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Silk protein–Cyclodextrin conjugates

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Keywords	Silk protein, Cyclodextrin, Biomaterial, Conjugate, Inclusion complex

Technical Support Skills	・Chemical modification of proteins and saccharides ・Separation of proteins and saccharides by Chromatography ・Investigation of molecular inclusion and recognition

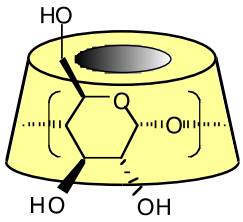
Research Contents — Synthesis and characterization of cyclodexrtrin modified silk protein

Silk protein of silkworms is composed of sericin(SS) and fibroin(SF), which have interesting abilities such as water retention, antibacterial property, UV absorption, and so on. Recovery and reuse of these proteins from the waste of silk industry are meaningful for recycling of natural resources and keeping the environment.

To add molecular inclusion and recognition abilities to the silk proteins, we have carried out chemical modification of their amino acid residues with cyclodextrin(CD) which acts as a host to bind hydrophobic guests in its well-defind cavity. CD-modified SS was prepared as a silk protein-CD conjugate and its binding behavior was investigated for the complex formation with phenolphthalein. It is expected that the SS-CD conjugate becomes a new candidate for a carrier protein in drug delivery systems.

(a) (b) (c)

Scheme 1. Fibroin: fiber(a), powder(b), and gel(c)



Scheme 2. Cyclodextrin

Available Facilities and Equipment

High-performance Liquid Chromatograph (Shimazu)	Fluorescence Spectrophotometer (JASCO)
Gel Permiation Chromatograph (Waters)	UV-Vis Spectrophotometer (Shimazu)
Circular Dichroism Spectropolarimeter (JASCO)	
Polarimeter (JASCO)	
FT-IR Spectrometer (Shimazu)	