# Short Communications

## NEW POLYESTER ACRYLATE RESINS FROM PALM OIL FOR WOOD COATING APPLICATIONS

**OOI, T L ***

Radiation curable systems are increasing in importance in the field of coatings in various industrial applications due to their many advantages as compared to the thermal and solvent-based coatings. Most important features of this new technology is that it is a solvent free process, fast curing and easily controlled curing reaction, takes place at room temperature, instant start and shut down, high production line with minimium working space and is an environmental friendly process. The important research areas include the development of new radiation curable materials for application such as wood and plastic coatings, printing inks, digital video disk printing, pressure sensitive adhesive and electronic industries. Most of the radiation curable resins in the market are commercially derived from petrochemical-based raw materials and vegetable oil-based products such as soyabean oil, tung oil and linseed oils for such resins are few. Some scientists tried to synthesize epoxy palm oil acrylated resins from palm oil products but their synthesized resins showed poorer curing properties in radiation curable coating applications due to limited unsaturation in the fatty acid chain of palm oil molecules. The presence of unsaturation in the fatty acids chain is important for the production of acceptable performance radiation curable resins. This article deals with palm oil-based polyester acrylate resins that were synthesized from palm oil-based products. Two palm oil-based acrylated polyester resins PEPP-1( from refined, bleached and deodorized palm oil) and PEPP-2 ( from crude palm oil) were synthesized. The performances of these resins with respect to their curing rate and physical-mechanical properties of cured products under UV radiation were studied. It was found that these newly synthesized palm oil-based UV radiation-curable polyester acrylated prepolymers can be used as radiation-curable coating materials for wood coating applications.

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## QUANTITATIVE DETERMINATION OF PEROXIDE VALUE IN THERMALLY OXIDIZED PALM OLEIN BY FOURIER TRANSFORM INFRARED SPECTROSCOPY

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A simple and rapid quantitative method to determine peroxide value (PV) of palm olein has been developed using transmittance Fourier transform infrared (FTIR) spectroscopy. Palm olein was oxidized and blended with unoxidized palm olein to generate samples with PVs in the range 3.52-9.86. These samples were used in the calibration and validation steps. A calibration model based on partial least-squares analysis was constructed using the spectral and chemical data of the calibration set. Evaluation of the calibration model was carried out by cross-validation. The standard error of prediction and coefficient determination obtained from the cross-validation equation were 0.172 PV and 0.996, respectively. The standard deviation of the difference for reproducibility of the FTIR method was found to be better than that of the chemical method. The FTIR method would be suitable for PV determination in the palm olein industry and takes an average of less than 2 min per sample.

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# OPTIMIZATION AND VALIDATION OF HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC METHOD FOR THE DETERMINATION OF DOWTHERM A™ IN EDIBLE OILS AND OLEOCHEMICALS

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A method using high performance liquid chromatography (HPLC) and fluorescence detection is optimized and validated for the determination of Dowtherm A in spiked oleochemicals and edible oils. The samples are directly injected into a reversed-phase C18 column and Dowtherm A is detected using fluorescence detector set at 247 nm excitation and 310 nm emission wavelengths. The simple isocratic mobile phase used is a mixture of methanol and water (90 + 10, v/v) at a flow rate of 1 ml $min^{-1}$. The limits of quantitation are from 0.1 µg $g^{-1}$ to 0.2 µg $g^{-1}$. Mean recoveries ranged from 93.0% to 116 % with reproducibilities of 1.29 %-3.84 %. The procedure provides a simple, reliable and sensitive method for determining Dowtherm A residue in oleochemical and edible oil without prior sample clean-up or extraction.

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# BIOTECHNOLOGICAL STRATEGIES FOR IMPROVING PLANTATION TREE CROPS: THE OIL PALM – A CASE STUDY

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Despite the Malaysian Government's policy of industrialization, the plantation sector has remained steadfast in its position as an important contributor to the country's economy. However, there are forces at play which are driving the industry towards change. Decline in price and increase in production costs need to be addressed if the industry is to remain profitable in the future. New innovations are much needed. As the long lived palm does not lend itself to be biologically altered in a short period of time, there is an urgent need for long-term planning to strategize research and development (R&D) efforts towards maximizing and sustaining future profitability. A powerful tool which one can use to develop such strategies is embodied in the collection of techniques which Wall Street named *biotechnology*. These techniques can be harnessed to understand, decipher and manipulate the genetic make-up of living organisms. Biotechnology is currently being applied to several crop plants, including some which produce commodities that compete with the products of plantations in this country. The key strategy recommended is the *decommoditization* of the plantation industry, that is, efforts in R&D should be geared towards producing differentiated high value products in place of the present low value commodities. The implementation of such a strategy has been initiated in oil palm. The paper reviewed successes achieved to date and possible future directions.

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