



Antibacterial Finishing of 100% Cotton Fabric with β -Cyclodextrin-Ozonated Olive Oil Inclusion Complex

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Abstract

Ozone (O₃) was reacted with unsaturated fatty acids in vegetable oils to yield products with antibacterial activity. In this paper, olive oil, containing large amounts of unsaturated fatty acids, was ozonated and characterized with gas chromatography (GC), Fourier transform infrared (FTIR), and thermogravimetric (TGA) analyses. The ozonated oils were sequestered in β -cyclodextrin (β -CD) inclusion complexes and applied onto 100% cotton fabric. The inclusion complex was analyzed with scanning electron microscopy (SEM), FTIR, and TGA, and treated fabric with FTIR and SEM. The antibacterial activity of the ozonated oil and treated fabric was assessed using ASTM E2149-01. The results showed that the ozonated oil had high antibacterial activity and the resulting β -CD/ozonated olive oil inclusion complex also had antibacterial activity when applied to cotton fabric.

Key Terms

β -Cyclodextrin, Inclusion Complex, Olive Oil, Ozonated Oil, Ozone

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Hydrogen Peroxide/UV Irradiation as a Bleaching Process for Soybean Fabric

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Abstract

The bleaching of greige soybean knitted fabric using UV irradiation on hydrogen peroxide impregnated samples was studied. The effect of many variables on the samples' whiteness, lightness, wettability, hydrophilic properties, cystine content, surface examination, and Fourier transform infrared (FTIR) properties was investigated. The UV/H₂O₂ bleaching process was optimized using a Box-Behnken experimental design and three optimal recipes were achieved. A novel bleaching process for greige soybean knitted fabric, which consists of sample impregnation in various peroxide baths, followed by UV irradiation, was developed. The improvement in whiteness of greige soybean samples, not easily bleached by conventional bleaching processes, was obtained within minutes, improving processing time and providing energy savings.

Key Terms

Advanced Oxidation Process, AOP, Bleaching, Peroxide, Soybean, UV Irradiation

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Improvement of Ecofriendly and Antibacterial Behaviors on Blended Knit Fabrics

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Abstract

Yarns (30/1 Ne) consisting of four different fibers were produced in different blends and knitted into single jersey fabrics. Antibacterial properties, water retention capacity, hydrophilicity, whiteness, and yellowness values of these fabrics were tested. Chitosan or lyocell fibers were added in mixtures, increasing the antibacterial activity, hydrophilicity, and water retention capacity of the resulting fabrics. Whiteness values of knitted fabrics produced from poly(lactic acid) (PLA) and lyocell fibers were quite high. Water retention capacity and hydrophilicity of these fabrics were better when compared to fabrics that included greige cotton fibers.

Key Terms

Antibacterial Activity, Chitosan, Cotton, Hydrophilicity, Lyocell, PLA, Poly(lactic acid), Water Retention, Whiteness Value

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