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ABSTRACT

The high specific strength and stiffness and excellent damping behavior promote the use of flax fibre composites in the construction sector. However, the limited compatibility between raw flax fibres and bio-epoxy resin often leads to composites with mechanical properties well below their theoretical capacities. Moreover, the incomplete understanding of the intrinsic non-linear mechanical behavior of flax fibre composites forces the application of larger safety factors. In this study, three chemical treatments are applied to improve the interphase properties and gain further insight in the longitudinal tensile behavior of flax fibre bio-epoxy composites. Both alkali and APS treatment result in a threefold improvement in the transverse flexural strength to ~30MPa. Both treatments additionally shift the weakest link to the elementary fibre interphase strength. Analysis of the longitudinal tensile stress-strain curves of UD flax fibre composites results in a tri-linear shape that is preserved after treatment.