

Melaleuca alternifolia Fibre Composites: Effect of Different Type of Fibre on Mechanical and Physical Properties

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Abstract : The fabrication of melaleuca alternifolia fibre reinforced thermoplastic starch composites was successfully done. This paper aims to show the effect of melaleuca alternifolia fibres on mechanical and physical properties of composites by using starch as a matrix. The fibres were extracted from three different part i.e. tea tree trunk (TTT), tea tree bunch (TTB) and tea tree leaf (TTL) and combined with tapioca starch by casting method. All composites showed superior mechanical properties in comparison to TS. The addition of 5% (v/v) fibres as a filler to TS led to the improvement in young's modulus by 350% for TTB/TS, 282% for TTT/TS and 220% for TTL/TS. The tensile strength also increased to 34.39% for TTL/TS, 82.80% for TTB/TS and 203.18% for TTT/TS respectively. The trend can be correlated to the amount of cellulose in the fibres. For physical properties, it can be seen that, with the addition of fibres, the water absorption and swelling of composites decreased. The addition of melaleuca alternifolia fibre improved mechanical and physical properties of thermoplastic starch composites.

Keywords : melaleuca alternifolia, fibre, starch, mechanical, physical

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