

CASE STUDY

Enhancing my pyrolysis knowledge at EBRI



Pelle Mellin of KTH Royal Institute of Technology in Sweden visited Aston University's European Bioenergy Research Institute (EBRI) in the UK as part of the BRISK initiative.

Below is Pelle's account of his time spent at EBRI.

My time at Aston University has been a fruitful and exciting experience. Working with the skilled staff at EBRI and my colleague Abdul Hye from KTH, proved to be a good opportunity. During the early days of my visit, acid washing of biomass and its effect on pyrolysis was investigated by pyrolysis gas chromatography/mass spectrometry (Py-GC/MS). Pyrolysis of plastics and normal biomass was also something we wanted to try. The study was subsequently developed, which enabled me to leave EBRI with interesting results on co-pyrolysis of biomass and plastics, most notably electric cables, which comes from recycled cars. Co-pyrolysis means the mixing of two feedstocks and pyrolysing them together, which provides a number of benefits.

Co-pyrolysis of electric waste (and plastics in general) with biomass is easier to operate continuously, compared to pyrolysis of plastics alone. However, co-pyrolysis still cannot be achieved in normal setups, such as fixed or fluidised beds. Instead, auger or screw pyrolysis worked to our benefit (see Figure 3). In the co-pyrolysis of cables and biomass, the plastics will vaporise and mix with the liquid product of the process, forming a wax/bio-oil mixture, which is a good fuel but also interesting for further upgrading. Another benefit of pyrolysis of electric waste is the metals, which will not oxidize and as result will be possible to recycle.

In addition to all the work, we spent some time exploring Birmingham, and took an interesting

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Figure 1: Working inside one of EBRI's labs.



Figure 2: Formation of bio-oil from the electrostatic precipitator.

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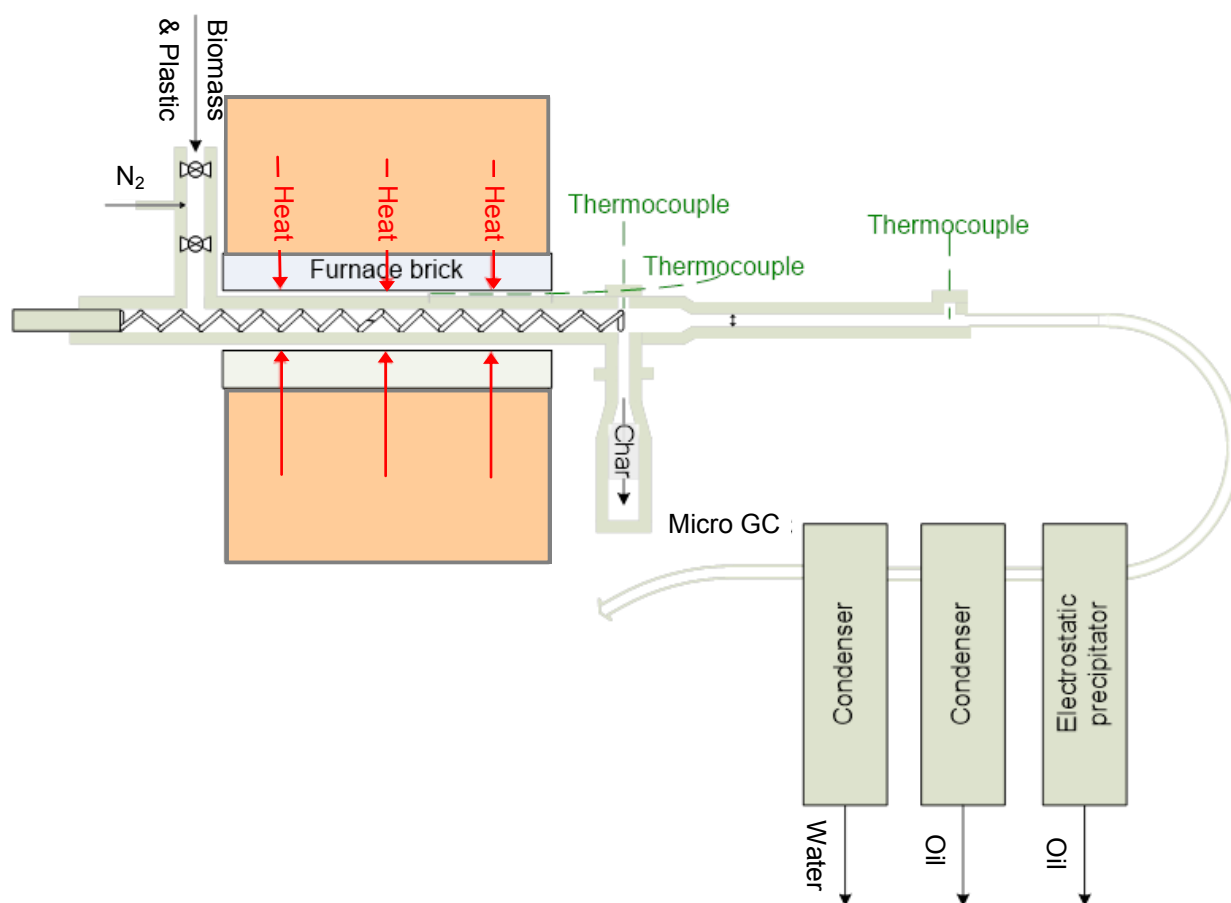


Figure 3: Schematic of the EBRI continuous bench-scale screw pyrolysis reactor.

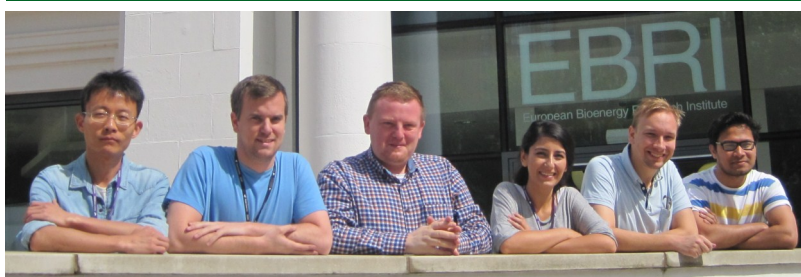


Figure 4: Wenfei Cai (Shanghai Jiao Tong University, China), Scott Banks and Daniel Nowakowski (both from Aston University, UK), Gözde Duman (Ege University, Turkey), Pelle Mellin and Abdul Hye (both from KTH University).

train ride to Glasgow and Edinburgh in the beautiful country of Scotland. The campus of Aston University accommodated every need, the apartment and registration was arranged promptly, plus stores and restaurants could be found nearby. All in all, it has been a most pleasant stay.

Acknowledgments

I would like to thank all the kind personnel at EBRI; to name a few worth a special thank-you: Dr Daniel Nowakowski, Dr Scott Banks, Surila Darbar, Ana Maria Cortes and Professor Tony Bridgwater.

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EBRI
European Bioenergy Research Institute