2. Zekai Sen, 2008, Solar Energy Fundamentals and Modeling Techniques, Springer-Verlag London Limited, London.
3. Baden Powell, 1856, On the demonstration of Fresnel's formulas for reflected and refracted light; and their applications, Bodleian libraries, Oxford.
4. Laboratory of Atmospheric Composition Climatology, 2012, Solar Radiation Dependence on Time, viewed 14 August 2012, <http://lop.iao.ru/eng/index.php/about-tor-station/meteo>.

Pleshkov, A.N., Stolyarova, A.K.

Experimental study of biomass drying softwood

National Research Tomsk Polytechnic University.

The topic of my scientific work is «Experimental study of biomass drying softwood».

The purpose of my work is Experimental determination of the evaporation rate liquid in the softwood biomass.

In recent years in the world there is a greater interest in using of biomass for heat and electricity, its involvement in the fuel and energy balance of the regions and countries on the whole. This is proved by numerous studies in the European Union and the United States, aimed at identifying the best ways of using biomass energy, as well as in Russia .The interest in using biomass is defined by the following main factors: Environmental, associated with the need to address, including global climate problems. It's necessary to reduce the consumption of non-renewable energy sources (gas, oil, coal), actively exhaustible in the nearest future, and to replace them with the renewable sources. The biomass use is one of the radical solutions of the problem to reduce the greenhouse gas emissions (CO2) power plants using fuel, as well as to reduce the emissions of other harmful ingredients: trees and plants that make up the main part of the biomass themselves absorb CO2 emissions: how much CO2 is absorbed, so much produced by burning and does not increase by a concentration in the atmosphere; practically there is no biomass virtually sulfur, low nitrogen and ash content.

The work relevance.

Examining and analyzing the literature a has been found that insufficiently reliable experiments must be conducted by the experiments in this direction.

The practical significance.

Analysing and developing are the optimum parameters of drying softwood biomass, in order to increase savings in non-renewable energy sources, as well as the funds spent on their prey Improving the impact of the heat production.

How biomass is formed.

The atmosphere carbon dioxide and soil water by means of participating in the photosynthesis process to produce the carbohydrates forming the biomass "building blocks". Thus the solar energy used in the photosynthesis has stored in chemical form in the biomass structure. If we burn the biomass efficiently, the extract chemical energy, the atmosphere oxygen and the carbon contained in plants react forming the carbon dioxide and water. The process is cyclic because the carbon dioxide can once again participate in the production of a new biomass.

Biomass energy application.

The biomass taking the sixth reserves among the currently available energy sources besides the oil shale, uranium, coal, oil and natural gas . Approximately complete biological

land mass is estimated at $2,4 \cdot 10^{12}$ tons. Biomass is the fifth performance of the renewable energy source besides the direct solar, wind, hydro and geothermal energy. Every year, on the ground are produces about 170 billion tons of primary biomass and about the same amount is destroyed. The biomass is the largest by using of the world economy in a renewable resource (more than 500 million tons at . (Tons per year) The biomass is used to produce heat, electricity, biofuels, biogas (methane, hydrogen) .The main part of the biomass fuels (80%), is primarily the wood, used for heating and cooking in developing countries.

The examples of using biomass.

In 2002, the U.S. electric power was installed 9733 MW of the generating capacity the biomass use. 5886 MW of them worked at the waste of Agriculture and Forestry, 3308 MW worked at municipal solid waste, 539 MW from other sources. In 2003, 4 % of all the U.S. energy was produced from biomass. In 2004, the worldwide electricity was produced from biomass power plants with the total capacity of 35,000 MW. Currently, The European countries are experimenting growing the energy forests for the biomass production . On the large plantations have been grown fast-growing trees : poplar, acacia, eucalyptus and others. Tested about 20 species of plants. Plantations can be combined when the trees are grown between the rows of other crops, such as poplar, combined with barley. There is a energy forests rotation for 6-7 years.

Boilers for biomass.

The Biofuel boilers successfully combine the advanced automation, the heat exchangers and the modern convenience dignity with the unique pellets . The pellets themselves have been compressed under a high pressure from a small wood waste or vegetation. No artificial additives in their manufacture have been applicable.

Conclusion.

When burning there are absolutely harmless products, as well as a natural and pleasant smell . The remained ash after it can be used as a fertilizer in your garden . Thus the environmental cleanliness is one of the important characteristics of biofuels.

References:

1. Расев А.И. Сушка древесины: Учебное пособие. Изд. 4-е. – М.: МГУЛ,2000.
2. Холманский А. С., Сорокина Е. Ю., Порев И. А., Курганов А. А. Быстрый пиролиз клетчатки. – Электронный журнал «Исследовано в России» – http://zhurnal.ape.relarn.ru/articles/2004/123pdf, 2007г.
3. Кассиров Г.М., Лопатин В.В., Секисов Ф.Г., Смердов О.В., Ли Хунда. Применение ВЧ разрядов при сушке древесины // Становление и развитие научных исследований в высшей школе: Сб. трудов Междунар. науч. конф. – Томск, 2009. – Т. 2. – С. 264-269.
4. Горешнев М.А., Казарин А.Н., Алексеев М.В. Моделирование тепломассопереноса древесины при нагреве в камере с пониженным давлением // Современные техника и технологии: Сб. трудов XVI Междунар. научно-практ. конф. студентов, аспирантов и молодых ученых. – Томск, 2010. – Т. 3. – С. 172-173.
5. Расев А. И. Тепловая обработка и сушка древесины: Учебник. – М.: ГОУ ВПО МГУЛ (Московский государственный университет леса), 2009. Страниц:360.

Научн. рук.: Бульба Е.Е., к.т.н., доц. каф. ТПТ.