**Abstract (summary between 100-250 words)**

It is a real fact that recycling is important in today’s world if we want to leave this planet for future generations. The evolution of the human race has led the development of the human knowledge, as well as all the inventions during human’s history have promoted the evolution of technology. However, a really ambitious human race has made an uncontrollable use of the resources of the planet, leading all environmental problems that we have nowadays. Moreover, we have been careless up to this point and it is something that we must change.

If we are to achieve the changes to fight against the global warming, it is necessary to promote alternative energy sources, so non-renewable energy sources such as fossil fuels are not an option any more. In the search for those renewable energies and in an environmental friendly political context, the popularity of alternative fuels such as biomass and refuse derived fuels (RDF) is growing really fast. However, their combustion behaviour has not been fully investigated yet due to the difficulty of defining a pattern in the properties of the raw material. As well as their heterogeneous nature, another drawback that these materials represent is that for many industrial applications that combustion power is not high enough. Biomass and RDF stock can differ considerably in term of physical, chemical and morphological characteristics.

This is the departure point of the current project. The main idea is to produce a powerful fuel from torrefied waste or biomass, in order to be used in industrial applications. In other words, this project will develop an alternative way of producing high energy-power fuels from materials that cannot be reused. To do that a torrefaction prototype constructed in the laboratory will be used, where samples of biomass and RDF will be torrefied using the heat transmitted by the passage of a current through a resistance. These samples will be torrefied for different resistance temperatures by controlling the voltage through the resistance with a variable power supply. After being torrefied, the high heating value (HHV) of those samples will be calculated through the use of the oxygen bomb calorimeter.

Although it is pretty difficult to predict a sequence or pattern in terms of the origin and raw properties of the tested materials (being even more difficult for RDF), the improvement of the characteristics as fuels of RDF and biomass is demonstrated. It is found that the higher is the torrefaction temperature the higher is the high heating value and the loss of mass, reaching a stage where from a practical point of view does not deserve to keep rising the torrefaction temperature due to the scarce improvement on the HHV. Nevertheless, the greatest improvement is given for the bulk energy density of RDF: it is reached an improvement of 700%.

**Materias o Palabras claves (máximo 5)**

Torrefaction; Pyrolysis; Refuse Derived Fuels; Biomass; High heating value