Novel organosolv delignification method yielding strong fibers and reactive lignin

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ABSTRACT
A novel organosolv process, Lignofibre or LGF process is presented in this paper. LGF pulping process uses phosphinic acid as a catalyst in delignification of lignocellulosic material carried out in selected organic solvent. The process can be used for production of lignin rich, strong, reactive fibres with high yield or for fractionation of lignocellulosic materials to cellulose-rich fibres, purified lignin and hemicellulose.

INTRODUCTION
Many of the known organosolv methods employ strong mineral acid catalyst or oxidative reaction conditions that lead to reduction of molecular weight of cellulose and consequently to reduction in fibre strength. The novel LGF process overcomes this drawback. The properties and potential applications of various fractions obtained from the LGF processing of lignocellulosic materials are discussed.

CONCLUSIONS
• A novel organosolv pulping process, Lignofibre or LGF process, using phosphinic acid as a catalyst has been developed for delignification of lignocellulosic materials.
• Depending on starting material and pulping parameters, the LGF pulping method results in 50-60% yield of lignin-rich fibres, 5-15% yield of purified lignin nanoparticles and 3-7% yield of hemicellulose (Mw> 5000 g/mol) calculated from dry weight of starting lignocellulose material. Thus, more than 70% of lignocellulose material can be converted to useful biopolymers by LGF and further fractionation.
• LGF method is suitable for preparation of strong, reactive fibers which are suited e.g. for plastic reinforcing agent and technically useful biopolymers.

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