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Structural and Thermal Characteristics of *Antheraea pernyi* Silk Fibroin/Chitosan Blend Film

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Silk fibroin (SF), one of the typical natural protein polymers, is classified into domestic (*Bombyx mori*) and wild type (*Antheraea pernyi*, etc.). SF spun by a wild silkworm *Antheraea pernyi* (*A. pernyi*) is characterized for the chemical composition of *A. pernyi* SF with small side chain such as alanine, glycine, serine and several basic amino acids. In particular, it contains tripeptide sequence arg-gly-asp, known as a cell adhesive site for mammalian cell culture. Therefore, *A. pernyi* SF has been investigated as biomaterials such as matrix for enzyme immobilization and mammalian fibroblast cell culture. Chitosan, deacetylated product of chitin, has been widely used in the fields of biomedical applications due to its biocompatible and biodegradable properties. In particular, chitosan could be considered as biomaterials for wound dressing and artificial skin due to its unique properties such as accelerating wound healing and attainment of a good-looking healing skin surface.

This article is aimed at researching on the structural characteristics and thermal properties of blend films prepared by mixing aqueous *A. pernyi* SF solution and acetic acid chitosan solution. The conformation of *A. pernyi* SF in blend films was β-sheet structure, mainly due to the effect of acetic acid used as a mixing solvent. SEM and DTG results showed that the phase separation occurred in *A. pernyi* SF/chitosan blend films. According to FTIR spectra, the amide II band of SF and C-O stretching band of chitosan were shifted, indicating that some intermolecular interactions of hydrogen bonding might be formed between two components in blend films. The endo-exo transition of SF did not occur in blend films due to the precrystallization of β-sheet conformation. The blend films showed two distinct maximum decomposition temperatures at around 294℃ (chitosan component) and 369℃ (*A. pernyi* component), which could be an indirect evidence of phase separation. The thermal decomposition stability of chitosan can be enhanced by blending with *A. pernyi* SF as one component in blend.