

Energy crops take a roasting

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A process used to roast coffee beans could give Britain's biomass a power boost, increasing the energy content of some of the UK's leading energy crops by up to 20 per cent.

The study, carried out by engineers from the University of Leeds, examined the combustion behaviour of crops grown specifically for energy creation when put through a mild thermal process called 'torrefaction' – more usually associated with coffee production.

Torrefaction is increasingly seen as a desirable treatment for biomass because it creates a solid product which is easier to store, transport and mill than raw biomass.

The study examined the energy crops willow, canary grass and agricultural residue wheat straw to see what happened when they went through the torrefaction process and how they behaved at a range of temperatures when they were heated to create an energy-enhanced fuel.

Results showed that the treated materials needed less time and energy to heat to burning point, and also that they offered increased energy yields upon burning.

Willow emerged as having the most favourable properties, in that it retained more of its mass in the torrefaction process and also performed best in terms of its energy yield. As an example, willow was shown to have an 86 per cent energy yield, compared with 77 per cent for wheat straw and 78 per cent for reed canary grass.

“Raw biomass takes up a lot of space and has a low energy density which makes it costly – environmentally and economically – to transport. Plus you need more of it than say, coal, to produce energy efficiently,” says Professor Jenny Jones who worked on this study with PhD student Toby Bridgeman.

“Torrefaction is not currently used in the UK in either the agricultural or the energy sectors,” says Bridgeman. “But our paper shows that it has a lot of benefits, besides those to do with fuel handling, so we feel it’s definitely something we’d like to explore further.”

Source: University of Leeds

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