

## Physical and chemical properties of different morphological parts of sugar palm fibres.

### ABSTRACT

Recently, due to increased environmental concerns, scientists and technologists have placed great importance on the application of natural fibres, especially in biocomposites. The sugar palm tree is one of the most popular natural fibres used in engineering applications. A study on the fundamental properties of fibres from different morphological parts of the sugar palm plant, which are bunch, black sugar palm fibre, locally known as ijuk, trunk and frond was carried out in order to evaluate their potential as eventual raw materials for reinforced polymer composites. From this study, it was found that sugar palm frond (SPF) gives the highest tensile strength compared to the other parts, which is 421.4 N/mm<sup>2</sup>. The tensile strength for sugar palm bunch (SPB), ijuk and sugar palm trunk (SPT) is 365.1, 276.6 and 198.3 N/mm<sup>2</sup>, respectively. These results have been proven using those for their chemical compositions, where the highest cellulose content was obtained from SPF (66.5%), followed by SPB (61.8%), ijuk (52.3%), and SPT (40.6%). For water absorption testing, it was found that SPF also gave the highest percentage - 132.8%, followed by SPB, ijuk and SPT. Fourier transform infrared (FT-IR) spectroscopy was used in order to detect the presence of functional groups existing in sugar palm fibre.

**Keyword:** Bunch; Frond; Ijuk; Sugar palm; Tensile properties; Trunk.