# 1. ABSTRACT

The objective of this study is to optimize a nortryptiline hydrochloride patch previously designed (1) with the intended aim to develop controlled drug release system as a smoking cessation aid.

Patches of 5%, 7.5% and 10% NTH concentrations were assayed for physical experiments. Measured thickness of the patches remains constant regardless of the NTH concentration. Obtained values are 31.88±5.0 µm, 32.33±5.1 µm and 32.00±3.8 µm for 5%, 7.5% and 10% patch respectively. The variability is lower than 20 % in every case. Release and penetration studies were performed using Franz type of diffusion cells. The maximum cumulative amount released from assayed patches at 7 hours (last sampling point) varies as a function of the NTH concentration. Two kinetic models, power law and first order kinetics, are useful in order to predict the maximum amount to be released and the rate at which the process will be developed. Taking first order results into account, the maximum amount to be released (Qinf) is 7.185±0.30[mg/cm$^2$]; 12.359±0.69[mg/cm$^2$]; and 29.333 ±1.97 [mg/cm$^2$] for 5%; 7.5% and 10%patch respectively. Considering the power law fitting, the main conclusion is that the release mechanism is basically fickian diffusion as the exponent is about 0.5. Estimated permeation parameters are Kp=0.019·10$^{-3}$±0.00 [cm/h]; t0=51.273±2.42[h] for 5% patch, Kp=0.004·10$^{-3}$±0.00 [mg/cm]; t0=28.099±1.97[h] for 7.5% patch and Kp=0.005·10$^{-3}$±0,00[mg/cm]; t0=26.312±1.98[h] for 10%patch. The lag time is decreases as the patch concentration is increased. Calculated flux is 0.834·10$^{-6}$ and 1.291·10$^{-6}$ [mg$^2$cm/g] for 7.5% and 10%patch respectively. Considering both parameters, flux and lug time, 10% patch is better dosage form than the other two.