Academic Research in Educational Sciences
ISSN: 2181-1385
DOI: 10.24412/2181-1385-2022-3-1037-1041

Volume 3 | Issue 3 | 2022
Cite-Factor: 0,89 | SIS: 1,12
SJIF: 5,7 | UIF: 6,1

EFFICIENT WASHING WOOL FIBRES

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ABSTRACT

The influence of the nature of the surfactant on the quality of the local wool fiber washing process was studied. Based on the results of the experiments, it was recommended to use Sulfanol NP-1 as a surfactant in terms of increasing the wettability of the fiber, maintaining its length and the efficiency of removing non-protein impurities from wool.

Keywords: wool, protein, fiber, wettability, degree of whiteness, color intensity.

INTRODUCTION

At present, the necessary legal framework and a favorable environment for the development of the textile and sewing and knitwear industry have been formed in the Republic of Uzbekistan. This presents great opportunities for the development of all textiles in general, in particular for expanding the range of textile products from natural protein fibers of local origin [1]. In light industry, sheep, camel and goat wool are used as wool raw materials. For the textile industry, sheep wool is of the greatest importance [2]. The texture of wool fiber has significant features in contrast to other natural and chemical fibers. Wool fiber is a horn formation of epidermal origin, consisting of keratin protein.

MATERIALS AND METHODS

Wool fiber has positive properties such as its thickness, length, tensile strength, tensile strength, elasticity, smooth color formation, thickening, adhesion ability. High-quality woolen fabrics are made from fine fibers, suit and coat fabrics from semi-fine fibers, coarse-thick suit and coat fabrics from semi-coarse fibers, and movut fabrics and felt from coarse fibers.

In this paper, black and dark brown local wool fibers and white goat hair were taken as the object for research. The washing

process of local coarse wool fiber was carried out for 30-150 minutes at a temperature of 45-500C in a 1:50 modular solution containing sodium carbonate and surfactant (SFM).

It was then washed in warm and cold water for 5 minutes in a 1: 100 module, then dried. To carry out the bleaching-discoloration process, the samples were sampled for 45-60 minutes at a temperature of 45-50^{0}C in a solution containing 2% hydrogen peroxide (30%) relative to the mass of wool fiber, the same amount of sodium silicate and 1% SFM of different activity. processed in the module. The bleached sample was washed, dried and the whiteness of the sample was determined before and after bleaching.

The length of the washed samples was determined in accordance with GOST 21244-75 [3], the degree of whiteness and color intensity [4]. To determine the wettability, the washed fibers were determined according to the Dreivza sedimentation method [5], i.e., the washed wool fibers were sequentially immersed in an aqueous solution of SFM and the time of their complete immersion in the solution was determined.

The processes of washing, dripping and bleaching-bleaching are of special importance in the initial processing of wool fibers [6]. The purpose of washing is to remove various types of waste, natural oil residues, mineral waste from wool fiber materials. The complex composition of the waste, in addition to natural waste, requires the selection of special technology [7] and equipment for the preparation of starch, its hydrolysis products, PVS, PAA, mineral oil, etc., which are also used in enterprises. The composition of the washing solution consists of surfactant and soda. Under the influence of soda, the fat-wax substances in the fiber become soluble, the surfactant emulsifies the fat-wax substances in this soluble state and ensures their release from the fiber. In this study, various surfactants and soap solutions were used to wash local wool fibers.

RESULTS AND DISCUSSION

The washing quality was assessed by maintaining the fiber length and increasing the wettability. Anionactive - Sulfanol NP-1, noionogen - Prevotsel V-OF were used as surfactants in the experiments. Table 1 presents the results of a study on the effect of a surfactant type on the washing quality of wool fibers.

Table 1.

The effect of the type of surfactant on the washing quality of wool fibers

Surfactant	Decrease in wool fiber length, %	Fiber wetness, min		Wool fiber mass, g	
		first	after washing	first	after washing
Sulfanol NP-1	6	12	21 sek	2,0	1,6
Prevotsel V-OF	11	it did not sink for 15 min	5	2,0	1,3

From the results obtained, when anionic surfactant is used as a detergent, not only the nature of the surfactant but also the pH of the solution may have affected the fiber length with noionogenic SFMs. Therefore, subsequent studies have studied the dependence of the quality of wool fiber on the environment of the washing solution (Fig. 1), in which the anionic - sulfanol NP-1 was used as SFM.

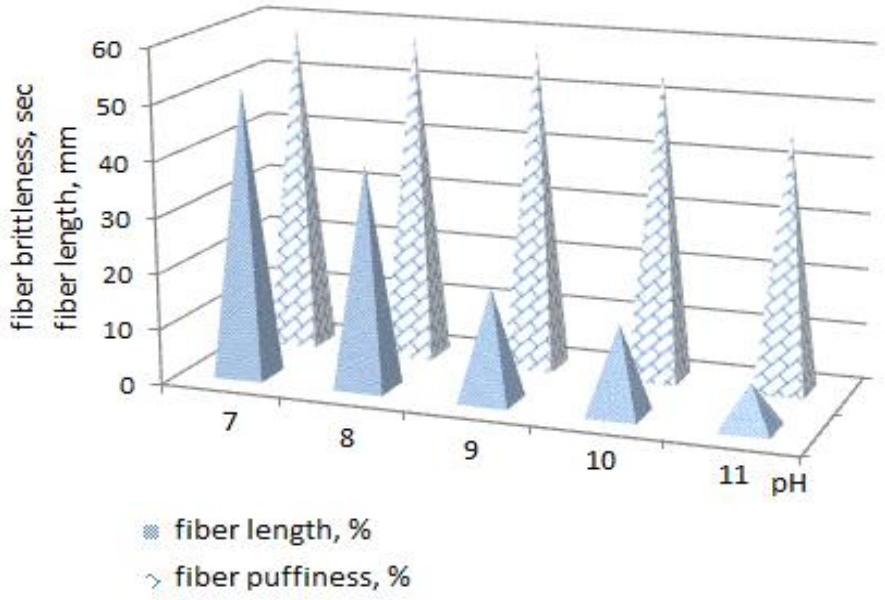

Figure 1. The dependence of the fiber length and wettability on the pH environment of the washing solution

From the given diagram we can see that the fiber length and its wettability are proportional when the washing solution medium is 9. When the pH of the solution exceeds 10, the wettability of the fiber gives a good result, but its size decreases sharply, as well as the brittleness of the fiber is felt on organoleptic analysis. In the study of the effect of washing process duration on wool fiber quality (Fig. 2), it was observed that increasing the process duration had a negative effect on fiber wetting.

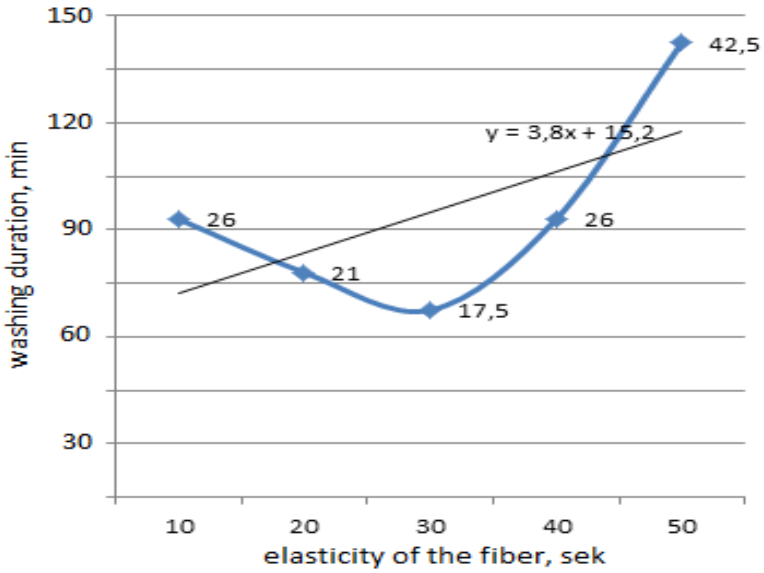

Figure 2. Dependence of fiber moisture on washing duration

This is due to the consumption of solution components during the process, i.e. most of the wax-oil substances are emulsified under the influence of SFM in the washing solution and leave the fabric in the emulsion state. The other part is hydrolyzed under the influence of soda. Under the influence of soda, the water softens, the swelling of the fiber improves, as a result it is quickly cleared of waste, neutralizes acidic fats. In summary, the effect of the type of surfactant on the washing quality of the local wool fiber, the fiber length, and the wettability of the washing solution were found to depend on the pH environment.

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