

## Green preparation of antimicrobial cotton fabrics by using bioactive agents from cupressaceae pods

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### ABSTRACT

Antimicrobial fabrics have become essential in organizing and managing infestation and reducing odor formation by microbes. Various green sources add antimicrobial properties to fabrics, especially cotton. However, the major problem with microbial fabrics is the reduction of antimicrobial activity after each wash. Cupressaceae pods have shown natural potential as an antimicrobial agent in herbal medicine. This study utilizes cupressaceae for incorporating antimicrobial properties in cotton fabric. After the methanolic extraction of the cupressaceae extract, it was applied to the cotton fabric. The application of the extract to cotton fabric was made by optimizing concentration, temperature, and pH parameters. The extract modified cotton showed the best performance at 15 wt.% of concentration, 140°C and pH 7.5. The treated fabrics were tested in the presence and absence of the binder using the standard washing method ISO 105-C10:2006. Mordant-treated fabric retained 16.4% more activity after 20 washes. Finally, the antimicrobial activity of the greenly developed antimicrobial cotton fabrics was checked against *Staphylococcus*, *E. coli*, *Bacillus*, and *C. albicans* by using AATCC 100-2004 test method. The study indicated that the prepared cotton fabric showed better antimicrobial activity against the earlier mentioned strains, except for *C. albicans*. The prepared antimicrobial fabric showed a wide range of antimicrobial activity and less fungal activity. Thus, the prepared fabric can be used for wound dressings, hospital staff gown material, and athlete's sportswear to prevent microbial infection.

### KEYWORDS

Green chemistry; Antimicrobial finishing; Cotton fabrics; Bioactive agents; Cupressaceae pods

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