and 30 to35, respectively kraft and ASAM process. The autohydrolysis liquor was characterized by an average of 16 % in xylose and 1.4 % in furfural.

Keywords: E. globulus; stumps; biomass; biorefineries; kraft; ASAM

PP198

Optimization of forest biomass use in reducing green house gas emission: a life cycle analysis

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In this study, we discuss the greenhouse gas emission reduction from sustainable harvest and utilization of forest residues and stumps. Forest production, harvest, and use of forest residues and stumps to replace fossil fuels are considered for greenhouse gas emissions accounting in northern Sweden.

A system-based approach to life cycle assessment is adopted to calculate greenhouse gas emission reduction benefits. Amount of forest biomass production and harvest for one hectare of forest land in northern Sweden are obtained from DT model. Amount of wood processing residues recovery is obtained from the wood processing in the wood industries. Greenhouse emissions during silvicultural activities and transportation of products are considered in calculation. At the same time the greenhouse gas reductions in terms of carbon sequestration in biomass and soil, stocks in forest products, and reductions by substituting fossil fuel and non-wood materials are accounted. System boundary is expanded to replace fossil fuel use by the use of forest biomass as feedstock for bioenergy production. Sensitivity analysis for biomass recovery is performed to see the implications in greenhouse gas emission reductions.

The results of the study have shown that the use of forest residues for energy has increased during the past two decades and further increase is expected in future. Harvest of forest residue does not significantly decrease the soil carbon pool if the forest is regenerated subsequently. Use of forest residues to replace fossil fuel will provide significant greenhouse gas emission reductions compared to the soil carbon development if it is left in the forest. Allocating some biomass to be used for pulp and paper production does not significantly change the overall carbon balance in this study. However the results may depend on the forest biomass production rate and forest biomass harvest rate.

Keywords: Forest production, DT model, harvest, bioenergy, substitution.

PP199

Lignocellulosic Resources Uses for Savings of Fossil Fuels

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Lignocellulosic biomass makes up the main part of the biomass produced in the world (12.1011 ton per year); relatively speaking, saccharose and starch make up a lower part (108t). Wood (from secondary-growth species) and related biomaterial from primary-growth species (palms, coconut, bamboo) make up nearly 80% of lignocellulosic biomass produced in the world.

The remaining part mainly comes from co-products of food plants (straw and co-products from cereals and oleaginous plants, bagasse…) and also annual plants produced for fibre (cotton, flax, hemp).

A part of these fibres is used for other various applications than energy: pulp, biomaterial, and bioproducts. The wide range of celluloses-lignin-hemicelluloses distribution and structure of these biopolymers sometimes limit their applications.

The development of these applications is also limited by two factors: (1) the collection and the transport of the fibres are not well organized; (2) the fibres must be frequently left on the ground after harvesting in order to maintain the soil fertility. Lignocellulosic materials play a major role to save fossil fuels for three main reasons: (1) their elaboration and their use need a low quantity of energy, by comparison with other materials; (2) lignocellulosic materials capture carbon during plant growth and store it during the life cycle of the manufactured products; (3) savings of energy are also possible when the biomaterials are used on the spot instead of imported materials, without long transport distances.

It is economically interesting to produce energy from lignocellulosic biomass only if a part of this biomass is used as far as possible for higher added value applications, i.e. plant materials.

Co-products and by-products used for energy are then obtained at lower cost.

Lignocellulosic materials and energy applications are directly linked due to carbon storage in biomass that is used for energy at the end of life cycle.

Keywords: Lignocelluloses; Energy; Carbon storage; Plant Materials

PP200

Characteristics of Bi-functional Acidic Endoglucanase (Cel5B) from *Gloeophyllum trabeum*

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The endoglucanase (Cel5B) from the filamentous fungus Gloeophyllum trabeum was cloned and expressed in Pichia pastoris GS115.

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The awards will be presented at the Conference dinner, on July 11 and consist of a certificate and a gift sponsored by 3DCork – www.3dcork.com

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