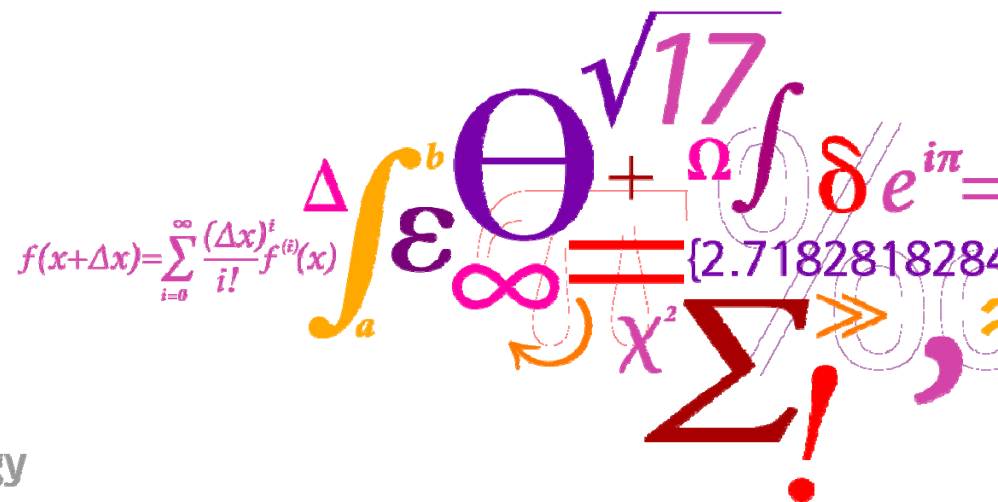


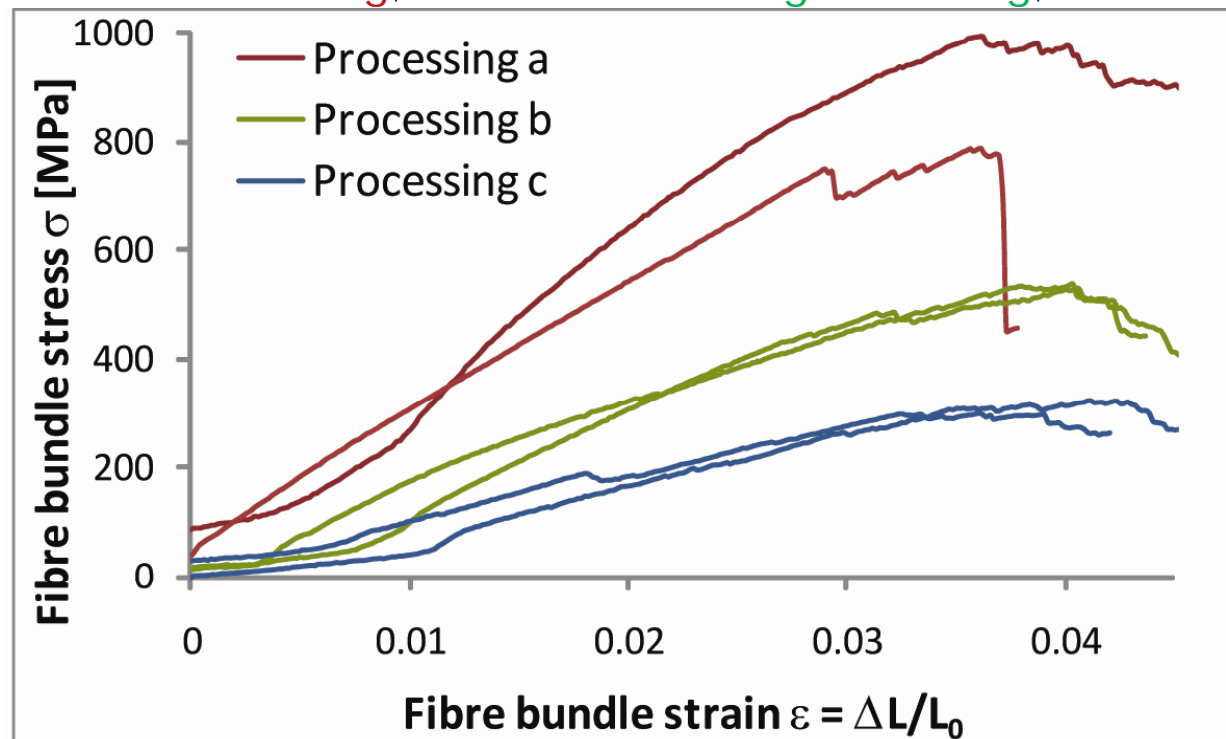
# Analysis of strength of flax fibre bundles

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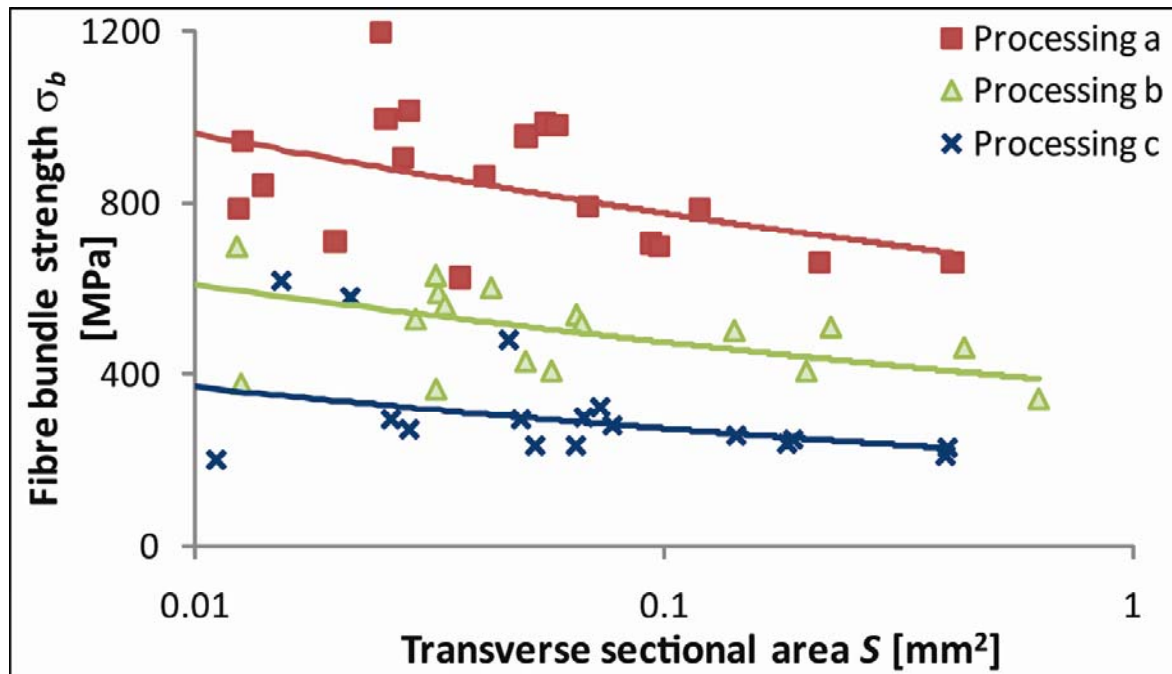
## Fibre bundle tensile tests

- Flax fibres have a potential as reinforcement of composite materials.
- Carding and cottonization of flax are used in yarn production.
- Usually plant fibres are arranged as bundles of variable size.
- Bundle strength was recorded as the maximum stress value before fracture.
- **a = field retting**; **b = a + scutching + carding**; **c = b + cottonization**



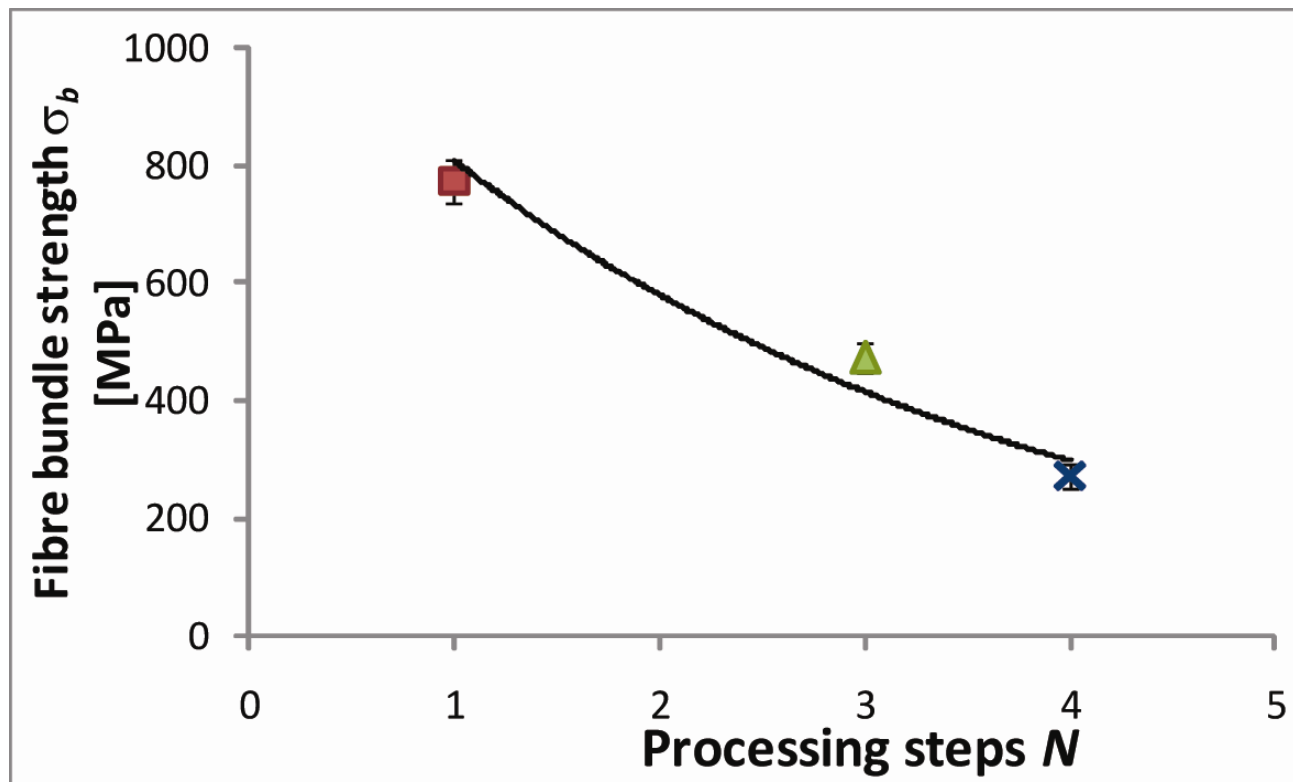
# Fibre bundle strength versus transverse sectional area

- The fibre bundle strength decreased versus the transverse sectional area of the fibre bundles.
- Slope coefficient  $\alpha = -0.09 - -0.13$ .
- Increased processing resulted in reduced bundle strength.
- **a** = field retting; **b** = a + scutching + carding; **c** = b + cottonization



# Effect of processing steps on fibre bundle strength

- The reduction of strength was estimated to 29 % per processing step.
- The estimated fibre bundle strength of unprocessed flax fibres was estimated to 1130 MPa.
- Thin flax fibres exposed to few processing steps are optimal as reinforcement of composite materials.



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Thanks for your attention!