MEDICAL AND BIODEGRADABLE PROTEINS OF SILK MOTH

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ABSTRACT
Economic insect that are emerging as an ideal molecular Genetic resource for solving a broad range of biological problems. The silkworm, B. mori produces massive amount of silk proteins during the final stage of larval development. These proteins are stored in the middle silk gland and they are discharged through the anterior duct and spinneret, at the end of the fifth instar. Recently, silkworm is being used as bio factory for the production of useful protein using the silk gland, which has promoted the technological development in sericulture. With the above background silkworm can be classified as a value added biomaterial for medical application, application of silk protein fibroin and sericin as a biomaterial and other Seri-byproducts.

Silk fibers have proven to be effective in many clinical applications. Silk fibroin based wound dressing that could accelerate healing and could be peeled off without damaging the newly formed skin. Subsequently the wound dressing was made with a mixture of both fibroin and sericin .The present paper overviews some important studies carried out on sericin and fibroin of silkworm, Bombyx mori Linn.

KEYWORDS: Sericin, Fibroin, Bombyx mori.

INTRODUCTION
Bombyx mori belongs to Bombycidae produces a delicate twin thread of silk fibroin, which is coated by a protective cover of sericin. Silk protein is a kind of protein like collagen, elastin, keratin, fibroin, sporgin etc., it is an essential constituent of cocoon filament (Komatsu, 1975,80). The silk fiber protein is synthesized by silk gland cells and stored in the lumen of the silk glands. Subsequently, it is converted into silk fibres. When the silkworms secrete the liquid silk during the spinning, it passes through the anterior gland and expelled out through
the spinneret opening (Shimizu, 2000). Quantity and nature of sericin are fundamental characteristics in conferring distinctive traits sericin extracted from the liquid silk and fresh cocoon shells of a silkworm mutant, which secretes only sericin.

sericins from both the liquid silk in the silk gland and the cocoon filament and confirmed the relationship between solubility in hot water and molecular conformation (Komatsu, 1982).

Most experimental evidences indicate that sericin exists mainly in the random coil or β-structure. It is believed that β structure is intrinsic to liquid silk on analysis of circular spectrum, which, indicated that sericin extracted from liquid silk for 45 minutes with water contains a small fraction (10%) of α-helix. Komatsu (1980) argued that during the dissolution of the liquid silk in water, part of the sericin become a white suspension due to the coexisting cocoon yarn wax but does not coagulate and the β structure is originally present in the liquid silk. β-structure sericin is more insoluble than random coil sericin. The transition of sericin from its random coil to β-structure takes place by repeated absorption and de-absorption.

DISCUSSION

Medi biodegradeble Material

Environment – friendly medi biodegradable polymers can be produced by blending sericin with other resins (Annamaria et al., 1998) are biodegradable materials.

Membrane based separations (e.g., reverse osmosis, dialysis, ultra filtration and microfiltration) are used in process such as desalination of water, production of extremely pure water, the bioprocessing industry and some chemical processes. Pure sericin not easily made into membranes, but membranes of sericin cross-linked, blended, or copolymerized with other substance are made readily, because sericin contains large amount of amino acid with neutral polar functional groups. Sericin and fibroin can be used to make membranes for use in separation processes.

The insolubilized silk fibroin membrane could be used to separate the mixture of water and alcohol describe a cross-linked thin film made of sericin for use as a separating membrane for water and ethanol. Sericin containing membranes are quite hydrophilic. Acrylonitrile used in making certain synthetic polymers can be copolymerized with sericin to prepare a protein containing synthetic polymer film for separating water from organics. Functional biomaterials Nakajima (1994) has found that sericin film located on lay of liquid crystal can
uniformly orient the liquid crystal molecules to provide distortion-free high-quality crystal displays. Sericin-coated film is used on the surface of refrigeration equipment because of its antifrosting action (Tanaka and Mizuno, 2001).

Use of the coated sericin film is a membrane composed of sericin and fibroin is an effective substrate for the proliferation of adherent animal cells and can be used as a substitute for collagen. investigated the attachment and growth of animal cells on films made of sericin and fibroin. Cell attachment and growth were dependent on maintaining a minimum of around 90% sericin in the composite membrane. Film made of sericin and fibroin has excellent oxygen permeability and is similar to human cornea in its functional properties. It hoped that the sericin-fibroin blended film could be used to form article corneas wounds.

A novel mucoadhesive polymer has been prepared by template polymerization of acrylic acid in the presence of silk sericin (Ahn et al., 2001). Silk protein can be made into a biomaterial with anticoagulant properties, by a sulfonation treatment of sericin and fibroin provided the first evidence of antioxidant action of the silk protein by showing that sericin suppressed in vitro lipid peroxidation. Furthermore, sericin also found to inhibit tyrosinase activity.

APPLICATIONS OF SILK FIBROIN
The silk sericin has resemblance with the natural moisturizing factor (NMR). Sericin gel is prepared by using sericin solution with pluronic and carbopol as a Sericin and fibroin have been recently explored in the field of drug delivery systems. properties and application of wound protective membrane made by silk fibroin. It is concluded that the fibroin membrane has good wound healing properties. The fibroin hydrogels prepared either by treating a 2% (w/v) silk fibroin aqueous solution at 4 °C temperature or by adding 30% glycerol could be used as scaffolds able to promote in situ bone regeneration (Matta et al., 2004). Using fibroin controlled release tablets, gels and mesosphere have been prepared. The applicability of fibroin, a major silk protein, to controlled release type dosage tablets is investigated in vitro and in vivo. The silk fibroin can be used as the substratum for the culture Sericin and fibroin have been recently explored in the field of drug delivery systems. It is concluded that the fibroin membrane has good wound healing properties.

RESULT
These results suggested that sericin is the valuable natural ingredient for food and cosmetics. The biopolymer sericin has a strong affinity to keratin. Excessive transepidermal water loss
(TEWL) is one of the causes of dry skin and skin moisturizers have been used to wound dressing made mixture of both fibroin and sericin.

REFERENCES