

Author:  [ADVANCED](#) | Volume  Page   
 Keyword:   |



[TOP](#) > [Available Issues](#) > [Table of Contents](#) > Abstract

ONLINE ISSN : 1881-3984

PRINT ISSN : 1344-6606

## Food Science and Technology Research

Vol. 11 (2005) , No. 1 pp.37-42



[\[PDF \(927K\)\]](#) [\[References\]](#)

### Physicochemical Properties of Silk Fibroin after Solubilization Using Calcium Chloride with or without Ethanol

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(Received: April 20, 2004)

(Accepted: December 16, 2004)

To elucidate the physicochemical properties of silk protein, we studied the effects of calcium chloride and ethanol on the gelation of fibroin. Fibroin was treated with 5.0M calcium chloride in water (Ca/W) or 5.0M calcium chloride in 20% (v/v) ethanol (Ca/Et) and the rheological properties of colloidal fibroin were investigated. The Ca/W-treatment promoted an increased rate of gelation and gave higher gel strength than the Ca/Et-treatment. The maximum gel strengths of Ca/W- and Ca/Et- treated fibroins were obtained at pH 7.0 and pH 5.5, respectively. Scanning electron micrographs showed that the Ca/W-treated fibroin gel had a more developed three-dimensional molecular network than the Ca/Et-treated gel. Further, FT-IR spectra suggested that Ca/W-treated fibroin has more of a  $\beta$ -structure than Ca/Et-treated one in colloidal conditions. This study indicated that the use of calcium chloride alone was more beneficial to the gelation of fibroin than combined use with ethanol.

**Keywords:** [Fibroin](#), [gelation](#), [calcium chloride](#), [SEM](#), [FT-IR](#)



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**Physicochemical Properties of Silk Fibroin after Solubilization Using Calcium Chloride with or without Ethanol** Yuji MIYAGUCHI and Jianen HU, *FSTR*. Vol. **11**, 37-42. (2005) .

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doi:10.3136/fstr.11.37

JOI JST.JSTAGE/fstr/11.37

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