

## **Physicochemical and mechanical properties of different morphological parts of tea tree (*Melaleuca alternifolia*) fibres**

### **Abstract**

Tea tree fibres as underutilised fibres were investigated physically, chemically and mechanically. From this study, it was found that the tea tree leaf (TTL) had the highest density - 0.42 g/cm<sup>3</sup>, and the highest percentage of water absorption - 69.9%. From the tensile strength, the tea tree trunk (TTT) gave the highest value - 65.44 MPa, followed by the tea tree branch (TTB) - 48.43 MPa and tea tree leaf (TTL) - 47.47 MPa. The chemical composition of fibres showed TTT had the highest cellulose content, which is 33.9%, followed by TTB -27.2%, and TTL - 13.5%. Meanwhile TTL had the highest extractive value - 16.4%, almost 3 times higher than TTB and TTT due to the existence of tea tree oil in TTL. From the FTIR result, TTL, TTB and TTT had similar spectra and no major differences. This paper aims to rationalise the potential of underutilised tea tree (*Melaleuca alternifolia*) waste as a novel source of natural fibre, to become a potential reinforcement or filler in the development of a new biocomposite.