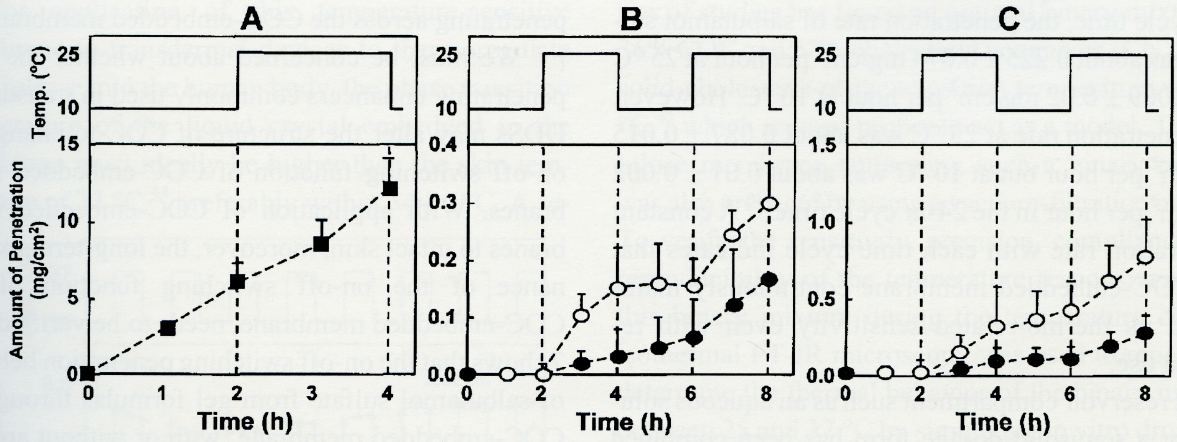

Fig. 5. Penetration profile of salbutamol sulfate across a COC-free membrane (A) and COC-embedded membranes prepared by 2 manufacturing methods (B: 10 °C, C: 37 °C).[36-37] Storage temperature: ●, 10 °C; o, 37 °C.

ature change between 10 and 25 °C. Higher manufacturing or storage temperatures gave better alignment of COC in the membranes, making superior regularity for movement of salbutamol sulfate across the membranes as compared with the COC-free membrane (Fig. 5). The amount of salbutamol sulfate penetrating the COC-embedded membrane was controlled by the amount of COC absorbed in the cellulose nitrate membrane. The penetration rate of salbutamol sulfate across the COC-embedded membrane was also found to predominantly depend on the pore size of the membrane. The optimal pore size ranged 0.2~0.45 μm for controlling the amount of COC adsorbed.[38] Moreover, membrane properties and adsorption of COC also play important roles in controlling solute permeation.[39]

The COC-embedded membrane used in the long-term course should maintain its thermo-responsive sensitivity to the external modulation of temperature for its expected lifetime. Whether the thermo-related sensitivity is altered or not during the repeated multi-cycle temperature exchange is a very important parameter expressing its on-off function. Fig. 6 shows that the on-off function of this COC-embedded membrane was independent of the cycle time used. With a

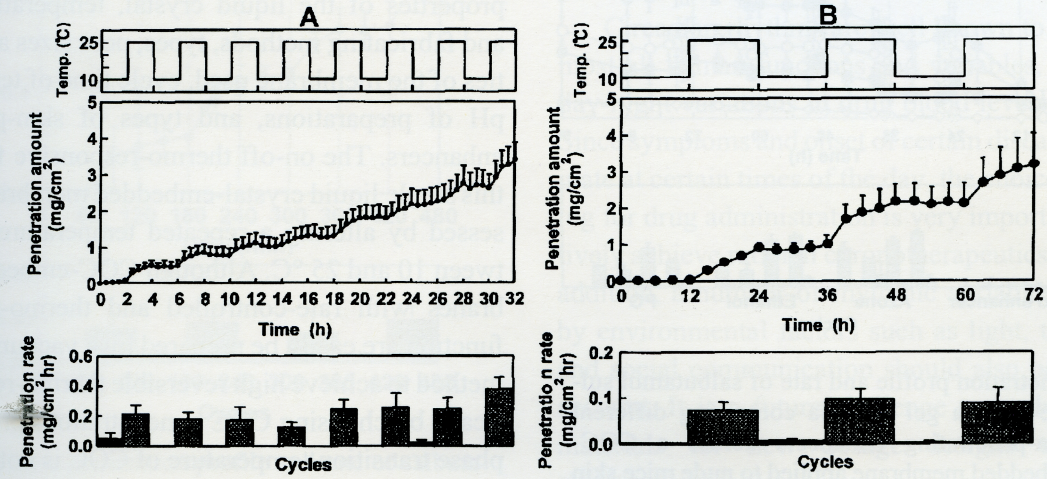

Fig. 6. Pulsatile penetration behavior and rate of salbutamol sulfate across a COC-embedded membrane in response to a temperature exchange cycle.[40] Cycle time: (A) 4h, (B) 24h.