Determining the Best Softener for Different Types of Fabrics: An Investigative Study for Optimal Laundering Techniques and Care Labels

Foram Patel and Naomi Sing-Benco
Faculty Advisors: Sean Cormier and Md Imranul Islam
Textile Development and Marketing Department, Fashion Institute of Technology

Abstract

Fabric softeners contain lubricating ingredients that coat and soften the fibers in clothing items and come in the forms of liquid, powder, and dryer balls/sheets. Softeners are commonly used to help fight wrinkles, reduce static, and add a soft touch and scent to the fabric. With the many types of fabrics in the market, it is essential to have proper care labels that clearly outline the correct softener techniques that work best for that specific type of fabric. The quantitative method was used for this study - assessing the best levels of softness/hand the softeners have on the cotton, polyester, and wool knit fabrics. Testing for fabric hand value using AATCC EP5, testing for absorbance using AATCC 79-1992. The samples were tested after 3 washes using a top load laundry machine.

Introduction

- Softener products in today’s market are diverse and able to work with a wide range of fibers. They are textile modifiers and protectors.

Objectives

- (1) Identifying the optimal amount of different types of softeners required to wash cotton, polyester, and wool knit fabrics.
- (2) Determining if liquid softener, dryer sheets, or dryer balls works best with each selected fabric based on softness and absorbency.
- (3) Assessing the softness level by using the AATCC hand feel test.
- (4) Testing for absorbance using the AATCC TM61-2013a2.

Hypothesis

The Liquid Softener is expected to work the best for the cotton fabric due to the high absorbency nature of cotton. Liquid softener also helps reduce the great mechanical stress.

Dryer sheets are expected to work best for polyester due to the tendency for this fabric to have a build-up of static electricity.

Dryer balls are expected to work the best for the wool sample because it will not coat the fibers as much as liquid softener and reduce their natural abilities to manage moisture and regulate temperature. Dryer balls reduce drying time.

Method

<table>
<thead>
<tr>
<th>Wool (Woven)</th>
<th>Polyester (Woven)</th>
<th>Cotton (Woven)</th>
</tr>
</thead>
</table>

- Cut out 4x8 samples of each fiber (cotton, wool, polyester).
- Each washed with 1.0 fl. Oz. of Liquid Detergent.
- Softener Specifications: 1 Bounce Dye sheet, 1 Wool Ball, 0.48 fl. Oz. Downy Liquid Softener.
- Each set washed 3x, 30-minute washing cycle, 25-minute drying cycle.

Absorbency

- Sample was mounted in an embroidery hoop, free of wrinkles.
- Hoop was placed about 1.0 cm below the tip of the burette.
- After a droplet was formed on the sample, we measured the time required for the surface of the liquid to lose its spectacular reflectance with a stopwatch.

Hand-Feel Test

- Judged results based on crispness, smoothness, scratchiness, softness, and firmness.
- Scale: 0=None, 1=Less, 2=More.
- Comparisons were made with the standard (no softener).

Results

<table>
<thead>
<tr>
<th>Fabrics</th>
<th>Liquid</th>
<th>Smooth</th>
<th>Scratchy</th>
<th>Soft</th>
<th>Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Polyester</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dryer Sheets</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fabrics</th>
<th>Liquid</th>
<th>Smooth</th>
<th>Scratchy</th>
<th>Soft</th>
<th>Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Polyester</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dryer Sheets</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fabrics</th>
<th>Liquid</th>
<th>Smooth</th>
<th>Scratchy</th>
<th>Soft</th>
<th>Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Wool</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dryer Sheets</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend

- Wool Ball
- Dryer Sheet
- Liquid Softener
- No Softener

Findings

- Softeners are types of lubricants that may block pores when applied to the fabric surface. That is why optimum concentration is necessary for softeners; otherwise, they reduce the absorbency of fabrics.
- According to the absorbency test, it was found that the absorbency for wool, cotton, and polyester considerably decreased with the use of different types of softeners.
- Dryer sheet fabric softeners are less effective in softening fabrics than liquid softeners because of erratic deposition of softener and less lubrication on the fabric. Wool balls showed negligible to no difference when it comes to softening the fabric.

Conclusion/Future Application

The purpose of this study was to examine the effects of household fabric softeners on the absorbency and hand feel of cotton, wool, and polyester. Based on our experiment and the analyzed data, the results showed that all, the liquid softener, the dryer sheet and the dryer balls significantly decreased the absorbency of the tested fabrics. These results are beneficial to consumers who are concerned about the absorbency of their clothes, such as T-shirts and underwear especially in hot weather. According to the results, liquid softener works best with cotton fabric in improving the smoothness and hand of the fabric. Dryer sheets worked best with polyester in reducing the static cling, however, the dryer balls showed reverse effect on wool, reducing its moisture management. From the data, no one type of softener evaluated could be labeled as best or worst in terms of overall performance; however, the dryer balls appeared least effective in most tests.