ASPECTS OF EXPLOITATION WOOD BIOMASS

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Abstract

This paper presents briquetting and pelleting the scrap resulting from technological process of wood treatment manufacture are two of the main ways which can protect the environment. Also, these two treatment processes biomass have as result the obtaining of a higher calorific value fules. Regarding related products resulting from wood processing enterprises and mining residues, which can be exploited by direct combustion, briquetting and pelleting.

Key words: Renewable energy, wood , briquetting, pelleting, biomass

INTRODUCTION

Europe faces energy challenges: how to ensure energy resources, how to increase security of energy supply and how to reduce emissions of greenhouse gases. Of course, you must ensure economic growth, but at the same time, we must ensure that society develops in a sustainable manner. These imperatives require drastic action in an international context. Renewable energy is a solution (1).

Several initiatives at the political level, such as Directive 2009/28/EC on renewable energy with 20% target for 2020, say growing need to move from a society based on fossil fuels, to a society based more on renewable energy (2), (10). Bioenergy is an essential component for achieving the aims of 2020. Romania has great potential for renewable energy, especially hydro, wind and biomass. Biomass will play an important role in the National Action Plan for Renewable Energy (4).

MATERIAL AND METHOD

Wood burning is the process of transforming its oxidation, accompanied by release of heat. Combustion, a term generally synonymous with that of combustion is a process that is primarily intended to produce heat, while burning can track and obtain valuable chemicals.Burning and combustion that are associated with radiation emission, mainly in the visible range (flame). Being a flammable material, wood can get flame from a burning body, or burn it reaches a certain temperature.

Flammability increases with increasing surface / volume ratio, thin wood element ignites and burns more easily than one with a large section of

it, thus justifying that suspension of wood dust in the air can be explosive mixture. In terms of medium density and moisture equilibrium with the ambient air, wood ignites at a temperature of about 300 ° C. It has been shown, however, that if the heat loss can not occur (air ducts wood, wood long exposed to a temperature of 80-90 ° C) can cause a build up of heat which results in an ignition at much lower temperatures (6).

RESULTS AND DISSCUSIONS

Wood is heated initially ignited in the periphery, after which heat propagates inside. During heating, the water contains begins to be removed first free water is removed then bound water. Since burning is an oxidation process intensive, to maintain its air must penetrate inside the timber needs of around 0.6 kg air to burn 1 kg of this material. Burning rate for softwood species is lower than hardwood because the latter, one tissue vessels ensures better oxygen intake and flue gas lighter than traheidele narrow and closed at the ends, characteristic of first. In the chemical process of combustion (combustion) resulting chemical elements C, O, H and N in the form of gas and ash. Chemical elements can take the form of flammable gases: carbon monoxide (CO), hydrogen (H2), hydrocarbons (CH4), which burn well. Ash wood is 0.5-1% of volume is normally dry powder form. Sticky soil sometimes lead to a waste timber in the form of slag (5).

Maximum efficiency when burning is complete, with the final products of carbon dioxide (CO2), water (H2O) and ash. From incomplete combustion, CO and H2 yield is the atmosphere surrounding carbon and ash residue.

Recovery of wood biomass for heat production and currently maintains its importance, in addition, to restrict fossil fuel use of natural resources and reduce carbon dioxide emissions into the atmosphere, responsible for increased environmental degradation, it is now considered an alternative resource energy foreground. Note in this regard that the objective of the EU Member States is that, in 2020, the share in total consumption of energy from renewable resources, among which is part wood, to reach 20% (in 2005, it stood at 8.5%) (8).

To gain insight into the share of this category of resources, global production is considered forest woody biomass energy crops, with cycles of 8-12 years and 1-5 years respectively. In Romania, the total amount of plant biomass available annually, valued at 7.6 million toe (tons of oil equivalent), representing 19% of primary resources used to produce energy potential of forest resources toe stands at 1.665 million, 1.175 million toe would come from fuel wood and mining debris and 490 000 toe of debris from mechanical wood processing (Oprea, I.; Sbera, I.,).

An upper steering biomass energy recovery is considered

cogeneration, which occurs combined mechanical energy (electricity) and thermal energy (heat used). Overall efficiency of a cogeneration plant based on the principle may reach 85%, much better than the separate production of electricity and heat, when a significant part of the energy contained in the wood is lost as heat to the environment. Regarding related products resulting from wood processing enterprises and mining residues, which can be exploited by direct combustion, briquetting and pelleting.

Briquetting and pelleting the scrap resulting from technological process of wood treatment manufacture are two of the main ways which can protect the environment. Also, these two treatment processes biomass have as result the obtaining of a higher calorific value fules (3).

The modality of differentiation between briquettes and pellets is on their size, briquettes having larger dimensions than pellets. The pellets characteristics are: density, which is at least 1100 kg/m3, moisture, between 8% and 10%, ash remaining after combustion, its average value being 0,5% and heat generated, whose value is 17,58 MJ/kg or 4,88 kWh/kg.

The briquettes characteristics are: density, between 660 kg/m3 and 690 kg/m3, moisture content, which is 8%, ash content, average value being 1,5% and calorific power, which is 17,28 MJ/kg. The technological process of fabrication the pellets is similar to the process of the biomass briquettes production. The main difference between the two processes is given by the different sizes of the two energetic products, pellets (fig.1) and briquettes. Therefore, the presses to produce pellets have different characteristics from the presses used for briquetting.

Fig.1 Pellets

In terms of valorization the energy of pellets and briquettes, it can be done in any wood burners, from the terracotta stoves, to the open fires.
The pellet stoves have usually three engine systems, that require electricity, namely: the fuel supply to the combustion chamber, the exhaust fan for the air into the combustion chamber and the heat exchange fan room (9).

The pellet stoves offer a lower exhaust emission and a greater energetic efficiency, but require electricity to operate. This electricity can be obtained by fitting the plant with a battery to start the fan and the screw conveyer, especially when the stove can not be supplied with electricity.

Particles of wood briquettes and pellets must be free of bark, the decreasing grip them, which is why, before cutting the timber, round wood must first be peeled. However, wood should not be older than 3 months, so its possible to avoid degradation under the action of external factors, especially under the influence of moisture and possible reduction of lignin content, high calorific compound and having to compaction role binder (7).
Are currently subject to direct firing wet sawdust and various debris from cutting timber to chips and splinters as many companies having the purpose of proper modern boilers. For the material containing explosive substances (adhesives, melamine) or noxious, polluting necessary special boilers.

Table 1

Calorific value of wood (after Kollman)

Species	Calorific value in kcal / kg, moisture content of:		
	0.00%	15.00%	30.00%
Softwood			
Fir	4654	3690	x
Larch	4056	3550	3210
Spruce	4696	3725	3400
Pine	5066	4050	3600
Hardwood			
Black Alder	4316	3395	x
Hornbeam	4062	3180	x
Beech	4494	3545	3000
Ash	4255	3340	x
Birch	4655	3685	3250
Black poplar	4123	3230	x
White willow	4264	3260	x
Acacia	4527	3575	x

Briquetting is simple compaction (in ratio 1:6) particles of sawdust or wood residue after the latter have been submitted to chop and shred.
Pelleting is the process of transforming particles of sawdust or wood waste compacting finely ground advanced by the ratio of 1:10, the grain size lower cylindrical briquettes, commonly 6-8 mm in diameter and 10-15 mm length.
Technology of pellets comprises the following operations: grinding hammer mills wood particles to the fibers, wet shredded particles.

Combustion humidity of 10-15% achieved conditioning grain formation, pressing wet particles at 600 at a pressure at which moisture content is partially evaporated and they become hot and stick each other, resulting in pellets, pellet cooling to avoid then they decay.Pellets can be used for combustion in boilers with fully automated power individual homes, but also in large thermal power stations with installed capacities, allowing the serving of whole blocks. Although it requires a manufacturing process more demanding than if briquetting, thus more expensive, they are preferably used for convenience of servicing boilers burning, storage and retrieval of deposits, including by air.

CONCLUSIONS

Reduction of biodegradable waste disposal in landfills:

- 25% by 2012,
- 50% by 2014,
- 60% by 2016.

The most representative types of wood materials, fuel: firewood, bark, branches from forest exploitation, the maintenance branches chopped fruit orchards, vine ropes, sawdust, wood chips, small pieces of wood and other debris from wood. Typically derived from logging trees are a homogeneous high quality biofuel.

From energy efficient fuel wood materials have an average energy between 14 MJ / kg. and 19 MJ / kg.

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