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## Flexible strength-improved and crack-resistant biocomposites based on plasticised wheat gluten reinforced with a flax-fibre-weave

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### Abstract

This paper presents strength-improved and crack-resistant wheat gluten biocomposites, using flax-fibre-weaves as reinforcement. The composites were produced by dip-coating of the weave into a wheat gluten/glycerol (WGG) solution, or by compression moulding. The most extensive coverage and wetting of the flax yarns occurred during the compression moulding, and the adhesion between the fibres and the matrix increased with increasing glycerol content. The compression-moulded sheets were, at a comparable flax content, stiffer than those produced by dipping, whereas their strength was similar and their extensibility slightly lower. Tensile tests on notched samples showed that the flax yarn improved the crack-resistant properties significantly; the maximum stress increased from 2 to 29 MPa using a content of 19 wt.% flax fibres. A clear advantage of this novel mechanically flexible biocomposite is that it can be shaped plastically under ambient conditions, while at the same time providing in-plane stiffness, strength and crack/resistance.

### Keywords:

A. Fibres

A. Biocomposites

B. Fracture toughness

B. Mechanical properties

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