Characterization of Multiwalled Carbon Nanotube Filled, Palm-Oil-Based Polyalkyds: Effects of Loading and *In Situ* Reaction

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ABSTRACT
In this study, the contribution of multiwalled carbon nanotubes (MWCNTs) was studied for the evaluation of the performances of polyalkyd-based films produced from dehydrated palm oil. Initially, different percentages of MWCNTs, including 0.5, 1.0, and 1.5 wt %, were considered for loading into the resin with the help of sonication. Additionally, a 1.0 wt % loading was considered for *in situ* conditions during the esterification process to achieve better dispersion and obtain improved properties of the film. The loading was evaluated by different performance tests, such as those of tensile, elongation, pencil hardness, swelling ratio, gel content, wettability, chemical resistivity, adhesion, and surface morphology. The results of mechanical testing showed that the addition of 1.0 wt % MWCNTs enhanced the tensile strength by 50%, whereas *in situ* conditions were found to be favorable for significantly improving the tensile strength by 75%. Moreover, the wettability, surface morphology, and thermal properties were also found to be in favor of *in situ* conditions for the dispersion of the MWCNTs.

KEYWORDS: biomaterials; biopolymers and renewable polymers; coatings; crosslinking; films

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