

# Avian keratin fibre-based bio-composites

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## Abstract

**Purpose** – This paper aims to use the solvent– casting– evaporation method to prepare new bio-composites with thermoplastic poly(ether urethane) (TPU-polyether) as the polymer matrix and reinforced with natural chicken feather fibre (CFF).

**Design/methodology/approach** – To produce the bio-composites, 0 to 60 per cent-w/w of fibres in steps of 30 per cent-w/w were added to the polymer matrix. The uniformity of distribution of the keratin fibres in the polymer matrix was investigated via scanning electron microscopy, and the results suggested compatibility of the TPU-polyether matrix with the CFFs, thereby implying effective fibre– polymer interactions.

**Findings** – Addition of natural fibres to the polymer was found to decrease the mass loss of the composites at higher temperatures and decrease the glass transition temperature, as well as the storage and loss modulus, at lower temperatures, while increasing the remaining char ratio, storage modulus and loss modulus at higher temperatures.

**Originality/value** – The investigation confirmed that waste keratin CFF can improve the thermo-mechanical properties of composites, simply and cheaply, with potentially large environmental and economic benefits.

**Keywords** Bio-composites, Keratin chicken feather fibre, Thermoplastic poly(ether urethane)

**Paper type** Research paper

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