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Preparation of antimicrobial active silk fiber

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Silk fibers were modified by treatment with ethylenediaminetetraacetic (EDTA) dianhydride. Kinetics of modification with EDTA-dianhydride was investigated. The physical mechanical properties of silk fiber acylated with EDTA-dianhydride remained unchanged regardless of chemical modification. The absorption of metal cations (Ag^+ , Cu^{2+}) by untreated and modified silk fibers were studied as a function of the kind of modifying agent, weight gain, and H of the metal solution. The absorption of Cu^{2+} at alkaline pH was not significantly influenced by chemical modification of the silk substrate. The absorption of Ag^+ by acylated silk remained at a level as low as untreated silk. With respect to the pH of the metal solution, the acylation with EDTA dianhydride enabled silk to absorb and bind metal cations even in the acidic and neutral pH range. Medium to high levels of metal desorption were exhibited by untreated and modified silk fibers towards the metal cations. All metal containing silks exhibited significant antibacterial activity.