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Semichemical fibres of *Leucaena collinsii* reinforced polypropylene: Macromechanical and micromechanical analysis

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Leucaena collinsii (LCN) is a fast growing legume. Due to the ability of legumes to fix nitrogen in the ground and the wide range of soils where they can grow up, Leucaena genus has been proposed for recovering deserted soils. Furthermore, the incorporation of fibres into the bosom of a polymeric matrix increases the tensile strength. This study examines the options of a treated fibre of *Leucaena collinsii* to be added as reinforcement to a polypropylene matrix. The influence on the tensile properties of different percentages of coupling agent and reinforcement were studied. A local maximum for the tensile strength was noticed when increasing the amount of coupling agent up to 6% for 30% w/w LCN contents. Afterwards, a tensile strength characterisation for 20 to 50% w/w LCN contents with the same amount of coupling agent was performed. The fibres from the composite reinforced with a 30% of LCN were recovered by extraction. The theoretical tensile strengths for composites from 20 to 50% w/w LCN content were modelled using the fibre distribution of the 30% composite material and compared with the experimental results. A good correlation between experimental and theoretical values was confirmed.

Keywords: A. Wood, Polymer-matrix composites (PMCs). B. Mechanical properties. C. Analytical modelling. E. Injection moulding.

1 INTRODUCTION

Leucaena is a vegetal genus formed by 24 species of bushes and trees. They can be found in North and Central America, and belong to the legume family and Mimosaidea subfamily. Its growing is optimum in places with long warm seasons, although they have a big potential for growing in productive plantations with a wide range of weather and soil. The interest about the productivity in some of those species has increased due to the easy adaptability to the ecological conditions of Mediterranean climate [1].