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Immobilization of Proteolytic Enzymes on Polyester and Polyamide Fiber for Enzymatic Hydrolysis of Silk Sericin

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Sericin is a minor protein of silk protein. It is removed during the degumming process of silk fiber. Most degumming processes involve chemical treatment using soaps and alkalines because of the quality of silk yarn. In such case, sericin is very difficult to reuse. Recently many farmers in Korea produce *Cordycepes*. During the production of *Cordycepes*, silkworm cocoons are also produced. But it could not be used in reeling process because they are cut to take out the pupae which is infected by *Cordycepes*. So these cocoons are used to the preparation of silk fibroin powder. Also in this case, sericin must be removed but it did not need any chemical treatment. Most of the sericin could be removed by simple water treatment. Sericin prepared by this method could be easily recovered.

There are some reports about physiological effects of sericin. Especially sericin is interested as cosmetics. But there are some problems to reuse this protein. Its gelation and loss of solubiltiy after lyophilization are the major problems that prevent fully reuse of sericin. Gelation and loss of solubility are due to conformational change (random coil to β-sheet) of sericin, and it could not be prevented by addition of salts or lyoprotectant unless it is used with very high concentration.

In previous study, hydrolysis of sericin prevents gelation behavior and loss of solubility. By cutting the long chain molecule of sericin, it is unable to form the network structure that is essential to gelation properties. And also the β-sheet structures are weaken.

In present study, we immobilized proteolytic enzymes, trypsin and α-chymotrypsin, on fibrous support. Fibrous support has many advantageous properties, including high specific surface area, low pressure drop, high mechanical strength and low material costs. Polyester and polyamide fiber are used as fibrous support. Both enzymes are immobilized by covalent bond on each fiber for enzymatic hydrolysis of silk sericin.

The aim of this study is to provide more suitable immobilizing method for high molecular weight substrates and to reuse sericin as cosmetic ingredients.