

Chem. Pharm. Bull., **47**, 1044-1046, (1999)

## Relationship between Solubility of Chitosan in Alcoholic Solution and Its Gelation

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A cationic polymer, chitosan (CHI) is anticipated to be a potent component in several dosage forms involving transdermal drug delivery systems (TDDS). Solubility of CHI and its gelation in alcoholic aqueous solutions were investigated. Elasticity of the gel containing 3% CHI, 2% oxalic acid, as a crosslinking agent, and ethanol (EtOH) and/or 1,3-butylene glycol (BG) was also evaluated by a rheometer. The CHI solubility in the gel was dependent on the solubility parameters of the mixed solvent. High elasticity was observed in the CHI gel when an alcoholic solvent giving low solubility of CHI was used. A good correlation was found between the gel elasticity and the relative gel concentration (=concentration of CHI in gel/solubility of CHI in gel). Since the polarity of mixed solvents also affected the thermodynamic activities of drugs and penetration enhancers, optimization of the vehicle composition for TDDS is important to assure suitable drug efficacy.