

SOFTENED FABRICS COMPLEMENT THE MANAGEMENT OF SENSITIVE SKIN



ABSTRACT

Clothing is in constant direct contact with the skin. Therefore, it plays an important role in the management of sensitive skin. Fabrics with rough or scratchy surfaces, such as wool and linen, have the potential to cause, or exacerbate, skin irritation in individuals with sensitive skin, because of increased friction between the fabric and the skin. Damaged fibers resulting from repeated washing of everyday clothing can alter the fabric's feel and exert a similar effect on the skin.

The use of fabric softeners in the laundry process helps to mitigate the fabric abrasion and breakage that happen during washing by lubricating and aligning broken fibers to improve the feel of the fabric. Clinical studies evaluating the

effect of softener-treated fabrics on the skin have revealed potential benefits for individuals with sensitive skin. In line with these findings, all® free clear fabric softener is designed to complement the management of sensitive skin by improving the feel of fabrics while being mild on skin. Formulated without dyes and perfumes to limit skin sensitization, all® free clear fabric softener is a valuable addition to the line of all® free clear laundry products.

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INTRODUCTION

Millions of people are affected by sensitive skin, a condition that generally refers to skin that elicits an inflammatory response to specific stimuli. The American Academy of Dermatology lists 4 distinct types of sensitive skin reactions: acne, rosacea, burning and stinging, and allergic or irritant contact dermatitis.¹ Clothing, being

in direct contact with the skin, can be a source of physical, chemical, and immunologic stress (Figure 1, right). Airborne allergens, such as dust mite matter, animal dander, and pollen, can become trapped in fabric fibers and may increase skin sensitization in susceptible individuals,^{2,3} while residual laundry detergent in clothing after washing may prompt



all® free clear fabric softener

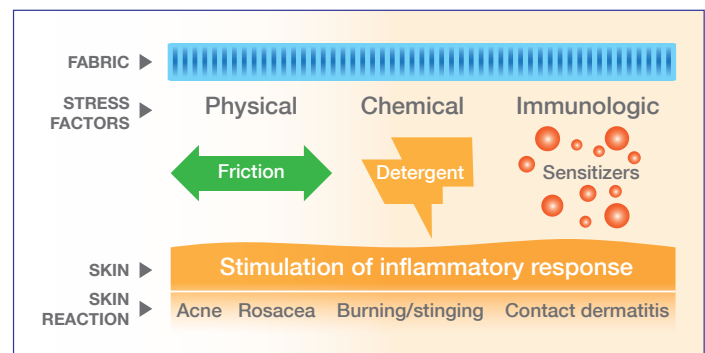


Figure 1: Clothing can be a source of physical, chemical, and immunologic stress on the skin.¹⁻⁵

skin irritancy in individuals with sensitive skin.⁴ In addition, the friction between certain fabrics and the skin can trigger or exacerbate skin irritation and further compromise skin barrier integrity.⁵

A variety of laundry products designed to alleviate these stressors are available to the consumer. Yet, scientific

literature evaluating the clinical effects of laundry products on the skin is limited, particularly with respect to fabric softeners.

The purpose of this paper is to assess the potential benefits of softener-treated fabrics for the management of sensitive skin by evaluating the existing scientific literature pertaining to fabric softeners. In this context, the role of fabric softener in the laundry process is discussed.

FABRIC SOFTENERS COMPLETE THE LAUNDRY PROCESS

Fabric feel is altered by repeated washing

Laundry detergents are formulated to efficiently remove different stains and soils from fabrics during the washing process. In addition, laundry detergents can significantly reduce the levels of airborne allergens trapped in fabrics. all® free clear laundry detergent has been proven, even in cold water, to remove 99% of top household and seasonal allergens,⁶ thereby limiting exposure to potentially sensitizing factors, a beneficial effect of the laundry process. However, repeated washing can alter the microstructure and feel of the fabric. These changes are the result of fiber shrinkage, fiber damage from mechanical friction, and the chemical action of detergents, as well as from the deposition of inorganic salts and insoluble calcium salts present in detergents and hard water, respectively. The use of fabric softener helps to reduce shrinkage, protects fabrics from damage, and improves fabric feel and handling.⁷

THE MECHANISM OF FABRIC SOFTENING

Similar to laundry detergents, fabric softener formulations depend on surfactants, chemical compounds that possess both hydrophilic and hydrophobic properties. Surfactants form the foundation of effective detergency and are largely classified based on their physicochemical properties with respect to the ionic charge present at the hydrophilic head group of the molecule upon dissociation in water (*Figure 2*).^{8,9}

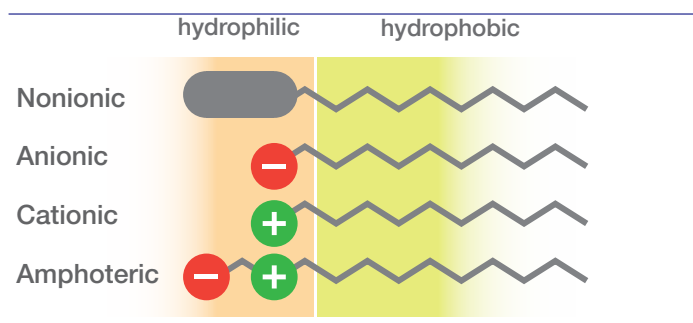


Figure 2: Classification of surfactants.⁹

- Nonionic surfactants (no electric charge in head group)
- Anionic surfactants (negatively charged head group)
- Cationic surfactants (positively charged head group)
- Amphoteric surfactants have hydrophilic portions that contain both a positively and negatively charged head group

Laundry detergent formulations often contain a blend of nonionic and anionic surfactants, whereas fabric softeners contain cationic surfactants.⁸ The positively charged head groups of cationic surfactants interact with negatively charged sites common to most fabrics. As such, cationic surfactants play a critical role in the effective deposition of the softener on textile fabrics, a prerequisite for the function of fabric softeners.⁷

Adsorption of fabric softener to the fabric surface prevents direct contact between fibers and lubricates fabrics, which improves the feel of the fabric on the skin.⁷ However, this also raises the question of whether the benefits of softened fabrics outweigh the skin irritation potential of the fabric softener itself.

CLINICAL EVALUATION OF SOFTENER-TREATED FABRICS IN INDIVIDUALS WITH SENSITIVE OR DRY SKIN

Piérard et al^{10,11} studied the effects of softened and unsoftened fabric on infant skin and in adults with sensitive skin. Effects on skin were assessed as described in Crawford and Zirwas¹² and included visual grading for redness, smoothness, and dryness, as well as squamometry and transepidermal water loss (TEWL) measurement. The study results showed that softened fabric may have a beneficial effect in infants and adults with sensitive skin, particularly on previously irritated skin.^{10,11}

Fujimura et al⁵ hypothesized that treating fabrics with fabric softener reduces the coefficient of friction of the fabric on the skin and, thereby, may be beneficial for individuals with dry skin. To test this hypothesis, they assessed the skin of 20 male volunteers with dry skin after wearing softener-treated T-shirts for 2 weeks. The effects were evaluated by clinical grading, subjective symptoms, stratum corneum water content (SCWC), and TEWL. The evaluation revealed significant improvement in SCWC in T-shirt-covered areas, such as the torso, waist, and shoulders. In contrast, the inner forearms, areas not covered by the softened fabric, did not show any improvement. In addition, the study assessed the friction coefficient of softener-treated fabrics on the skin compared with that of unsoftened fabric with a surface tester, using model skin and softened or unsoftened cotton fabric (*Figure 3*).⁵

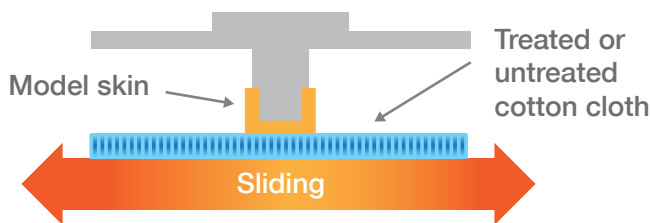


Figure 3: Experimental setup to measure the coefficient of friction.⁵

The results demonstrated a significant reduction in the coefficient of friction for softener-treated fabric. The investigators concluded that softener-treated fabric may provide benefits to individuals with dry skin by decreasing the coefficient of friction.⁵

These results are in line with those of a study by Isoda et al,¹³ a randomized, parallel comparative study that assessed the effect of softener-treated fabrics on the skin of 40 male volunteers with nonatopic, modestly to moderately dry skin over a 4-week period. Significant improvement in SCWC was observed in the skin of the shoulders (days 7, 14, and 28) and the lateral abdomen (day 14) in the group wearing softener-treated fabrics.¹³

Softened fabrics did not demonstrate adverse effects on the skin in any of these 4 studies.^{5,10,11,13} Taken together, the results suggest benefits of wearing softener-treated fabrics for individuals with sensitive or dry skin.

ALL® FREE CLEAR FABRIC SOFTENER COMPLEMENTS THE BENEFITS OF ALL® FREE CLEAR LAUNDRY DETERGENT

Similar to all® free clear laundry detergent, all® free clear fabric softener does not contain formaldehyde, dyes, or perfumes, eliminating common sources of skin sensitization and irritation. The formulation of all® free clear fabric softener is based on alkyl ester quaternary ammonium compounds (ester quats), a group of cationic surfactants. Ester quats provide the foundation for effective fabric softening, as well as have a good environmental profile.¹⁴

Jowsey et al¹⁵ assessed 2 ester quats—the dialkyl ester of triethanol ammonium methyl sulfate (TEA-Quat) and the di-(hardened tallow fatty acid) ester of 2,3-dihydroxypropyl-trimethyl ammonium chloride (HEQ)—for their ability to prompt contact allergy in humans. The results showed that TEA-Quat and HEQ lack substantial skin-sensitizing potential as demonstrated by human maximization testing and diagnostic patch testing.¹⁵

The skin-irritation potential of all® free clear fabric softener was clinically tested in a 14-day cumulative irritation study.⁶ Fabric swatches washed with all® free clear laundry detergent, with or without softening with all® free clear fabric softener, were wetted with distilled water and applied in patches on the backs of healthy volunteers for 23 (±2) hours for 14 consecutive days. They were compared with swatches treated with other available laundry products, as well as with a high-irritancy control (0.1% aqueous sodium dodecyl sulfate) and a low-irritancy control (physiologic saline solution). The skin was evaluated visually once daily and graded for signs of irritation or edema. The study results ranked the samples treated with all® free clear fabric softener as a mild article, eliciting no experimental irritation, comparable to the low-irritancy control.⁶

all® free clear fabric softener is clinically proven to be mild on skin. It is designed with a unique formula, free of dyes and perfumes, to limit its skin-sensitizing potential while effectively softening fabrics to reduce the friction of fabrics on sensitive skin.



CONCLUSION

all® free clear is dedicated to working with physicians to support the evidence-based use of its products.

all® free clear fabric softener has been shown to improve the feel of fabrics, a potential benefit for individuals with sensitive or dry skin. all® free clear fabric softener has been shown to improve the feel of fabrics, a potential benefit for individuals with sensitive or dry skin. Moreover, it is clinically proven to be mild on skin, and the absence

of dyes and perfumes limits its skin-sensitizing potential. These features make all® free clear fabric softener a valuable addition to the line of all® free clear laundry products. In combination with all® free clear laundry detergent, the #1-recommended detergent by dermatologists, pediatricians, and allergists for patients with sensitive skin, it can complement the management of sensitive skin.



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