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Electric Field Enhanced Diffusion of Salicylic Acid through Polyacrylamide Hydrogels SUMONMAN NIAMLANG, ANUVAT SIRIVAT, The Petroleum and Petrochemical College — The release mechanisms and the diffusion coefficients of salicylic acid -loaded polyacrylamide hydrogels were investigated experimentally by using a modified Franz-diffusion cell at 37 °C to determine the effects of crosslinking ratio and electric field strength. A significant amount of salicylic acid is released within 48 hours from the hydrogels of various crosslinking ratios, with and without electric field. The release characteristic follows the Q vs. $t^{1/2}$ linear relationship. Diffusion coefficient initially increases with increasing electric field strength and reaches the maximum value at electric field strength of 0.1 V; beyond that it decreases with electric field strength and becomes saturated at electric field strength of 5 V. The diffusion coefficient increases at low electric field strength (less 0.1 V) as a result of the electrophoresis of the salicylic acid, the expansion of pore size, and the induced pathway in pigskin. For electric field strength higher than 0.1 V, the decrease in the diffusion coefficient is due to the reduction of the polyacrylamide pore size. The diffusion coefficient obeys the scaling behavior D/D_o=(drug size/pore size)^m, with the scaling exponent m equal to 0.93 and 0.42 at electric fields of 0 and 0.1 V, respectively.

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