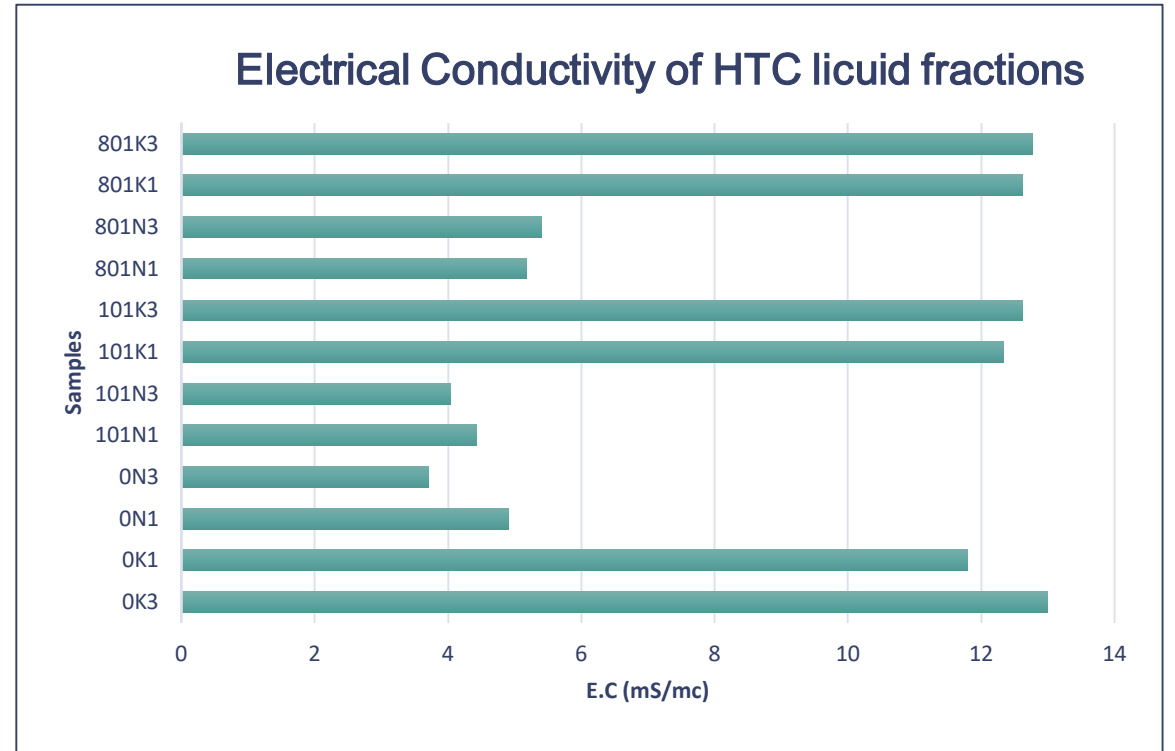
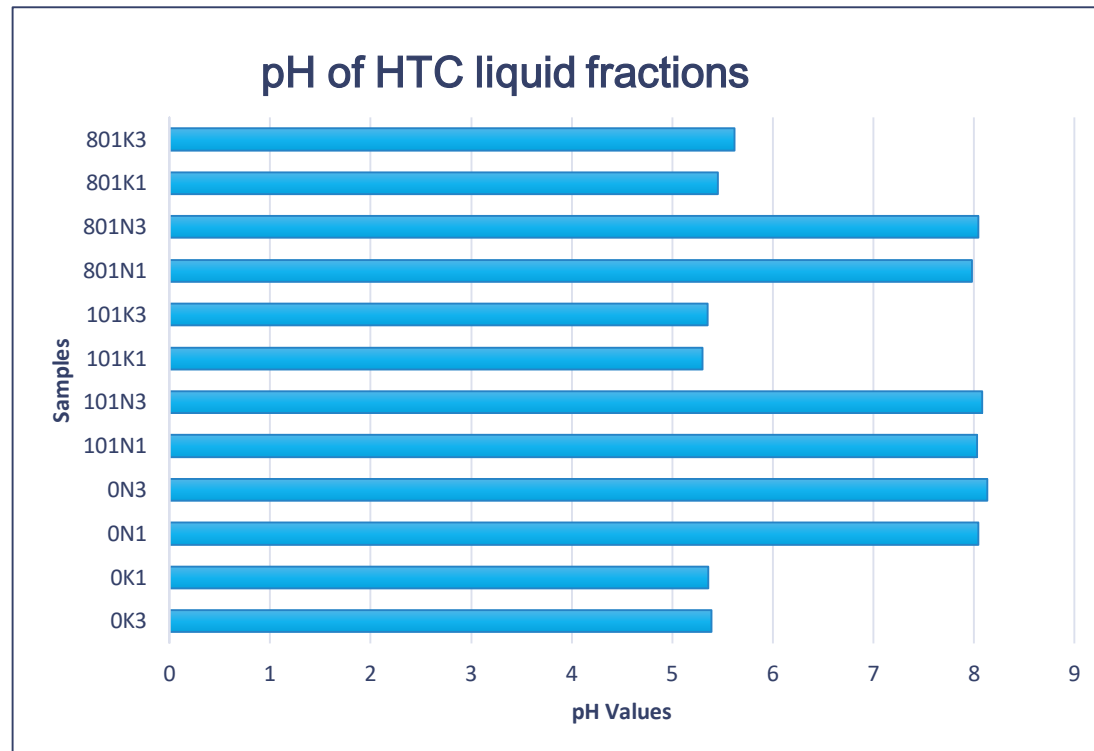
- Drying at 70 ° C to 80 ° C, the heating values were measured in a PARR 6400 Calorimeter
- At least 0.1g of material was placed in a specialized container inside the calorimeter
- Conversion of the hydrochar samples into pellets in a small-scale pelletizer → most consistent approach for the faster and more efficient measurement of the fuel in the calorimeter.



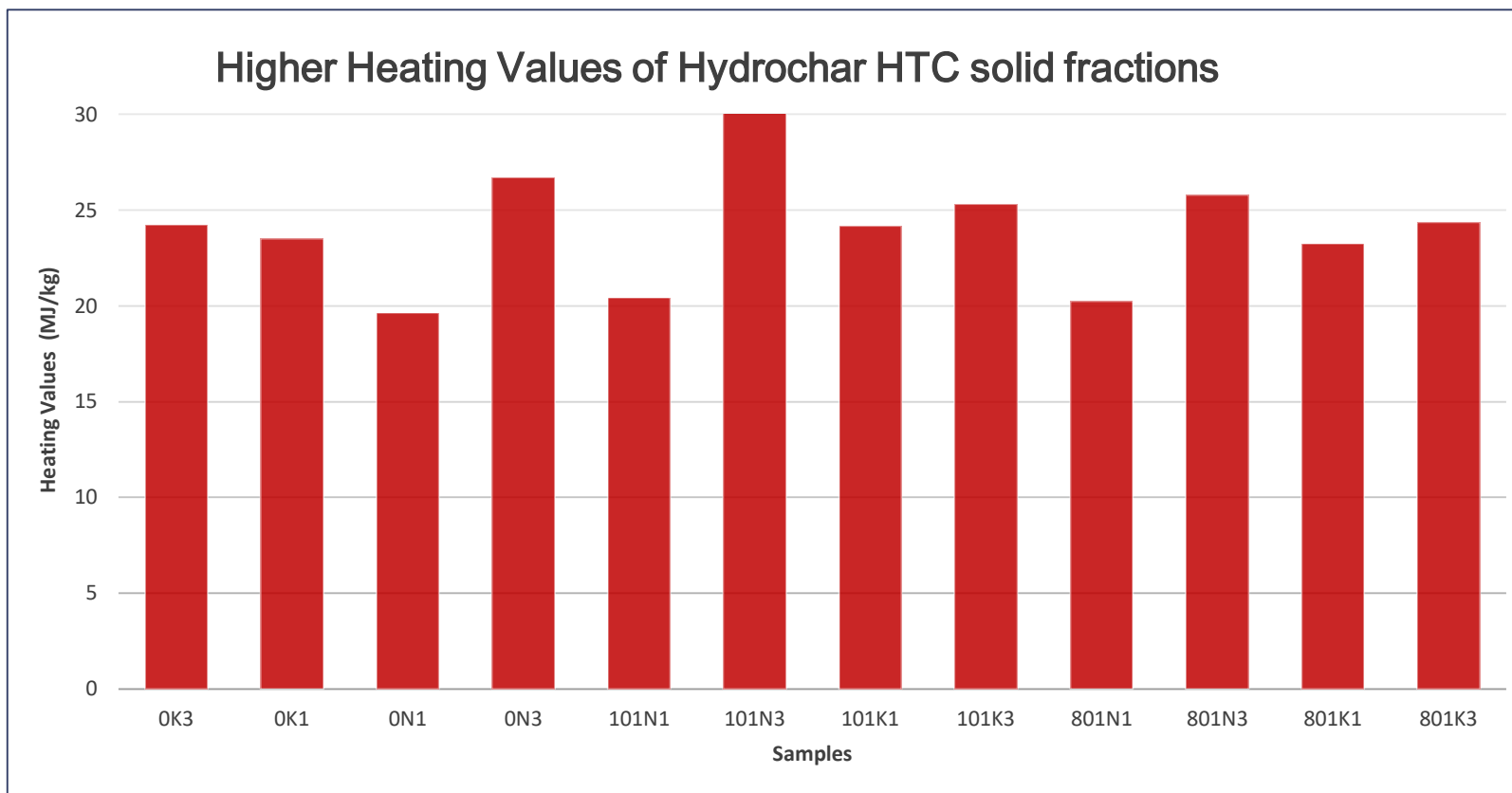
Results: HTC Mass Fractions



Results

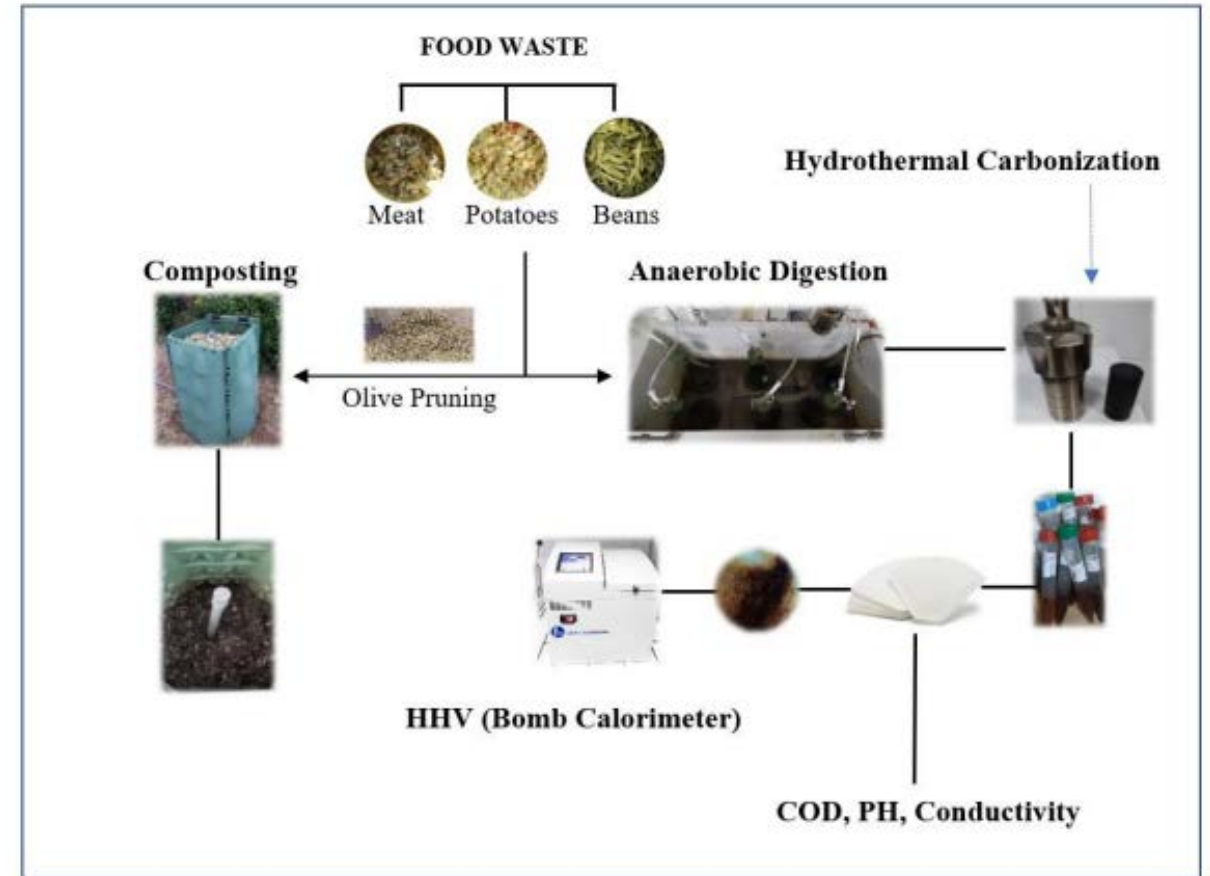


Results



Conclusion

- ✓ Holistic Management of Biowaste focusing on co-treatment of biowaste digestate into hydrothermal treatment
- ✓ HTC reduce pH on all liquid products because of the production of volatile fatty acids.
- ✓ OMWW returns higher hydrochar yields than water
- ✓ Higher Heating Values are significantly affected by the residence time of HTC
- ✓ Future work will focus on the specific analysis of the liquid & solid products (elemental analysis, gas chromatography).



Acknowledgments

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□ **Agro Waste Lab**

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SPECIAL MANAGING AUTHORITY
North Aegean Operational Programme





* Wait a minute, do not say **WASTE** but
ALTERNATIVE RESOURCES



Thank you for your attention

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