Abstract
Application of Sericin-Based Materials in Food Packaging: An Overview †

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Abstract: Proteins are some of the most commonly used biomaterials in food technology, especially in food packaging, coatings, and additives. They are outstanding candidates for producing innovative food components due to their immense nutritional properties, molecular characteristics, biocompatibility, biodegradability, and safe status. Numerous application examples of protein-based films and coatings in food packaging also approve their significant role in food packaging materials. Sericin is a natural silk globular protein, which is usually discarded as a biological waste material after removing the fibroin for making silk products from the silk cocoon. In the current investigation, an attempt was made to extract this usually wasted silk protein from the silk cocoon, purify it, and study its potential applications in the food sector as a food packaging material. The sericin was extracted from the silk cocoon by the degumming method. The protein concentration of the extracted crude sericin sample was estimated by the standard Lowry’s method using the bovine serum albumin as the reference standard. Linearity was obtained ($R^2 > 0.99$), and the protein concentration of the crude sericin was found out to be 3.60 % (w/v). The purification of the crude protein was carried out by dialysis using a cellulose tubing with a molecular weight cutoff of 12 kDa, followed by freeze-drying. The protein concentration of the purified sericin was found out to be 3.47 % (w/v). Following extraction, sericin can be used as the food packaging material. Proteins, especially sericin, which is a byproduct, can provide a low-cost and naturally occurring raw material to be used as green formulation ingredients in the food industry as a food packaging material. Further research is under process to evaluate the antimicrobial and antioxidant potential of the extracted sericin and study its applications, including food packaging materials.

Keywords: silk cocoon; sericin; food packaging; antibacterial; antioxidant

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