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THANED PONGJANYAKUL: DEVELOPMENT OF ACRYLIC ADHESIVE  
TYPE NICOTINE TRANSDERMAL PATCHES. THESIS ADVISORS: SOMPOL  
PRAKONGPAN, Ph.D., AROONSRI PRIPREM, Ph.D., NARONG SARISUTA, Ph.D. 233 P.  
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Nicotine transdermal patches (NTPs) were developed by using an acrylic pressure sensitive adhesive emulsion to form a transparent matrix film. The nicotine released from the patch was studied by using a paddle over disk dissolution apparatus. A linear relationship between the nicotine released and the square root of time was observed which indicated a matrix diffusion controlled release mechanism. The production process parameters such as nicotine content and weight/area ratio that might have affected the nicotine released from NTP were evaluated. Short term stability studies indicated that NTP maintained a good appearance and that more than 90% of the initial content of nicotine remained after storage at 45 °C/75%RH for 3 months or 30 °C for 1 year. Neither the release rate of nicotine nor the adhesive properties of NTP were significantly changed. The *in vitro* permeation of the NTP was studied using 2 types of barrier membrane: cobra skin (CS) from *Naja Naja Khaotia* and human epidermis (HE). Both CS and HE gave similar permeation profiles of nicotine release from the NTPs. The permeability coefficient of nicotine across CS was about 2 times greater than that across HE. However, the use of CS had advantages over the HE in terms of lower variation of the permeation fluxes. NTP containing 6.17 %w/w of nicotine provided a nicotine release within USP 24 limits and a nicotine permeation which was close to Nicotinell®20. Bioequivalence of the NTP and Nicotinell®20 was studied in 18 non-smoking healthy Thai volunteers using a crossover design. The two systems were found to be bioequivalent when the pharmacokinetic parameters of nicotine, such as  $C_{max}$  and  $AUC_{0-24}$ , were normalized by the patch area and analyzed for equality by using the 90% confidence interval and the two one-sided t-test. The nicotine absorption profile of the NTP simulated by using numerical deconvolution showed a good correlation with the *in vitro* permeation profile of nicotine across HE.