

# Technology Converts Agricultural “Leftovers” Into Useful Products

University of Western Ontario



A new technology developed at the University of Western Ontario in London, Canada, enables farmers to convert biomass “leftovers” into valuable commodities such as heating oil, pharmaceuticals and food additives.

Department of biochemical engineering professors Franco Berruti, Ph.D., Cedric Briens, Ph.D., and Ron Golden, Ph.D., developed the apparatus and process for the pyrolysis of agricultural biomass in 2005. Initial funding of \$100,000 was provided through the Ontario Centers of Excellence. Agri-Therm, a University of Western Ontario spin-off company, was created to commercialize and market the technology.

“ The portable device converts agricultural biomass, such as leftover crop material, into bio-oil, carbon char and non-condensable gases through a process that rapidly heats the biomass to temperatures hotter than 932 degrees Fahrenheit (500 degrees Celsius).

The chemical bonds of biomass compounds are broken, releasing the constituent components. The resulting hot, smoky gas is filtered and rapidly cooled to condense liquid bio-oil from the gas stream. Combustible gases such as

methane, hydrogen, and ethane are recovered and burned as a partial replacement for natural gas used to heat the pyrolysis process, or to dry out biomass feedstocks. The solid “char” can also be burned as fuel, applied as fertilizer, or used to filter contaminated air streams.

While the process can convert any carbon-based material, or biomass, each feedstock produces a unique combination of solids, bio-oil, and gases depending on its chemical makeup. Fuel, fertilizer, pesticide, pharmaceutical, food and specialty chemical uses are all possible when appropriate feedstocks are matched with the desired end-use product. The truck-mounted mobility of the device allows farmers to economically process the biomass residue on-site in their fields.

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