

UNIVERSITI TEKNOLOGI MARA

**CHARACTERIZATION OF
TRANSDERMAL DRUG DELIVERY
USING NONDESTRUCTIVE VISIBLE
SPECTROPHOTOMETRY AND
ARTIFICIAL NEURAL NETWORK**

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ABSTRACT

Assessment of drug content and matrix characteristics, such as state of polymer-polymer and drug-polymer interaction are utmost important with respect to the therapeutic effectiveness of transdermal drug delivery system. Conventional methods for analysis result in sample being unrecoverable from test, disposal of a large amount of solvents, reagents and accessories, as well as, restrict the analysis to statistically selected samples. This thesis presents a new technique for drug content and drug concentration assessment of nifedipine and hydroxypropylmethyl cellulose films with 25%, 50% and 75% relative humidity using nondestructive testing techniques of Visible Spectrophotometry. The cross-study of the polymeric films by Differential Scanning Calorimetry, Fourier Transform Infrared Spectroscopy, Ultraviolet Spectrophotometry and Visible Spectrophotometry indicated physicochemical changes as the drug and polymer varied. The significant wavelength and intensity of visible spectrophotometry associated with different polymeric films and relative humidity were determined. Correlation studies of drug concentration from visible spectrophotometry and drug content were done using an artificial neural network. This intelligent technique has presented the reliability of Visible Spectrophotometry in detecting drug content and identifying drug concentration at minimum and maximum of 0 to 20 mg and 0 to 32.11 %w/w respectively.

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