

1-22. Effect of methyl alcohol on the morphology and conformational characteristics of silk sericin

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Silk sericin (SS) is one of essential components of cocoon filament, comprising granular and high molecular proteins with adhesive and gelatin-like characteristics. Silk fibroin (SF), another main component of cocoon filament, has been investigated by many researchers due to its good physicochemical properties. Recently, Nam and Park reported that the effect of alcohol addition into the SF solution on the morphology and structural characteristics of SF. According to their results, the structure of SF was changed from random coil to β -sheet structure and morphology of SF lyophilized showed spherical particle shape. SF is more hydrophobic than SS due to the different amino acid composition. Therefore, the structural transition phenomena of SS are expected to be different from that of SF.

In this study, we report the effects of alcohol addition on the characteristics of SS. The conformational and structural characteristics of SS by the addition of methyl alcohol were studied using circular dichroism (CD), infrared spectroscopy (IR), and X-ray diffraction. The morphology of SS lyophilized was also observed by scanning electron microscope (SEM).

The important results are as followed: Scanning electron microscope showed that morphology of SS lyophilized was dramatically changed from sponge-like structure to spherical fine particle type. X-ray diffraction method, infrared spectroscopy, and differential scanning calorimetry showed that the conformational characteristics of SS was random coil structure regardless of the addition of methyl alcohol. On the other hand, circular dichroism showed that the molecular states of SS were more densely packed.