

Softening Agent Improves Washable Leather and Shearlings

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Work in this laboratory has shown that glutaraldehyde-chrome combination tannages impart to leather and shearlings very good resistance to the effects of washing in warm to moderately hot soapy water. Furthermore, this resistance lasts through many wash-dry cycles (1,2,3,4,5,6,7). For example, golf gloves made of such leather were used by a group of golfers for an entire season or longer. The gloves were quite satisfactory, exhibiting outstanding washability and perspiration resistance (4). Shearling bed pads tanned with chrome-glutaraldehyde combination tannages were tested extensively in hospitals, nursing homes, and with out-patients over a three-year period. The washable pads were found to be serviceable for as long as 28 months with as many as 54 launderings. This compares very favorably with commercial pads produced formerly that lasted only about 6 months or 10 launderings (6). The improved bed pads are now on the market.

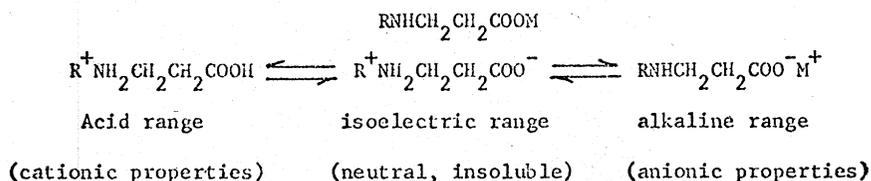
Some of the published data indicated that losses of lubricating agent, during the washing with soap and water, were more than replaced (on a percent chloroform-extractable basis), probably with the calcium salt of the fatty acids from the soap (8). Although most of these washable leathers remain reasonably soft and flexible after numerous washings, many are likely to develop a "dry-surface-feel," and the wool facing of shear-

lings soon develop small bundles of wool fibers that can form harsh, dry, tight clumps.

This report describes the use of a softening agent, used in the final rinse water of the laundering process, that will overcome the undesirable effects on leather and shearlings mentioned above.

The usual cationic softening agents, available from the laundry product shelf of the local food market, are not as effective as the amphoteric surfactant discussed below.

The materials that seem to be quite effective as softening agents are members of a group of long chain amino acid derivatives commercially available from General Mills² under the trade-name "Deriphats".³ The amino acid structure of these surfactants make them amphoteric in nature:



where R is a long chain hydrocarbon radical and M is hydrogen or a salt-forming cation. These fatty amino acid derivatives are obtained by the interaction of a fatty, primary amine and methyl acrylate. The amino propionic ester thus formed is then hydrolyzed to the carboxylic salt or acid (9). The supplier's descriptive formula for Deriphath 151C is N-"coco"-B-amino propionic acid, indicating that the long chain hydrocarbon radical in the formula shown above

was derived from coconut oil and is a mixture of compounds. A more refined product is listed as Deriphath 170 C with a somewhat more definite chemical description indicating this material to be a mixture of N-lauryl and N-myristyl B-amino propionic acids. Both were found to be effective softening agents, but most work was done at this laboratory with Deriphath 151C because it is listed at a lower price.

The chemistry and physical properties of these compounds are discussed in detail in references 9,10,11,12 and 13. The versatility of these compounds is derived from their amphoteric properties, their surfactant-detergent capabilities and their substantivity. Substantivity is the adsorption of a surfactant at a solid surface from a liquid. The Deriphats have de-

monstrated this property by the affinity of the fatty amino acid molecule for skin, hair, etc. It has been proposed that this affinity is due to the similarity in amphoteric properties of the substrate and the fatty amino acid (9,12,13). The substantivity of Deriphats appears to play an important role in imparting desirable properties to the leather and wool fibers.

The softening agent was applied rather simply by adding it to the

final rinse water in a washing machine. For shearlings (three 8 x 12 inch pieces), the experimental rinse solution was 25 g Deriphath 151C (45% active) in 13 gallons of water at about 47° C (approx. 117° F). The rinse mixture for a full shearling was 50 g dissolved in 16 gallons of water. The contact time with softening agent was about 4 min. in the final rinse sequence of an automatic washing machine. The better texture of the treated wool is obvious in the photograph, but the difference in actual feel of the wool is even more convincing. In spite of what may be said for "fluff-drying" in automatic dryers, the wool face of shearlings is best when air-dried on a line after the spin cycle of the washer. Tumbling in a dryer helps create tight fiber clumps. If shearlings must be machine-dried, the Deriphath treatment reduces the clump-formation notice-

ably and those formed are not as harsh.

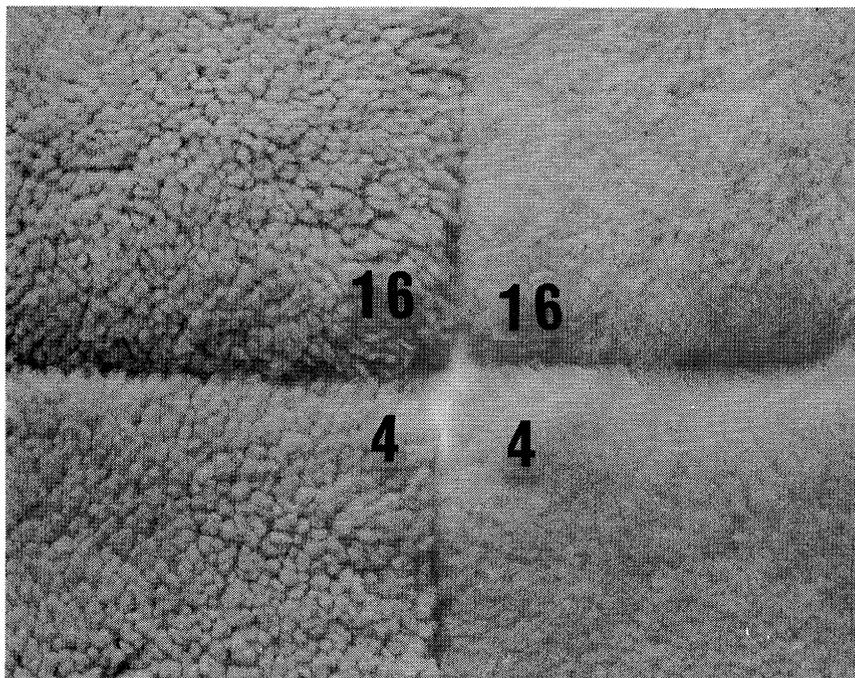
Suede and grain garment and glove leathers were treated experimentally with Deriphath 151C in an after-rinse to determine the effect of Deriphath on the shrink-temperature of the leather. A high concentration (10 g/liter of water) of softening agent was used on a group of leather pieces (12 inches square) that had been washed with soap and water. The wash and rinse cycles were repeated on some pieces up to eight times. The shrink temperature of leather treated as described was essentially the same as that for similar leather not given an after-rinse with Deriphath. The treated pieces in this experiment were softer than the controls. The amount of Deriphath used in these experiments was much more than needed to act merely as a softening agent.

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²Mention of brand or firm names does not constitute an endorsement by the Department of Agriculture over others of a similar nature not mentioned

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Shearling pieces washed 4 and 16 times in soap and water. Pieces on right treated with Deriphath after-rinse.