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The Importance Biomass Quality Source of Renewable Energy

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Abstract
Experts estimate that Romania has a high biomass energy potential, estimated at about 7594 tonnes of oil equivalent/year. This value it represent 19% of total consumption of primary resources 2010, divided into the following categories of fuels, residues from forestry 1175 tonnes of oil equivalent/year, waste wood 487 tonnes of oil equivalent/year, agricultural wastes resulting from grain 4799 tonnes of oil equivalent/year, biogas 588 tonnes of oil equivalent/year.

Keywords
woody biomass, combustion, renewable energy, calorific value

1. Introduction

Biomass fuels are sustainable. Woody biomass is one of the oldest known materials combustible. This material is a renewable fuel because of two reasons principle:

- wood is a renewable material, as a product of photosynthesis and annual increases;
- wood products remains are inherent flow woodworking.

The tree is a renewable material, is a constant source of wood and almost energetic. Cutting age, respectively to reach maturity is 110 years for oak and 35 years for poplar.

To grow trees use mater and mineral salts from the soil and carbon dioxide from the atmosphere, to develop chemical synthesis reactions.

To increase the thickness and height division uses wood or meristematic bills. The increase in thickness and height of trees has 3 phases: embryonic stage, expansionary phase, differential phase.

Embryonic stage occurs when meristematic cells with thin wall and high lumen increase in size.

The second phase of growth and promissory is expansion phase when cells no longer divide but will grow in length.

The third phase is the differentiation phase, when the complex changes, they will form specialized cells (for driving, endurance, storage).

The remains of wood or woody biomass is classified as:

- depending on the origin:
    - the activities silvo-cultural;
    - from operating activities;
    - in mechanical wood processing activities.
- depending on the possibilities of using:
    - fire wood;
    - wood charcoal;
    - wood briquettes and pellets;
    - wood composite products;

- after bark and wood content:
- only material with bark;
- only wood material;
- with bark and wood metal different percentages or equal.

2. The Calorific Value of Wood Biomass

The calorific value is the amount of heat produced from burning unit mass.

For woody biomass can distinguish two types of calorific: gross calorific value, net calorific value.

Calorific value is determined by bomb calorimetric, where water vapour condenses formed by burning hydrogen bomb in the container.

This frees 600 kcal/kg of water vapour condensed. Gross calorific power can't be used practically, but also net calorific value.

For example, calorific value for combustible material is: hydrogen 33900 kcal/m^3, marsh gas 13280 kcal/m^3, acetylene 12030 kcal/m^3.

The calorific value of softwood is 1200-3600 kcal/m^3, and hardwood is 1100-3300 kcal/m^3, because of its resin, a substance with a high content of hydrocarbons.

Factors that influence the calorific value of wood biomass are humidity, growing conditions, storage, transport and age.

High moisture content will decrease the calorific value of the biomass. For example if the moisture content is 50%, calorific wood will decrease by more than 50% compared to the absolutely dry wood.

3. Method for Determining the Calorific Value

The calorific value of the wood is determined calorific other solid fuels (coal).

Determining stars when there is a temperature uniformity of bodies from the vessel calorimetry and has three stages (Fig. 1):

- initial period, which aims to determine water temperature variations calorimetric vessel due to heat exchange with the outside before burning;
- during the main aims to determine water temperature vessel growth due calorimetry particle wood burning;
- final period aims at determining the average water temperature variation in vessel calorimetry.

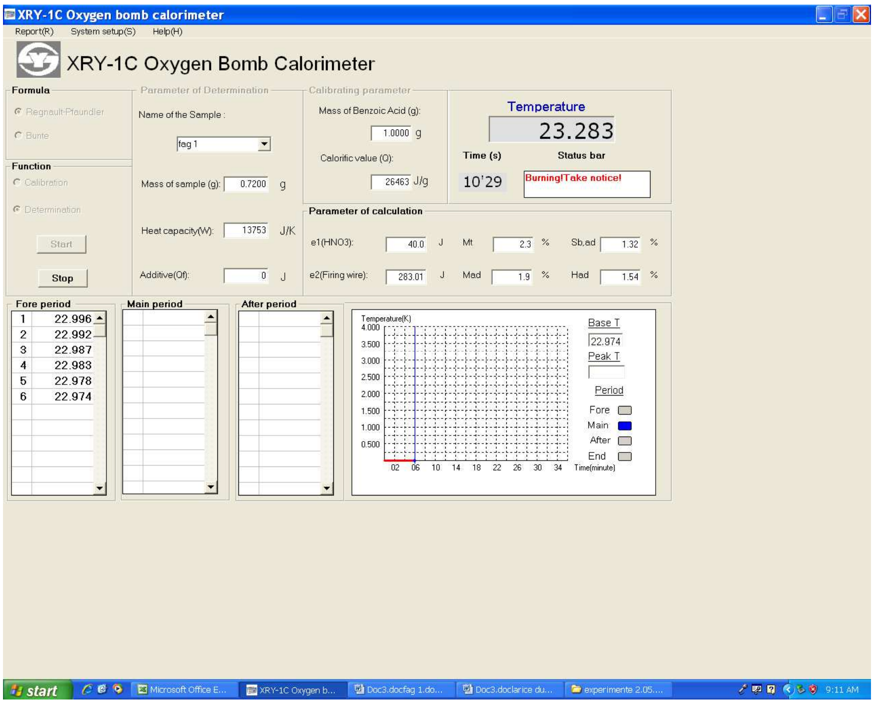

Fig. 1. The stages for determining calorific power

In Figure 2 is presented temperature of diagram.

Bomb calorimeter body is made of stainless steel (Fig. 3).

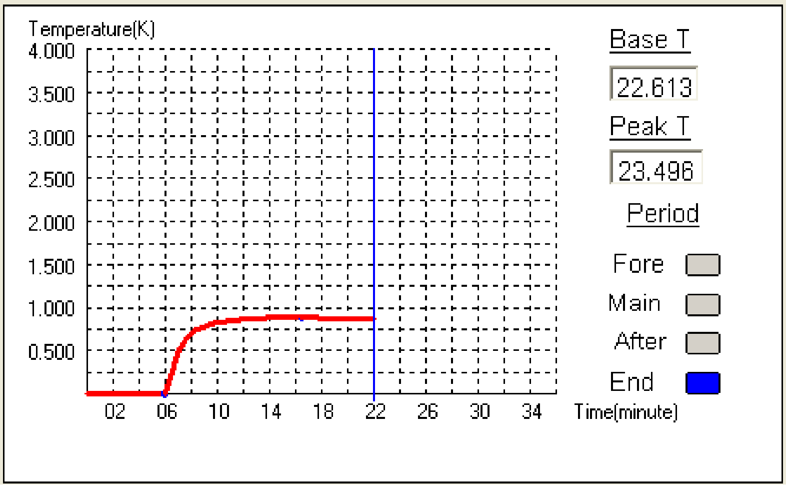

Fig. 2. Temperature of diagram

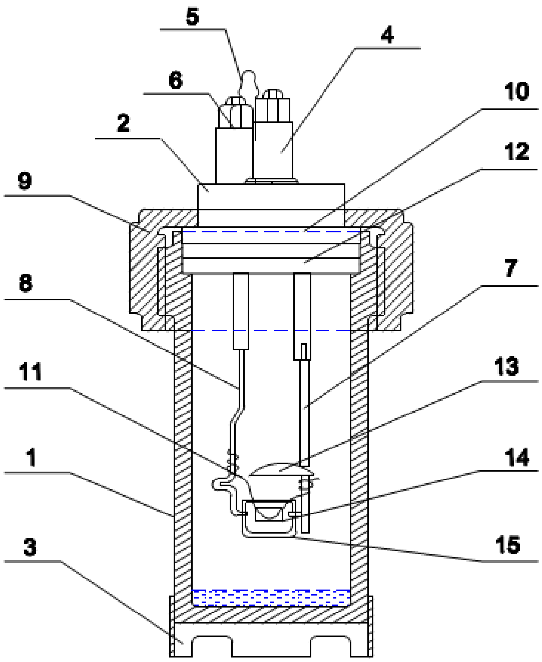

Fig. 3. Bomb calorimeter

Cover 2 is equipped with two valves 4 and 5 and an electrode 6. By valve 4, which continues with tube 7 pressurised oxygen is introduced in bomb calorimeter. The crucible 15 has the protective role and is made of porcelain.

After performing experiments was observed net calorific power for beech pellet is 19009 (J/g) and gross calorific value is 18652 (J/g). Also ash content is 1.8 %.

4. Conclusions

Woody biomass is renewable because it recycles dioxide carbon.

When it burns wood biomass, this rapid decomposition and carbon dioxide back into the atmosphere.

Pelletizing fuel produced a stable and uniform, and also the amount of dust produced material is minimized what can be described and roasted sawdust.

Another advantage of the pelletizing process is that it allows a free flow which facilities the handling and flow rate for calculating the loading and unloading operations.

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