

UNIVERSITI TEKNOLOGI MARA

**CHARACTERISATION OF CARBON – POLYOL
USING CARBON DERIVED FROM PALM
KERNEL CAKE (PKC) AS COATING
MATERIALS**

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ABSTRACT

Recently the application of sustainable and renewable resources in applications technology has been progressing where recycling the waste from natural plant to produce useful end products promote greater resource management. The innovation in management of resources especially in palm oil plantations and its down-stream activities has continuously generating wastes. This biomass wastes contributed Malaysia's economic sustainability where recycling waste at maximum capacity is highly encouraged. This study examines wastes or by-products of the palm oil industries such as leaf, tree trunk, fruit bunches, palm effluent and palm kernel/cake and focused into benefits of new materials science investigations for coating materials. The normal way of burning process of these waste materials have become unfavorable especially when emission of CO₂ is banned or controlled with stricter law to reduce pollution. The innovation utilizes the use of palm kernel cake (PKC) after it is no longer feasible for animal feed, to produce activated carbon (AC) residue from the pyrolysis process. This study utilizes the residue of AC produced as black pigment in the production of black ink/paint as a preliminarily study for current development of coating. Perspectives looked in the study includes evaluation on the physical characterization such as rheology, proof on substrates, lightfastness and rubfastness (ageing), Impedance spectroscopy analysis. The applied substrates i.e, Aluminium panel and paper resulted an acceptable protective value of the coated substrates especially on paper. Rheology relationship of various formulations with different pigment volume concentration (PVC) were obtained and concluded that pigment through pyrolysis process is more suitable for the dispersion processes. Characterization on rheology controls the ink/paint performance properties for innovating the products as practical formulation. The analyzed weight compositions were optimized at 7 wt% of PVC and rheological properties is ideal for paint or ink system.

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