Abstracts

Percutaneous-Penetration-Enhancing Mechanisms of Siloxane Compounds Containing Glucopyranosyl Group

by

Tomoko AKIMOTO*1 and Yu NAGASE*2

(received on Sept. 26, 2002 & accepted on Dec. 25, 2002)

Abstract

We have investigated the percutaneous-penetration-enhancing mechanisms of siloxane compounds containing a glucopyranosyl group with various siloxane chain lengths, based on experiments on skin penetration of drugs, effects of cholesterol extraction from the skin and X-ray diffraction. The results of these experiments suggest that the mechanisms of each enhancer are different. The compound with a long siloxane chain increased the partition of drugs into the stratum corneum (SC) through the alteration of skin lipophility by adsorption onto the surface without itself penetrating into the SC. The compound with a short siloxane chain also increased the partition of drugs into the SC, although some of the compound penetrated into the SC and extended the hydrophilic pathway between the lipid layers in SC. The compound with disiloxane and alkyl groups increased the partition of drugs into the SC as a result of a defatting effect and penetrated into the SC, which resulted in the increase in the degree of the diffusion of drugs. Furthermore, the percutaneous-penetration enhancement mechanisms of each siloxane enhancer were different from that of oleyl acid, which is a typical low-molecular-weight enhancer.

Keywords: Percutaneous penetration enhancer, Enhancing mechanism, Oligodimethylsiloxane, Disiloxane compound, Glucopyranosyl group

*1 Researcher, Department of Applied Chemistry.
*2 Professor, Department of Applied Chemistry.

Effects of Synthetic and Measurement Conditions on Elastic Modulus of poly-Vinyl Alcohol Gel

by

Takashi ASAKA*1 and Hisao KIKUGAWA*2

(Received on Sep. 30, 2002, accepted on Nov. 25, 2002)

Abstract

The elastic modulus of cross-linked PVA (poly-vinyl alcohol) gel has been successfully measured by means of a new conventional mechanical indentation testing method. However, the relationship between the concentration of sulfuric acid, a catalytic agent, and the gelation time of PVA gel is not yet clear. Furthermore, there was no sufficient clearance between the indenter of the testing equipment and the PVA-gel-filled vessel. To solve these problems, the effects of synthesis and measurement conditions on the elastic modulus of PVA gel were studied.

An increase in concentration of sulfuric acid shortened the gelation time of PVA gel and the elastic modulus of PVA gel was much less than that previously reported. These results indicated that the differences between the elastic moduli of PVA gels might be due to the deformation of the PVA gel clamped by the inner wall of the vessel.

Keywords: Viscelasticity, Poly-Vinyl Alcohol (PVA) Gel, Gelation Time, Mechanical Indentation, Elastic Modulus

*1 Assistant Professor, Department of Applied Chemistry.
*2 Assistant Professor, Department of Mechanical Engineering, School of Engineering II.

Vol. XXVIII, 2003