

EFFECT OF SURFACTANTS PRE-TREATMENT ON LIGNOCELLULOSIC BIOMASS

Rashmi Kataria¹, Luisa Lenz² and Ramesh Babu^{1, 2}*

¹Centre for Research Adoptive Nanostructures and Nano Devices

²School of Physics

Trinity College Dublin, Dublin 2, Ireland

babup@tcd.ie

Lignocellulosic biomass has been identified as a high potential feed stock for the biofuel as well as many value added metabolites production. Several pretreatment methods including chemical, physical, biological and physiochemical at high severe conditions (high temperature, pressure, and chemical dosage) have been applied on three dimensional lignocellulosic structure for delignification which is an essential to achieve sufficient saccharification of cellulose in lignocelluloses. A main concern is the high price of enzyme as well as costly pretreatment process to get high sugar concentration in economical way. Among all the methods studied, the application of surfactant to lignocellulosic biomass is a great deal of attention due to its nontoxic nature and economical aspect. Surfactant pretreatment may reduce the lignin content with liberation of sugars and improves hydrolysis step by reducing the enzyme loading. In the present study different Surfactants (ionic, non ionic and cationic) including Triton X, Tween 80, SDS, CTAB, Hexadecyltrimethylammonium p-toluenesulfonate were evaluated for the Rye grass (5% biomass loading) pretreatment at different temperatures. The liquid residue was analysed for the total reducing sugar estimation and the maximum sugars liberation with SDS was found to be most effective in term of TRS liberation. Different structural as well as compositional changes in biomass after pretreatment were also analysed by using SEM, TGA as well FTIR. Further, the effect of the surfactant on the hydrolysis step is under progress to achieve the maximum hydrolysis of sugars. Hence surfactants can be utilized for solubilisation of sugars in pretreatment step and solid residue remained may be further used for hydrolysis/saccharification in an effective way.