

Fractionation of organic substances from the South African *Eucalyptus grandis* biomass by a combination of hot water and mild alkaline treatments

Jonas K. Johakimu¹, Andrew Jerome¹, Bruce B. Sithole^{1,2}, Lekha Prabashni¹

¹ Forestry and Forest Products Research Centre, Council of Scientific and Industrial Research of South Africa, P.O. Box 17001, Congella, Durban, South Africa

² Discipline of Chemical Engineering, University of Kwazulu-Natal, Mazisi Kunene Rd, Glenwood, Durban 4041, South Africa

Abstract

An alternative way of fractionating lignocellulose biomass into its individual components, hemicelluloses, lignin and cellulose, was investigated. South African *Eucalyptus grandis* wood chips were fractionated using a combination of hot water and alkaline treatments with or without AQ. Initially, the biomass samples were treated in hot water to remove hemicelluloses. At optimum prefraction conditions, the data acquired revealed that almost 12 % of the *E. grandis* wood biomass could be recovered as hemicelluloses. When the hemicelluloses preextracted biomass was further treated using sodium hydroxide with or without AQ, the data indicated that the amount of lignin and cellulose that could be recovered was 22 and 36 %, respectively (as % of the wood mass). The substrate was characterised by a higher amount of α -cellulose (91–93 %), lower kappa no (12–13), viscosity (327–450 g mg/L) and DP (1078–1536). It was then presumed that such pulp could meet end-user requirement of the dissolving pulps. Industrial acceptance of this biomass fractionation concept, however, will further require careful assessments of various options for treating and purifying the hemicelluloses and lignin in their respect streams.