



COMPARATIVE ANALYSIS OF THE TREATMENTS ATTACHED TO THE MATERIALS IN THE COMPOSITION OF THE MATTRESS COVERS

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Abstract: *In the present paper, the materials for making three mattress covers (an antibacterial mattress cover, a mattress cover intended for hospital use and a hypoallergenic mattress cover) were treated and tested in order to obtain basic information about the chemical treatment of fibers in the new mattress covers. The constituent components of the three mattress covers were each undersampled by cutting each layer then, it was passed to the collection of samples in small, labeled bags. Each sample was sampled over its entire layer depth, with section areas of about 1-2 cm. This paper highlights the difference in finishing treatments, depending on the areas of use of knitted materials intended for mattress covers. Thus, in addition to the differences between the solutions that are applied to these materials, we can also observe that those intended for hospital use are without preservatives and are not washed, because the whole solution is eliminated from the treatment process, the ones that are contrary to the materials from which the hypoallergenic mattress covers are made, which after each wash becomes more and more beautiful and qualitative. On the machine called Squeezing Pader Machine of Tai Ping Yang, the treatment of the materials analyzed in this work was performed, both by treatments applied to the surface of the materials and by immersion, obtaining a load with 100% solution.*

Key words: *mattress cover, treatment likroll, antibacterian, hypoallergenic agent, ecoSHIELD.*

1. INTRODUCTION

If consumers are looking for a deeper understanding of their products, including how they are manufactured, what they contain and where they come from, certification labels can provide a useful shortening. Consumers may think that certiPUR-US (certifies just the foam components a company uses in mattresses) certified mattresses have undergone rigorous testing and do not contain hazardous substances. Flame retardants in the components of the mattress without foam must be labelled if they are for young children or infants [1]. In this aspect, it is not clear whether substances such as fiberglass are considered a flame-retardant chemical using current guidelines [2, 3]. However, certification and testing do not seem to include mattress covers [4].



2. GENERAL INFORMATION

In this paper, the materials for making three mattress covers (an antibacterial mattress cover, a mattress pouch intended for hospital use and a hypoallergenic mattress cover) were treated and tested in order to obtain basic information about the chemical treatment of fibers in the new mattress covers.

The constituent components of the three mattress covers were each undersampled by cutting each layer then proceeded to collect the samples in small, labeled bags. Each sample was sampled over its entire layer depth, with section areas of about 1–2 cm.

Sample preparation and analysis were carried out using an internal standard operating procedure for the analysis of the fibrous content of the materials in the three mattress covers.

All samples were made with a Motic brand light microscope with 5000 x magnification [5]. Thanks to the modular system, this stereo microscope series can be easily configured and adapted to the application needs and working environment.



Fig. 1: Equipment for the treatment of textile materials - Squeezing Pader Machine

On the Squeezing Pader Machine, the material treatment of the three mattress covers was carried out (an antibacterial mattress cover, a mattress cover intended for hospital use and a hypoallergenic mattress cover). After the knitting process, the material must be split from the tubular shape to the flat shape and after that it can be subjected to the specific treatments requested by the customer.

The main components of each mattress cover tested and their observed compositions are summarised in Table 1, Table 2 and Table 3.

Table 1: Treatment of antibacterial pouch (mattress)

Treatment	Likroll
Supplements	EcoShield 1.5% EU
Recipe	Citric Acid 0.2% Elastofin STO501 1.4% ecoShield EU 1.5%, Temp:150°C
Request width	229-231 cm
Request weight	267-278 gr/m ²
Composition	18% Viscose 82% Polyester
Color	Natural, Ciment

For the antibacterial mattress cover, the treatment was made with charging with 50% solution (LIKROLL - type of treatment on the surface of the material) Fig. 3.

Citric acid 0.2% is ph corrector, Elastofin STO501 1.4% is the balm used, ecoShield EU 1.5% -Eco antibacterial solution (action to combat bacteria). EcoShield is a recycled Polyester membrane made from 85% Polyester film waste + 15% recycled bottles Fig. 2. The treatment was

carried out at the temperature of 150°C, as evidenced by Table 1. The hypoallergenic and anti-mite treatments applied to the pouch are very important because in this way, we will protect the little ones from possible allergic reactions.

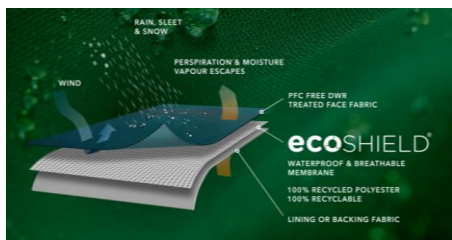


Fig. 2: ecoSHIELD is a recycled polyester membrane [6]

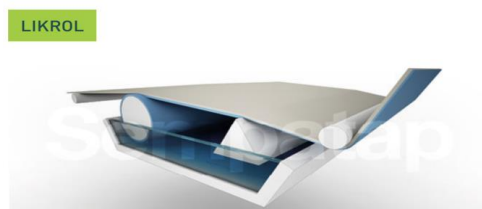


Fig. 3: LIKROL- treatment applied by rollers [7]

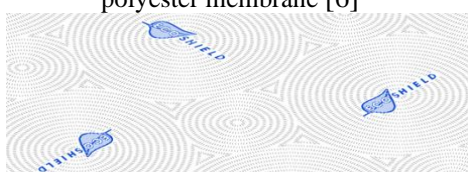


Fig. 4: Material treated for antibacterial pouch (mattress)

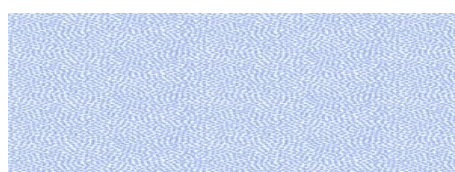


Fig. 5: Material treated for pouch (mattress) for the hospital

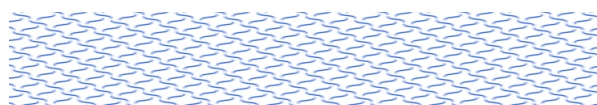


Fig. 6: Material treated for hypoallergenic pouch (mattress)

Table 2: Pouch treatment (hospital mattress)

Treatment	PADDER FR + LIKROLL – COATING FR (on back)
Supplements	Abioflame Polyester, Laminated with 20grm PP.
Recipe	AbioFlame JASMINE 14%, no softener no citric acid / pick-up 100%, Temp:130°C.
Request width	234-236 cm
Request weight	330-343 gr/m ²
Composition	100%Polyester
Color	Latte, Natural

Treatment for the mattress cover intended for hospital use, children's and/or the elderly was carried out at 130°C because at a temperature higher than 130°C the material is burned. The lamination cover is carried out on the back of the material, polyethylene substrate for waterproofing. For this mattress cover the tratamet was made by loading with solution in a proportion of 100%, by immersion (pick-up100%). Long-term sun exposure is not recommended, as it can turn green.

Table 3: Pouch treatment (hypoallergenic mattress)

Treatment	HAPPY SCOUR FR + LIKROLL – COATING FR (on the back)
Supplements	Eco Clean Permanent & Chimiical free FR.
Recipe	Happy scour 0,2% Citric Acid 0,2%, No Elastofin, Max 75°C/167 Fahrenheit/0,2% citric acid/Framing once, or twice if needed, Temp:150°C.
Request width	219-221 cm
Request weight	592-616 gr/m ²
Composition	98%Polyester 2%Elastane
Color	Natural, Metal



Hypoallergenic (means that something is less likely to trigger an allergic reaction) mattress cover, prevents the formation of bacteria, mold, mites and unpleasant odors. The treatment for the mattress cover was done at a temperature of 130°C. Special washing of this cover has the role of eliminating all volatile substances. Washing is done at a temperature of 90° in order to remove all the absorbed oil from the knitting needles and from the paraffining on the thread.

The apparent omission of mattress covers from the criteria for chemical-free mattress certifications suggests that improvements are needed in terms of mattress labelling and also correct consumer education [8].

5. CONCLUSIONS

Several scientific studies show that covering mattresses with certified anti-mite covers reduces exposure to allergens by 100 to 1000 times in a month, with objective and measurable benefits for allergy sufferers.

This paper highlights the difference in finishing treatments, depending on the areas of use of knitted materials, intended for mattress covers.

An important peculiarity of the covers for hospital use is that it is without preservatives and is not washed, since all the solution would be removed from the treatment process.

Substances that are not dangerous, can develop bacteria, too.

A great advantage of the hypoallergenic mattress cover is that after each wash it becomes more and more beautiful and qualitative.

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