

# RESEARCH ON THE INTERDEPENDENCE OF STRUCTURE AND COMFORT CHARACTERISTICS OF TEXTILES FOR TRADITIONAL SHIRTS

Jana CÎRJA, Viorica CAZAC, Elena URSU

Technical University of Moldova, Faculty of Design, Chisinau, Republic of Moldova  
jana.cirja@dtm.utm.md

**Abstract.** European cultural strategies focused on unity through diversity, valuing multiculturalism and intangible and material cultural heritage involve a greater focus on the traditional costume. The aspiration of Romania and the Republic of Moldova to include the traditional shirt with *altita* (element of the upper part of the sleeve) in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity is another argument that determined the necessity of this study. Just as the traditional costume is a subject of transnational interest, several communities have been initiated and preoccupied with the revitalization of the traditional costume both in Romania and the Republic of Moldova. The objective of revitalization and voluntary reintegration of the pieces of the traditional costume in the circuit of the current clothing products as an element of national identity entails several necessary topics to be solved. One of these is related to the identification of the textiles from which one of the important pieces of the suit-shirt is to be made. It must be as faithful as possible from the aspect of aesthetic characteristics, but also the functional, and technological ones. Because the traditional shirt presents a secular codified history with symbolic connotations of great identity importance, everything that determines it is chosen with great care. To ensure the irreproachable fidelity of the traditional shirts made today with the historical ones, the creators strive to choose for them homemade cloth obtained by hand through the same traditional technologies, aspiring to ensure the same characteristics of the products. The structural characteristics of the handmade fabrics influence the aesthetics of the integral product, especially the quality of the aesthetics of the reproduction of the symbolic ornamental elements that form the structural-compositional ensemble of the reproduced history. At the same time, they determine the comfort characteristics of textiles. The work presents the results of the study of the interdependence of the characteristics of structure and comfort as being in direct dependence. The study was done within the State Project 20.80009.0807.17. "Education for the revitalization of the national cultural heritage through traditional processing technologies used in the Republic of Moldova in the context of multiculturalism, diversity and European integration", running at the Technical University of Moldova.

**Keywords:** codes, message, traditional shirt, ornamental motifs.

## 1. INTRODUCTION

The textiles used by our predecessors in making traditional shirts were originally made up of hemp and flax fibers. Of natural vegetal origin, these resources ensured the carriers' health, and comfort, being environmentally friendly, biodegradable with great energy potential and sustainable.

The aspiration to be in balance with the environment first of all of our predecessors, determined to treat with great care and wisdom the resources in the environment in which they lived, using them through the prism of their efficiency and saving.

The multiple values attributed to the pieces of the traditional Romanian costume determined their interest for him, today being subjects of inclusion in the list of the cultural heritage of humanity UNESCO as is the case of the shirt with *altita*. Part of the values is determined by those derived from the materials from which they are made.

## 2. TRENDS OF VALORIZATION OF THE NATIONAL TEXTILE HERITAGE

Engaging in the implementation of European cultural strategies oriented towards cultural unity through diversity determines the directing of studies at the national level towards solving the following objectives focused on the dimension of valorization of traditional textile heritage [2, 3]:

- study of resources used as raw material for the realization of traditional textiles with various destination;
- analysis of raw material processing technologies;
- evaluation of technologies for obtaining traditional textiles with various destination: for traditional costume, for interior, technical products, etc.;
- research of traditional means and equipment involved in the realization of traditional textiles;
- study of traditional textile finishing technologies using organic extractions from an environmentally friendly environment;
- revitalization and obtaining of textiles with properties as faithful as possible to those of yesteryear to regenerate traditional products, including the traditional costume;
- researching the traditions related to the processes of obtaining raw materials, textiles and their products.

## 3. EXPERIMENTAL PART

### 3.1. The importance of ensuring comfort by traditional shirts

Comfort is described by the conception according to which, the human body, clothing and the environment are found in a complex and continuous interaction determined to create states of well-being for the carriers under certain conditions.

The interest in ensuring comfort, and respecting traditions and customs were preoccupations that involved generating original and sustainable identity solutions in the long term. To assess the comfort provided by the textiles used for traditional shirts, the present study focused on the analysis of their structure and comfort characteristics.

### 3.2. Materials involved in the study

Traditional shirts in the early days were made of hemp, linen, wool, silk/*borangic*, and later cotton [1, 3, 4, 6]. Nicolae Iorga [5] argued in this context the following "Cotton was introduced almost everywhere, but only from the XVIII<sup>th</sup> century or at most from the XVII<sup>th</sup> century, which, except for Bucovina and the mountainous part of Moldavia, invaded all the land. The aristocratic linen has sometimes taken refuge in certain regions." Being long until the ankle, the shirts required a large amount of material.

For this reason, the part of the shirt hidden under the skirt/*catrință* was sometimes made of hemp cloth, the visible part being made of cotton cloth. Starting from the above mentioned, it was decided to include in the study the materials presented in Table 1.

**Table 1**  
Structural characteristics of the textiles analyzed

No.	Fabric width L, m	Thickness of textiles, mm	Surface density M, g/m <sup>2</sup>	The density of the threads threads /10cm		Linear density of warp threads		Linear density of weft threads	
				<i>Warp</i>	<i>Weft</i>	<i>Ttex</i>	<i>Nm</i>	<i>Ttex</i>	<i>Nm</i>
I <sub>1</sub>	1.5	0.35	159.6	140	220	30	33	57	18
I <sub>2</sub>	1.7	0.4	160.4	190	140	48	21	50	20
B <sub>3</sub>	1.5	0.5	152.8	170	140	25x2	10/2	23	22
B <sub>4</sub>	0.72	0.5	135.6	140	160	22x2	23/1	24x2	20/1
B <sub>5</sub>	0.7	0.55	172.8	110	120	36x2	14/1	33x2	15/1
B <sub>6</sub>	2.1	0.3	140.4	190	240	32	31/1	30	32/1
B <sub>7</sub>	2.5	0.2	118.8	330	260	18	55	20	48
B <sub>8</sub>	1.5	0.3	90.4	150	220	10x2	25/2	10x2	24/2

Linen cloths, with plain weave, were coded by letter I and those made of cotton by letter B. In some textiles the threads are coupled 2 by 2 for a good ornamental decoration using needle embroidery techniques.

### 3. RESULTS AND DISCUSSION

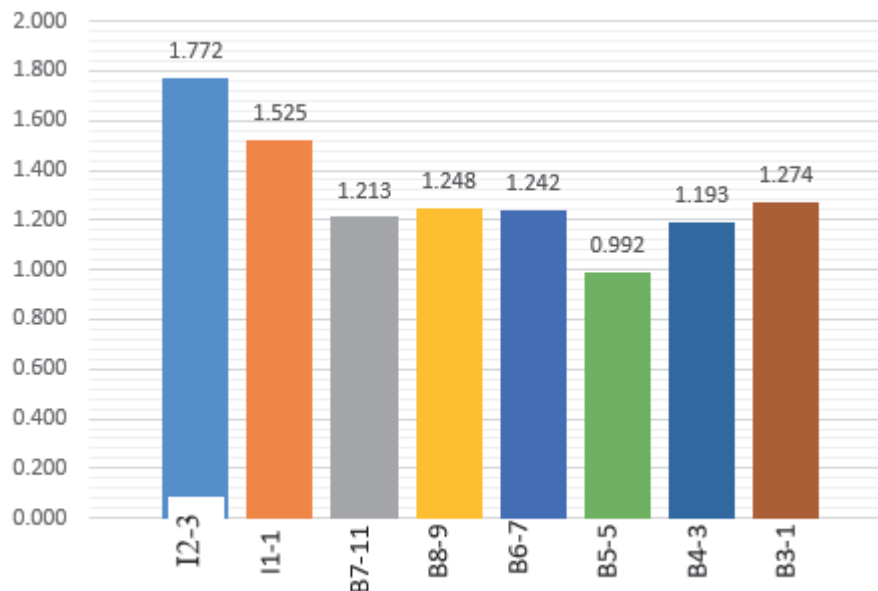
Ensuring the comfort of the wearers is a necessity determined by the conditions in which the traditional port pieces are worn, by the materials used, by their constructive and technological solution, by the type and complexity of the activities and movements.

The focus on textile materials intended for the production of traditional shirts and the interest in the analysis of the influence of structural characteristics on those of vapor permeability led to the finding of the results presented in Table 2.

**Table 2**  
Vapour permeability indices

No.	Textile code	The weight up to ex.	Variation of vapor permeability over time, g			Index of MIST $\mu$ , $g/m^2h$	Permeability to vapor, $P_v$ , mg
			24 h	48h	72h		
1	I2-3	91.695	92	91.205	88.15	15.810	1.772
2	I1-1	93.218	92.558	92	89.509	34.211	1.525
3	B7-11	43.550	43.234	42.184	40.808	21.394	1.213
4	B8-9	40.335	40.034	38.785	37.538	20.378	1.248
5	B6-7	39.639	39.352	38.288	36.869	19.431	1.242
6	B5-5	43.021	43.021	41.219	40.648	26.336	0.992
7	B4-3	40.882	40.585	39.342	38.2	20.108	1.193
8	B3-1	39.320	39.012	38.251	36.464	20.852	1.274

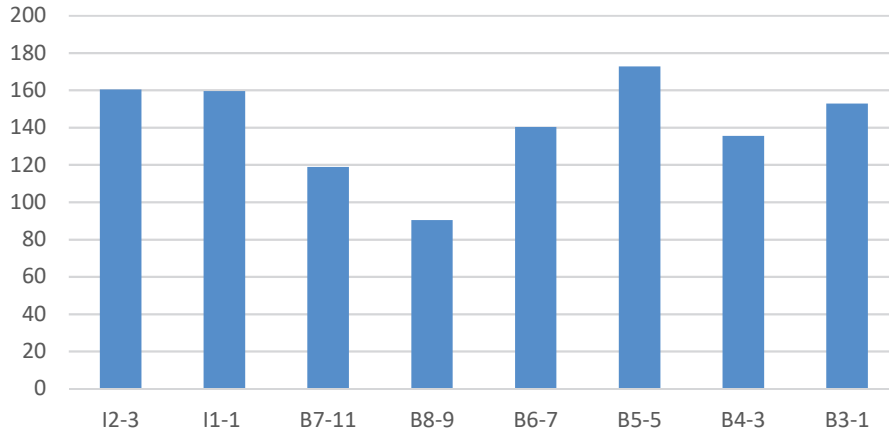
The evaluation of the vapor permeability led to the conclusion that the linen textiles used to make the traditional shirts have the best qualities in this respect concerning to the cotton cloths with the same destination.



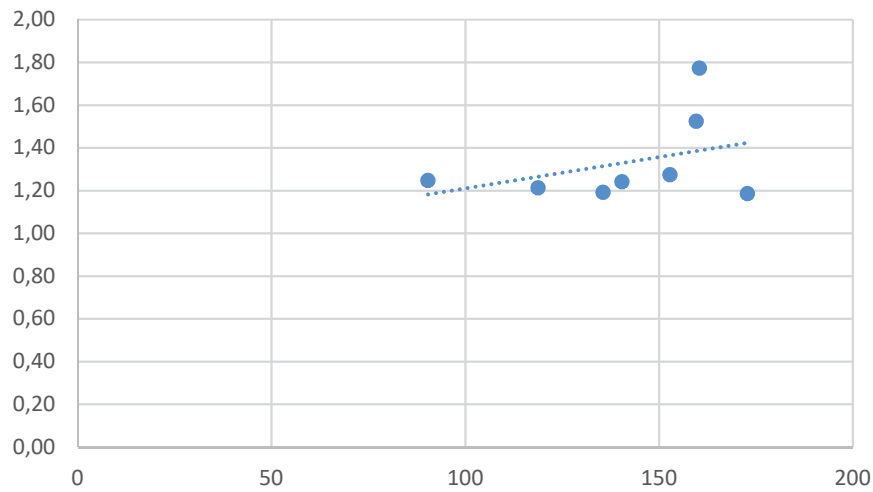
**Figure 1.** Vapor permeability of textiles included in the study

High-finesse linen textiles have the same surface density, although the thickness of the threads per 10 cm varies both on the warp and on the weft. Thus, the I2-3 linen fabric has a vapor permeability of 1.77 mg. Cotton textiles also have good vapor permeability characteristics. Of the 100% cotton

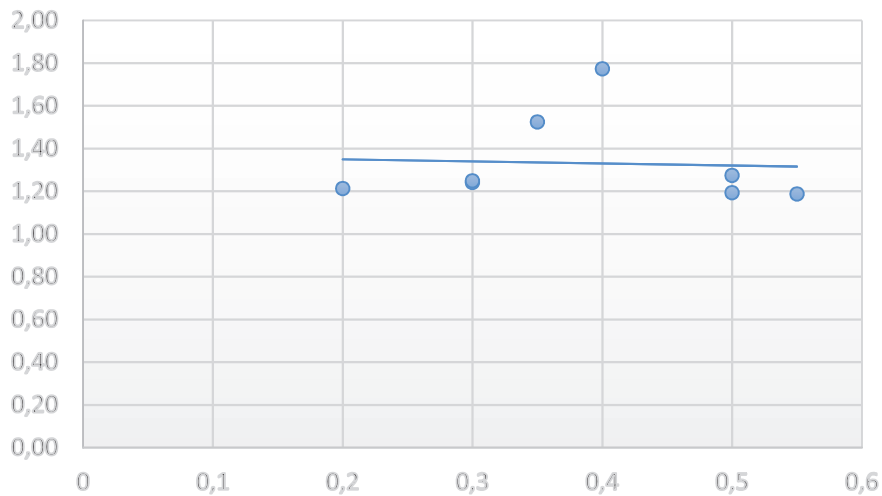
materials, the one with the best vapor permeability properties is B 8-9 with 1.248 mg showing the lowest surface density.



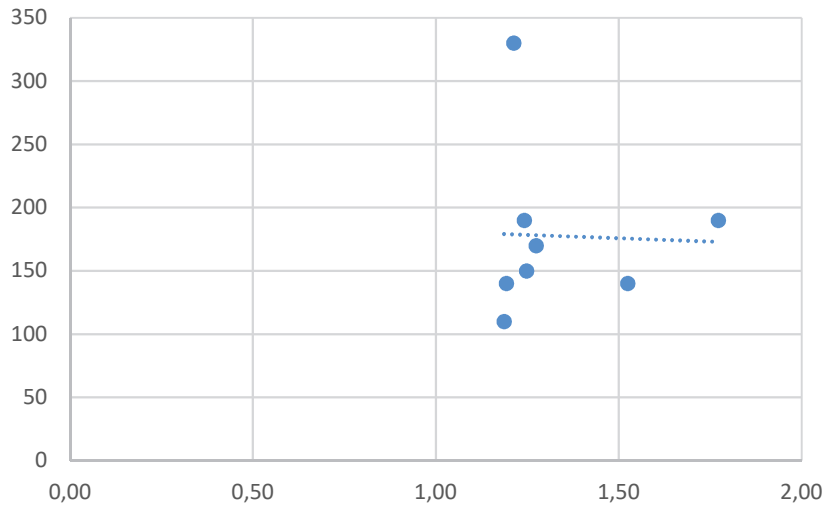
**Figure 2.** Variation in the surface density of textiles



**Figure 3.** Dependence of vapor permeability on surface density



**Figure 4.** Dependence of vapor permeability on material thickness



**Figure 5.** Dependence of vapor permeability on the desirability of the wires

The analysis of the dependence of vapor permeability on the structural properties of textile materials reveals that there is an inverse correlation between them. The higher the surface density, the lower the vapor permeability. The desirability of the wires does not reflect an addiction directly correlated with vapor permeability. The linear correlation is stronger when the variation is related to the thickness of the fabric.

#### 4. CONCLUSIONS

The study shows that:

Artisans put on the market a diverse range of textiles reproduced in artisanal conditions that bring very close to the materials obtained from the authentic ones used to make traditional shirts.

The experience of popular craftsmen in the craft of weaving makes it possible to obtain high-finesse textiles intended to be used for the creation of unique products considering the peculiarities of subsequent decoration by applying hand embroidery techniques with the needle. To facilitate the manual decoration of traditional shirts, the weavers connect the threads 2 of 2 each, this being the step one element of the seam. This helps in the proportionally correlated fine decoration of the ornamental compositional modules that determine the compositional registers.

The structural properties of textiles for traditional port pieces are very important, being attributed the necessary importance and attention. Starting from the field observations and museums in the country, the decoration of the traditional shirts was not only done by applying the sewing techniques, but also diversified to the weaving, creating complex ornamental modules integrated into the canvas with motifs perpetuated by various techniques and forming the national ornamental heritage.

Comfort was very important for users of another time. Arguments in this regard serve the aesthetic, construction and technological solutions offered by our predecessors.

The comfort characteristics provided by the textiles for the traditional shirts are in direct correlation with the structural ones. Thus, the vapor permeability is even greater as the surface density is lower, as well as the desiccation of the wires per unit area.

The best vapor permeability properties according to the experimental tests carried out are those presented by the flax textiles that explain the interest attributed to them by our predecessors. Good qualities of vapor permeability are also present in cotton textiles.

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