



Superior wood-polypropylene composites

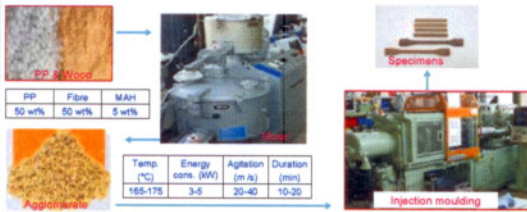
OBJECTIVE

The objective was to investigate the compatibility between wood and non-polar polypropylene, improving thermal and mechanical properties. Soft-wood fibres were treated with an aqueous surface modifier CK5, acetone and epoxy butane. The effect of various modifiers on the soft wood fibre properties and on the resulting composites properties was determined.



Intended applications of CK5 treated wood composites

PROCESS



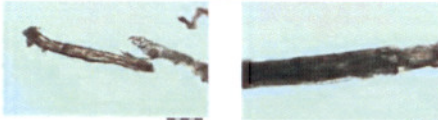
Compounding and moulding process

- Advantage of CK5 treatment:**
- Non toxic and sustainable
 - Improve machinability
 - Cut process duration and energy consumption
 - Increase durability

Wood fibre cost by different treatments increased no more than 20% to 30%.

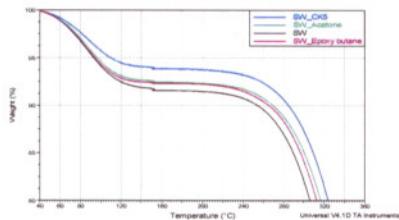
RESULTS

- Morphology:** Due to modification
- Removal of outer surface, wax and fat
 - Increase effective surface area
 - Fibrillation



SEM micrographs of untreated and CK5 treated wood fibre

Thermal stability: - Thermal stability increased by 20°C for CK5-treated wood fibre

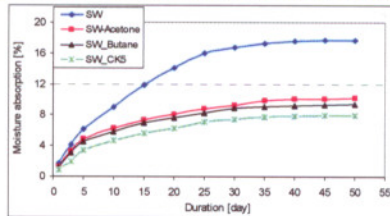


Thermal behaviour of treated and non treated wood fibre

More information on CK5 in WPC: Markus Murr, Uni Kassel, Email: m.murr@uni-kassel.de
Kees Nederveen, Chemconserve, Email: k.nederveen@wzsl.nl

7th Global Wood and Natural Fibre Composites Symposium, Kassel, Germany, June 18-19, 2008

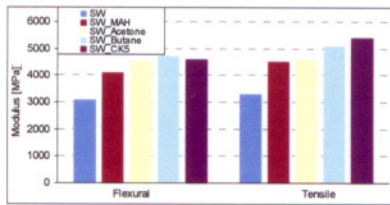
Moisture absorption: - Moisture absorption of CK5 treated fibre reduced by 60%.



Moisture absorption of treated and untreated wood fibre [RH 95%, T 23°C]

Modulus: Due to modification

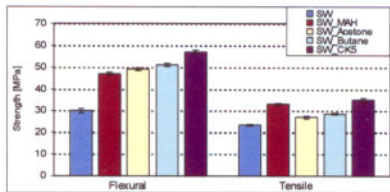
- Flexural modulus improved by 35% to 50%
- Tensile modulus improved by 40% to 60%
- CK5-treated composites showed 60% better tensile modulus



Modulus of treated and untreated wood fibre composites

Strength: Due to modification

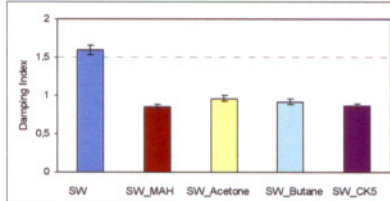
- Flexural strength improved by 55% to 90%
- Tensile strength improved by 15% to 35%
- CK5 treated composites showed superior strength properties



Strength of treated and untreated wood fibre composites

Energy absorption: Damping index = (Absorbed energy / Store energy)
Due to modification

- Energy absorption reduced by 40% to 50%
- CK5 treated composites showed lowest energy absorption



Impact of treated and untreated wood fibre composites

CONCLUSIONS

- CK5 treated fibre,**
- Thermal stability improved by 20°C
 - Moisture absorption reduced by 60%
- CK5 treated fibre composites,**
- Tensile and flexural properties improved by 35% to 90% respectively
 - Energy absorption reduced by 50%