Investigation of Poultry Litter Conversion Into Useful Energy Resources Using Fast Pyrolysis

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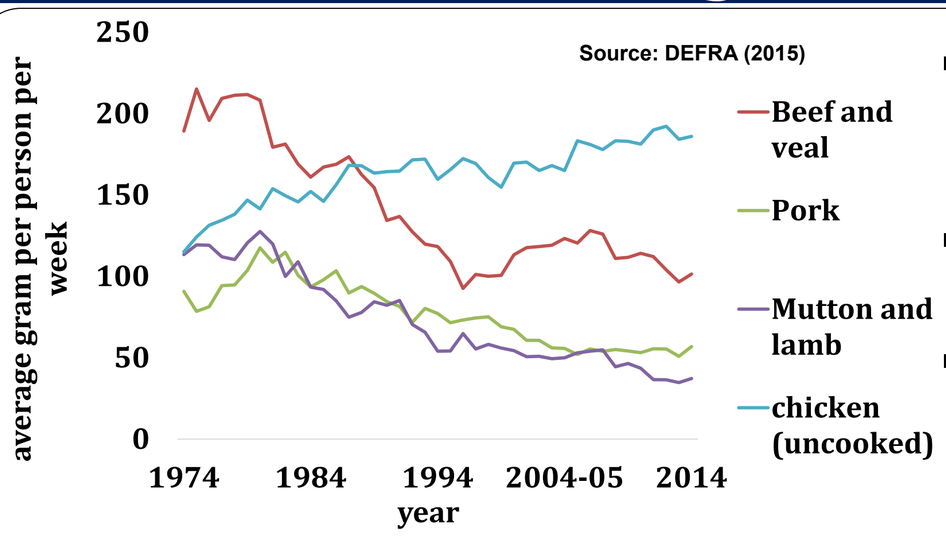
Background

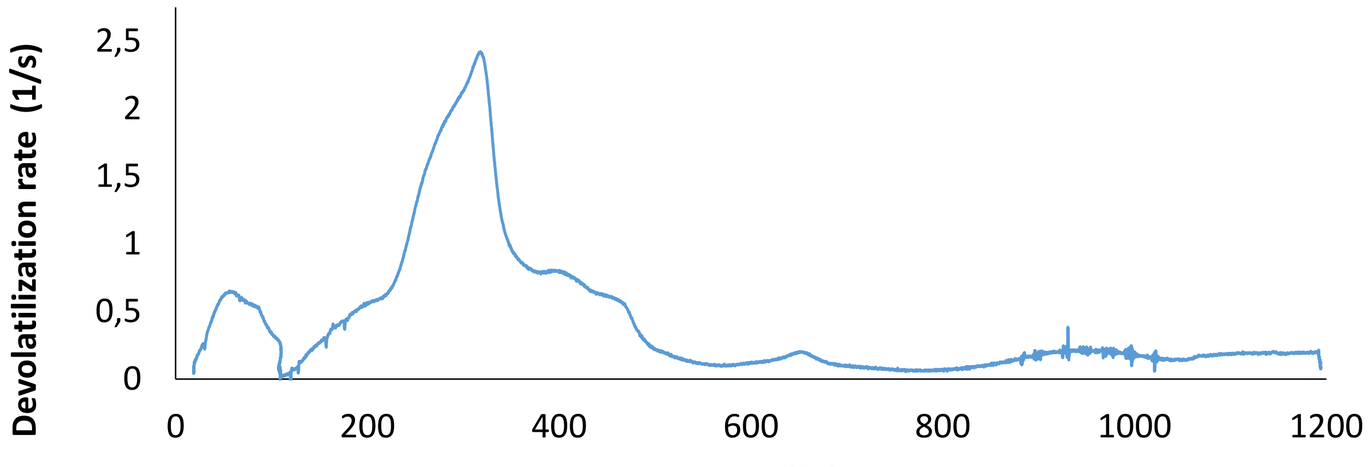


- Increased consumption of poultry (chicken) meat
- Short production time, high production yield.
- Waste disposal issues (e.g. Ammonia)

Objectives

- Characterization of Poultry Litter as a feedstock for fast pyrolysis
- Evaluation of the technical feasibility
- Evaluation of the liquid, gaseous and solid products

Thermogravimetric analysis (TGA)



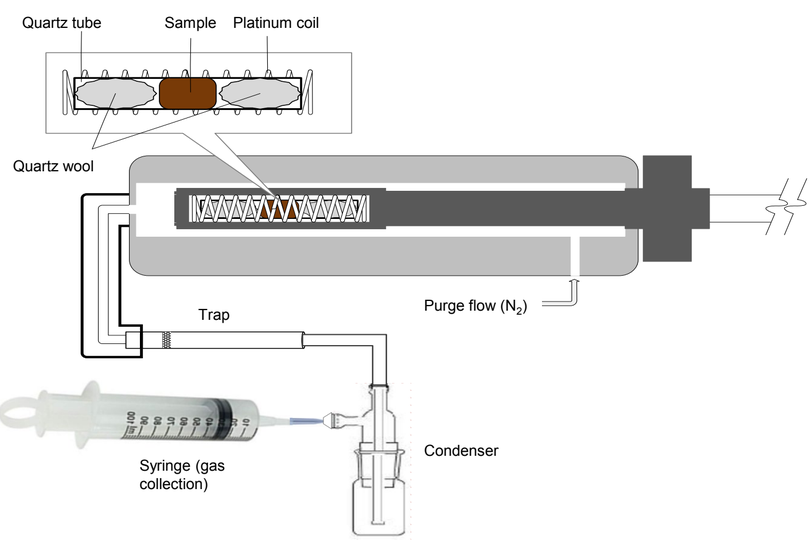
DTG curve of PL at a heating rate of 10 °C/min

- Maximum devolatilization rate: 300°C
- Increased devolatilization rate above 600 °C due to the high ash content and its decomposition.

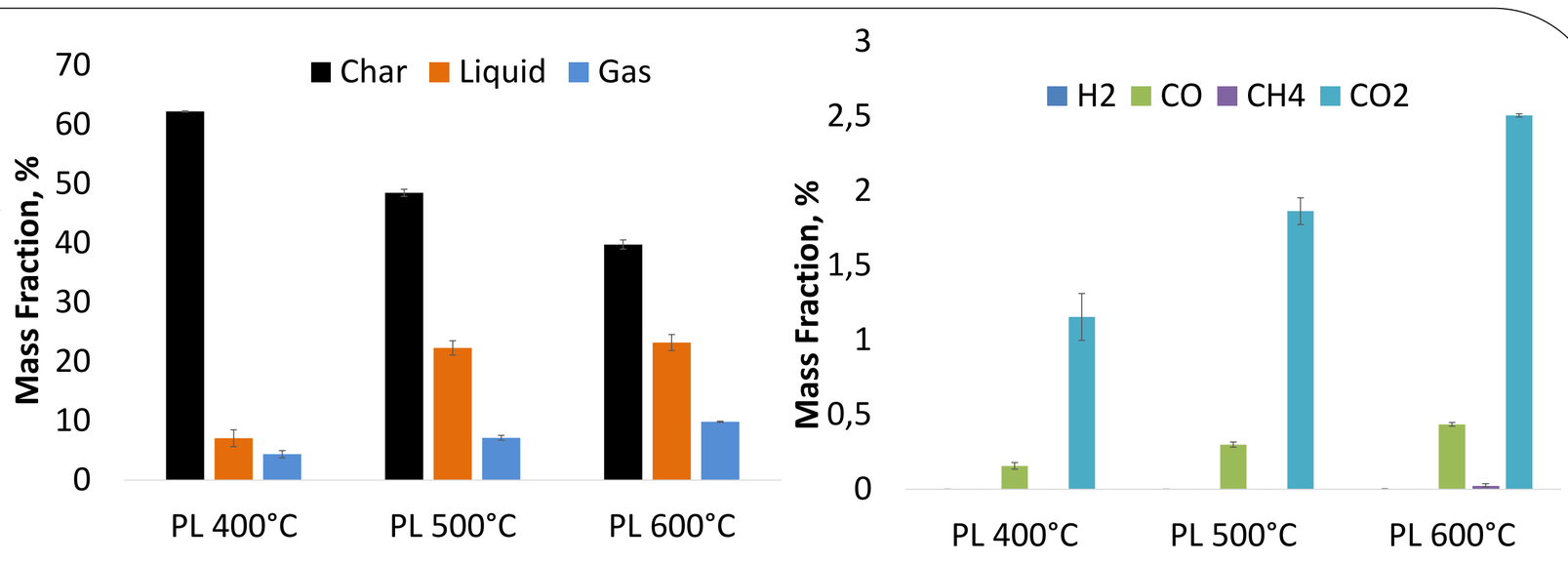
Preparation

- Feedstock: Poultry litter (PL) with peat as a bedding material (supplied by Biolan Finland).
- Proximate and ultimate analysis (in d.b.): C: 43 %, H: 5.50, N: 4.0 %, S: 0.65 %, O: 32 %, Ash: 14 % and Moisture : 9.7 % (a.r.).
- Particle size: <100 μm / sample size: 30 mg

Fast Pyrolysis



Schematic diagram of Pyroprobe 5200 reactor



Product yields from *Poultry Litter* pyrolysis (left) and product gas fractions on a N_2, O_2 free basis (right) (600 °C/s and 10 s)

Conclusions

- Poultry Litter main pyrolysis region: 200 °C - 500 °C.
- Low temperatures favour char production while increased temperatures yield higher liquid and gas products.

Future work

- Determination of the energy balance
- Characterization of the liquid product
- Char characterization and determination of its potential use

Acknowledgements

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