

Natural and polypyrrole-based antibacterial finishing of textiles

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Antibacterial textiles have obtained increasing interest from both academic research and industry because of their potential to provide better quality life and safety benefits to people [1]. Textile products are prone to host micro-organisms whose proliferation is responsible for diseases, unpleasant odors, color degradation and deterioration of fabrics [2]. Antimicrobial finishes are used in many textile products, such as sportswear, outdoor apparels, undergarments, shoes, furnishings, upholstery, hospital linens, wound care wraps, towels and wipes. Other applications are envisaged for antibacterial filter applications (biotechnology processes, water purification, clean rooms, operating theatres, domestic appliances).

Different approaches for the production of antibacterial fabrics have been developed using natural biocides and polymer biocides with the aim of reducing the leaching of biocidal agents to the environment.

The first consists in the modification of cotton fabrics with natural small molecule biocides (e.g., citric acid) bind to fiber surface. The second approach involves the deposition of chitosan followed by UV-curing on fabrics. The last method deals with *in-situ* polymerization on fibers and fabrics of a positively charged conjugated polymer (i.e., polypyrrole). The treated fabrics showed excellent (>97%) antibacterial properties against both Gram-negative and Gram-positive bacteria following standard test methods (AATCC 100, ASTM E 2149-01).