# Diffusion characteristics of collagen film

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## Abstract

Collagen films prepared by treating collagen gel solutions with different concentrations of glutaraldehyde were evaluated as a biodegradable and biocompatible drug carrier for cosmetically effective agents in this study. The influences of concentration of glutaraldehyde (0, 0.05, 0.075, 0.1, 0.2, 0.25, and 0.3%, v/w) with a fixed concentration (1%, w/w) of collagen on the crosslinking rate of collagen gel solutions and on the crosslinking extent of the collagen contained within were examined by monitoring changes in viscosity. In addition, the influences of the addition of different model drugs (retinoic acid, retinol palmitate, ascorbic acid 6-palmitate, and tocopherol acetate) on viscosity changes of collagen gel solutions were compared. The results demonstrate that the maximal viscosity of collagen gel solutions increases with increasing concentrations of glutaraldehyde. When the concentration of glutaraldehyde exceeds 0.2%, the maximal viscosity of collagen gel solutions reaches a plateau. However, model drugs showed insignificant effects on viscosity changes of collagen gel solutions. The diffusion characteristics of collagen films prepared from those gel solutions crosslinked with different concentrations of glutaraldehyde were assessed using two different matrix forms of solution or gel for the model drugs in a flow-through diffusion system. The matrix effect on the flux of model drugs from both solution and gel matrix through collagen films was inconclusive. However, both fluxes show the same tendency to decrease when the concentration of glutaraldehyde used for crosslinking is increased. However, when the concentration of glutaraldehyde exceeds 0.2%, these model drugs, except retinoic acid, show similar diffusion characteristics across the collagen films.