



BIOMASS ENERGY

SOLID BIOFUELS CHARACTERIZATION

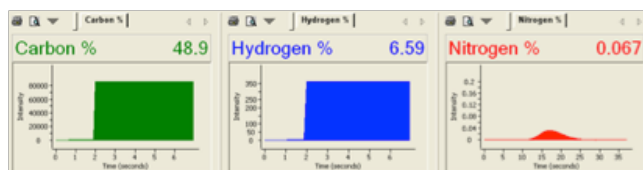
Quality and homogeneity of biofuels are key elements to assure its optimal and efficient behavior in thermochemical processes. Biomass diversity sources and supply mixes that can be employed as biofuels in thermoelectric applications require a correct characterization of their properties which allows evaluating its suitability to be used in Combustion, Gasification facilities or other applications.

Standards UNE-EN 14961 (1-4) establishes specifications and solid biofuels classification. From a thermochemical process valorization point of view:

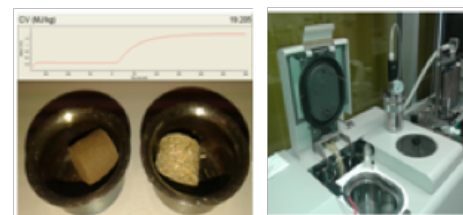
| Physical/Mechanical Parameters | Standard |
|--------------------------------|-------------------|
| Partide size distribution | UNE- EN 15149-1y2 |
| Bulk density | UNE-EN 15103 |
| Amount of fines | UNE-EN 15149-2 |
| Mechanical Durability | UNE-EN 15210-1 |



| Compositional Parameters | Standard |
|--|------------------|
| Elemental Analysis (C,H,N) | UNE- EN 15104 |
| Total Content of Sulphur | DIN-EN 15289 |
| Total Content of Clorine | DIN-EN 15289 |
| Major Elements (Al, Ca, Fe, Mg, P, K, Si, Na, Ti) | DIN CEN/TS 15290 |
| Minor Elements (As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V, Zn) | DIN-EN 15297 |



| Performance Parameters | Norma |
|----------------------------------|------------------------------|
| Moisture Content | UNE- EN 14774-2 |
| Ash Content | DIN-EN 14775 |
| Volatile Matter and fixed Carbon | DIN-EN 15148 |
| Calorific Value (NCV+GCV) | UNE-EN 14918 UNE-EN 15104 |
| Ash Melting Behaviour | DIN CEN/TS 15370-1 |



Cener´s Biomass Department supplements its Solid Biofuel Characterization Offers with:

- Technical Advise Capacity based on a deep knowledge of the Biomass conversion processes.
- Pilot Scale facilities for: solid biofuels production (particle size reduction and pelletising) and its process applications as Torrefaccion and Gasification.
- Ash behavior simulation capacity at high temperatures.

