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Structural Characteristics of Silk Sericin Powder

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Sericin powder(SP) was prepared by mechanical and chemical method and it was characterized through structural, thermal, and morphological examination. Structural characteristics of SP were examined using Fourier transform infrared spectroscopy(FTIR), X-ray diffractometry(XRD), and circular dichlorism. The morphology of SP was observed by scanning electron microscope. Thermal properties of SP were examined through differential scanning calorimeter.

FTIR showed that mechanical stress and alcohol treatment on the silk sericin was not inducing conformational changes of silk sericin. XRD diffractogram showed that silk sericin sponge prepared through lyophilization was showed a small diffraction peak at $2\theta = 18.76$ corresponding to the 4.72 Å. This diffraction peak reflects intermolecular spacings of silk sericin, which is not related to the crystalline spacings of silk sericin. With an increase of treatment time with mechanical stress, the diffraction peaks of silk sericin powder was shifted to the higher 2θ angle, meaning that the intermolecular spacings of silk sericin became shorter with an increase of treatment time. However, that of silk sericin treated with methyl alcohol was showed a sharp peak at $2\theta = 19.56$ and a shoulder peak $2\theta = 23.41$, corresponded with 4.53 and 3.79Å, respectively. Morphology of silk sericin obtained from sericin solution by freeze-drying showed sheet morphology. SP prepared by physical grinding method observed abnormal shapeless powder. However, SP prepared by addition of alcohol showed round particle morphology.