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A Comparative Study on The Effects of Different Timing Clorox Bleaching at Different Concentration on Cotton and Polyester Fabric – Tensile Strength

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Structured Abstract

Background: Textile fabrics used in industrial applications, workwear and clothing often undergo chemical treatments during the processing and finishing stages. One chemical commonly used in laundry is Clorox bleach (sodium hypochlorite), which is used for bleaching and disinfection. However, such treatments can alter the mechanical properties of fabrics, particularly tensile strength, which is important for durability and performance. The effects of chemical exposure vary depending on the fiber type, concentration, and duration of treatment. Therefore, systematic evaluation of cotton and polyester under different bleaching conditions is necessary to support informed material and fabric selection.

Methods: Cotton and polyester fabric samples were treated with Clorox bleach at two different concentrations, which is 5% and 10%, using a fixed liquor ratio of 1:20. The treatments were carried out over three exposure durations (30, 60, and 120 minutes) to simulate varying levels of bleach exposure to cotton and polyester fabrics. Following the treatment, tensile strength tests were conducted using standard testing methods to determine the mechanical performance of the fabrics. The results were analysed comparatively to assess the influence of fibre type, bleach concentration, elongation and exposure duration.

Results: The results shows that an increase in treatment concentration from 5% to 10% generally resulted in higher tensile strength values for both cotton and polyester fabrics. Polyester consistently exhibited significantly higher tensile strength as compared to cotton at all treatment times and concentrations. The highest tensile strength was observed in polyester fabric treated with a 10% concentration, particularly at longer treatment durations. In contrast, cotton showed a more moderate increase in tensile strength, indicating greater sensitivity to chemical treatment conditions.

Conclusion: In conclusion, fibre type and treatment concentration have a significant impact on the tensile strength of textile fabrics. Polyester shows superior mechanical stability and resistance to chemical treatment compared to cotton. These findings suggest that polyester is more suitable for applications requiring high mechanical strength, while careful control of treatment parameters is essential when processing cotton fabrics.

Keywords: Clorox bleach, cotton, polyester, tensile strength, bleach exposure

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