

Fiber characteristics and papermaking of seagrass using hand-beaten and blended pulp

ABSTRACT

Marine angiosperms could inevitably offer considerable potential resources for their fiber, yet little research has been conducted, especially in Malaysia. Fiber characteristics of five species of seagrass – *Enhalus acoroides*, *Cymodocea serrulata*, *Thalassia hemprichii*, *Halophila ovalis*, and *Halophila spinulosa* – were evaluated. Fiber dimensions were studied to determine slenderness ratio, flexibility coefficient, Runkel's ratio, and Luce's shape factor species selection. The seagrass species have the potential in papermaking production as they possessed slenderness ratio >33 (98.12 to 154.08) and high Luce's shape factor (0.77 to 0.83); however the species exhibited low flexibility coefficient <50 (30.07 to 35.18) and >1 Runkel's ratio (1.11 to 1.60), which indicate rigid fiber. The five seagrass species have high cellulose >34% (40.30 to 77.18%) and low lignin content <15% (5.02 to 11.20%), which are similar to those encountered in non-wood plant species. Handmade paper sheet of *Enhalus acoroides* using pulp subjected to mechanical blending exhibited the highest tensile strength (4.16 kN/m) compared to hand-beaten pulp (3.46 kN/m). The highest breaking length (3.43 km) was achieved by a paper sheet of *Thalassia hemprichii* using hand-beaten pulp. Based on their physical and chemical composition properties, seagrass have potential as sources of fibrous material for handmade papermaking.

Keyword: Seagrass; Fiber dimension; Chemical composition; Papermaking; Handmade paper; Mechanical strength