

Technical Expertise on Bioenergies

CHALLENGES AND ACTORS

Cirad, through its BioWooEB research Unit (Biomass, Wood, Energy, Bioproducts) is expert in energy recovery from tropical and mediterranean biomasses. It supports the economic operators and the public authorities in their projects of implementation of successful solutions and works with the equipment manufacturers to improve their technologies and adapt them to the contexts of the Southern countries

A FIELD EXPERTISE

To support the actors in France and abroad

Implementation of bioenergy system in tropical and Mediterranean environment

- ▶ Assessment of energy needs,
- ▶ Evaluation and characterization of usable biomass resources,
- ▶ Support to decision making on processes according to the context of each project,
- ▶ Analysis of techno-economic feasibility,
- ▶ Environmental assessment by the LCA method.

Support for the design of reactors and related systems

- ▶ Design of reactors from laboratory to industrial scale.

In situ process diagnostic

- ▶ Collection, sampling and analysis of products and by-products (gases, tars, particles)
- ▶ Energy and mass balances of processes.

Characterization of biomasses and solid, liquid and gaseous by-products

Proximate Analysis	Ultimate Analysis	Chemical Composition	Gas/liquid Composition	Thermogravimetric Analysis	Physical Properties
Ashes Volatils Moisture	Carbon Hydrogen Nitrogen Oxygen Minerals	Cellulose Hemicellulose Lignine	By chromatography (GC, HPLC...) Identification of ~100 molecules	Kinetic studies thermochemical behaviour	Heating value Granulometry Density

Flexible and personalized trainings

- ▶ Design of training package for institutions of higher education
- ▶ Design of training courses for professionals upon request.



CIRAD IN A NUTSHELL

- CIRAD is the French agricultural research and international cooperation organisation working for the sustainable development of tropical and Mediterranean regions.
- In partnership with the countries of the South, it produces and disseminates new knowledge to support agricultural development and to contribute to the debate on the major global challenges of agriculture, food and rural territories.
- ▶ Operations in 100 countries in the global South
- ▶ A staff of 1 650 people
- ▶ 800 researchers & engineers.



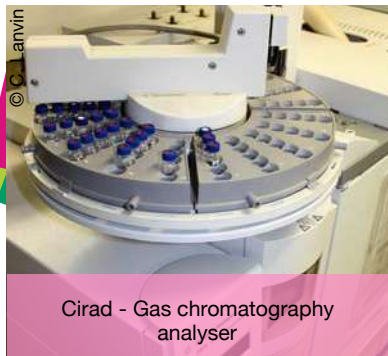
Cirad - Pilot scale gasification reactor.

TEAM AND RESOURCES

The experts in biomass energy of BioWooEB lead studies on the interactions between resources, reactors and applications, to optimize the processes of conversion toward the inlet resource or the type of aimed application. Their works also concern the multicriteria assessment of the production systems of bioenergy, including the environmental, economic and social evaluation.

In Montpellier, BioWooEB has developed a platform with semi industrial pilots of gasification, pyrolysis or torrefaction, with an engine bench test, as well as reactors at laboratory scale and a physico-chemical analysis laboratory for the characterization of biomass and by products from its conversion.

The team set up and implement a transportable line for on-site sampling of gases, particles and condensable products stemming from processes for further analysis.



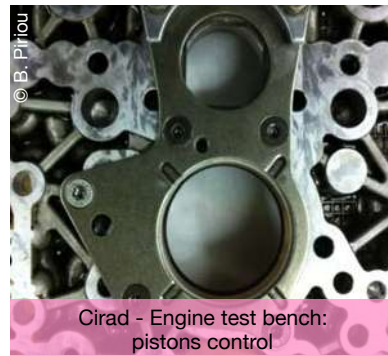
Cirad - Gas chromatography analyser



Fuelwood firebox in steam boiler (Brazil)



Rice husk



Cirad - Engine test bench: pistons control



Eucalyptus plantation for energy

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