

The utilisation of conventional wood derived fuels, new agricultural biomass fuels and pre-treated fuels is of increasing interest in all EU countries due to the growing relevance of energy utilisation from biomass. Moreover, fuel flexibility is of growing importance for all biomass furnace and boiler manufacturers which again makes an improved characterisation of fuels and fuel mixtures highly relevant.

In this respect, it has been essential to gain knowledge about the combustion and volatiles release behaviour of the different fuels and fuel mixtures. This is of special relevance for “new” and “difficult-to-use” fuels (e.g. short rotation crops, energy grasses, residues from agricultural industries), which usually show considerably higher ash contents and lower first ash melting points in comparison to conventional wood fuels (wood pellets, wood chips, bark) leading to increased problems concerning slagging, ash deposit formation and fine particulate emissions. Moreover, these fuels usually also show elevated N S and Cl contents leading to increasing NO_x, SO_x and HCl emissions.

Through years the Nordic countries and Austria have been very active in promoting biomass utilization for heat and power production. In SciToBiCom we have succeeded in conducting a research plan including main actors in the field of biomass combustion from Denmark, Norway, Finland and Austria. The project has aimed at the development of advanced fuel analysis and characterisation methods concerning the combustion of different biomass fuels in various plant technologies of different size ranges. The goal was to provide the basis for an improved understanding of the combustion behaviour and to collect the data in an advanced fuel database as an important contribution to topic 2 of the original ERANET call. Moreover, advanced CFD-based simulation routines considering different phenomena like single particle conversion, solid biomass combustion on the grate, release of ash forming elements, gas phase combustion and NO_x formation has been developed as efficient, future process analysis and plant design tools which represents an important contribution to topic 1 of the original ERANET call.