



Abstract

A continuous stand of two filaments concreated together which forms the silkworm cocoon, *Bombyx mori* is called silk. Degumming is a process by which a component of silk known as sericin is produced as a by-product during the processing of cocoons of silk. Sericin is very important biomaterial because of its extraordinary properties otherwise in past it was considered as a waste. Sericin is highly operative against fungal (*Aspergillus flavus* and *Candida albicans*) and bacterial (*Staphylococcus aureus*, *Escherichia coli*) strains. Silk sericin applications are being investigated by researchers due to its potential in many fields. There is ample evidence to support the notion that the recovery and use of sericin protein as a natural antimicrobial compound in the textile will not only minimize the detrimental environmental health impact, but will also be of immense commercial value.

In current study, we optimized the minimum inhibitory concentration (MIC) of silver and sericin in prepared sericin-Ag nanoparticles effective enough to show antibacterial activity against the textile degrading microbes. In first experiment we prepared five different sericin-AgNPs samples and in each sample there was fixed amount of Ag 0.5% and variable amount of sericin (1.5% Sericin, 1% Sericin, 0.5% Sericin, 0.375% Sericin, 0.1% Sericin) and took control Ag 0.5%. Optimized quantity of sericin was 0.1%. In second experiment we prepared four different samples of sericin-AgNPs to optimize Ag in which sericin was fixed 0.5% and Ag was different 0.3%, 0.2%, 0.1% and 0.05%. the optimized quantity of Ag was 0.05%. Moreover, sericin-AgNPs were stable at acidic, basic and neutral pH (11, 7, 4) and they were also stable at very high and even very low temperature. Our prepared product showed good stability at any pH (4, 7, 11) and temperature (70°C, 37°C, 4°C). On fabric trials, prepared sericin-AgNP samples showed excellent antibacterial activity against different bacterial strains at different concentrations of Ag (0.5%, 0.3%, 0.1%, 0.05%, 0.025%, 0.01%) and fixed silver concentration (0.5%) to optimize Ag concentration. Optimized quantity of silver is 0.01%. Moreover, fabric treated with prepared sericin-Ag solution is very stable at different temperatures (70°C, 37°C, 4°C) and at different pH (11, 7, 4) also.