

Characterization of microcrystalline cellulose extracted from olive fiber

ABSTRACT

Olive fiber is a renewable natural fiber which has potential as an alternative biomass for extraction of microcrystalline cellulose (MCC). MCC has been widely applied in various industries owing to its small dimensional size for ease of reactive fabrication process. At present study, a serial treatments of bleaching, alkaline and acid hydrolysis was employed to extract OL-BLF, OL-PUF, and OL-MCC respectively from olive stem fiber. In morphology examination, a feature of short micro-crystallite particles was obtained for OL-MCC. The particle size was found gradually reducing from OL-PUF (305.31 μm) to OL-MCC (156.06 μm) due to the disintegration of cellulose fibrils. From physicochemical analysis, most lignin and hemicellulose components had been removed from OL-BLF to form OL-PUF with individually fibril structure. The elemental analysis revealed that highly pure cellulose component was obtained for OL-MCC. Also, the rigidity had been improved from OL-BLF to OL-PUF, while with the highest for OL-MCC with 74.2% crystallinity, endowing it as a reliable load-bearing agent. As for thermal analysis, OL-MCC had the most stable heat resistance in among the chemically-treated fibers. Therefore, olive MCC could act as a promising reinforcing agent to withstand harsh conditions for variety fields of composite applications.

Keyword: Olive fiber; Microcrystalline cellulose; Morphology; Physicochemistry; Thermal stability