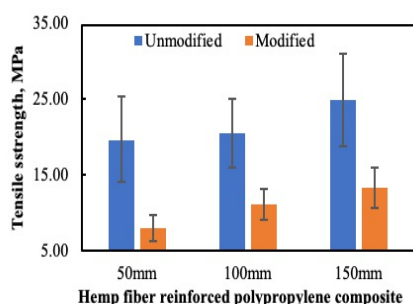


# Effect of hemp fibre length on the properties of polypropylene composites

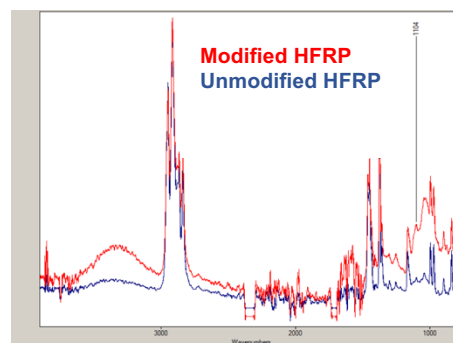
Percy Alao<sup>1</sup>, Heikko Kallakas<sup>2</sup>, and Jaan Kers<sup>2</sup>

*Labouratory of wood technology, Department of chemical and materials technology, Teadusparki tn 5, Tallinn University of technology, 12618, Tallinn, Estonia*

Hemp fibre (HF) is a natural fibre that has gained increased application in interior material for automobile industries. (Sanjay, et. al, 2016). However, good interfacial bonding between fibre/matrix is necessary to enhance the mechanical properties of the composite. (Pickering, et. al, 2007). This study focuses on the effect of fibre length, alkali and silane treatments on the mechanical and physical properties of hemp fibre reinforced polypropylene composites. Compression moulding technique was utilized in composite manufacture, fibre lengths of 50, 100 and 150 mm were selected and combined with polypropylene powder at a fibre/PP ratio of 60/40%, a pressure of 1.67 MPa and temp. between 160 – 200 °C. Result in figure 1, of the tensile test shows that longer fibres enhanced mechanical strength with a 21% increase in flexural strength at 150 mm. However, modification caused a 46% decrease (at same length) which may have been as a result of fibre damage, inadequate modification, less quality fibre or higher initial moisture content in the modified fibres as seen in FTIR spectroscopy in figure 2. However, further investigation is required to analyze the other stated possibilities.



**Fig. 1.** Flexural strength of modified & unmodified HFRP composite



**Fig. 2.** FTIR Spectra of modified & unmodified HFRP composite

## References

1. Pickering, K., Beckermann, G., Alam, S., & Foreman, N. (2007). Optimizing industrial hemp fibre for composites. *Composites Part A: Applied Science and Manufacturing*, 461–468.
2. Sanjay, M. R., Arpitha, G. R., Laxmana, N. L., Gopalakrishna, K., & Yogesha, B. (2016). Applications of Natural Fibers and Its Composites: An Overview. *Earth and environmental sciences, natural resources*, 108-114.