Environmental Engineering and Management Journal *January 2012, Vol.11, No. 1, 75-79*
http://omicron.ch.tuiasi.ro/EEMJ/

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LIGNOCELLULOSIC BIOREFINERY

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Abstract

Biomass is a very interesting natural source to obtain renewable energy as well as chemical products based on a renewable feedstock. Fuel produced from renewable resources is widely regarded as an option to substitute traditional fossil fuels and thus to answer to the adjunct climate debate. For the production of chemical substances from renewable substrates many process options are in investigation worldwide at the moment. However the ecological benefits of these technological options have to be ensured. Therefore the supply of feedstock must be decoupled from food production, transport of products and educts must be minimized and the energy needed for these processes must be ecologically optimized. To achieve an economic process it is necessary to develop selective separation and treatments processes with high overall energy efficiency for the whole process.
In this paper pressurized hot water treatment, steam explosion, organosolv and ionic liquid processes are investigated and discussed. Pressurized hot water treatment and steam explosion mainly dissolves the hemicellulose sugars and make the biomass ready for further enzymatic treatment prior to fermentation to produce biofuels (e.g. ethanol, butanol) or other chemicals. With an organosolv process most of the hemicellulose and lignin could be dissolved. In both processes the process conditions have to be optimized to achieve a high degree of dissolution of the desired components but low concentrations of unwanted by-products like furfural or hydroxylmethyfurfural. Using ionic liquid as solvent the whole biomass can be dissolved and with selective precipitation strategies product fractions of cellulose, hemicellulose and lignin can be derived.

Key words: biomass, biorefinery, lignocellulose, organosolv, straw

Received: September, 2011; Revised final: January 2012; Accepted: January, 2012