



ON THE PROBLEM OF INFLUENCE OF CHEMICAL TEXTILE POLLUTION ON THE HUMAN HEALTH AT DIFFERENT STAGES OF WEARING

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Abstract:

The problems of the increase in the sickness rate of workers while manufacturing garments caused by different problems have been considered. One of the main reasons of such a situation is the lowering of resistibility of the healthy organism connected with the change for the worse of the whole ecological state of environment and the usage of new textile fabrics undergone by uncertain chemical treatment at the manufacture. The main types of diseases caused by chemical pollution at different stages of garments manufacture have been analyzed.

Key words: textile pollution, garments, human health, manufacturing, eco standards

INTRODUCTION

Ensuring biological and chemical harmlessness of modern garments is one of the tasks of current importance, especially concerning children's clothes. The incompleteness of growth processes and development of child's organism, increased sensibility to the influence of external factors against the background of steady negative tendencies in the health state of our children are the factors which can't be ignored while designing the children's clothes and choosing the set of fabrics for them. According to the data of medical statistics in comparison with the sixties the sickness rate of children in Ukraine has been increased by 72 %, the number of healthy children has been decreased as much as 16 times, the number of new growths, diseases of nervous and digestion systems has been increased thrice. If these diseases take the sixth place in relation to preschool age children, they already take the third one as to the pupils. If in the sixties almost 1/3 of children was considered to be healthy, today only 3-4 % of them are healthy. The number of allergic diseases increased till 15 % of children. Respectively, a new generation of adults will be much weaker than their predecessors as the diseases which appeared due to inappropriate life conditions, aggressive external influence of products of modern civilization, harmful habits and professional activity will be added to children's diseases.

EXPERIMENTAL

Samples of textile were collected on locale wearing fabrics and locale shops of Mukachevo, Ukraine.

Following properties of textile were examined according to standard methods (GOST – State Standard): stability of dye to wet washing - GOST 9733.4-83; stability of dye to dry friction and to wet friction – GOST 9799.27; stability of dye to distilled water – GOST 9733.5-83; chemical composition - GOST ISO1833-2001; dressing fraction, free formaldehyde, salts of heavy metals, pH of solution - GOST 25617-83.

RESULTS AND DISCUSSION



At the same time textile industry being influenced by the world's fashion industry widens the assortment of textiles which have a number of positive operational characteristics as well as aesthetic properties.

Taking into account the fact that world's financial crisis has influenced all the branches of economy, and light industry in particular, manufacturers try to use cheaper and at the same time less safe textile fabrics and technologies of garments manufacturing.

As safety standards have been developed relative to the resistibility of the healthy organism, which is a great rarity nowadays, the influence of a harmful substance on a weakened organism was more aggressive than the standards developed by the physicians assume. It has been noted by many researchers that the workers directly contacting with textile fabrics have various skin allergic diseases. The influence of the dust mass of fabrics under mechanical and thermal treatment of the garments fabrics is also dangerous. The result of such an influence is the penetration of toxic particles into the worker's organism, which is practically not regulated by the manufacture standards.

The analysis of toxicological properties of chemical substances applied in textile industry (dyes, thickeners, impregnation, etc.) (*figure 1*) have proved their harmful influence on the man's organism. All the substances to a variable degree are harmful for the manufacturer and consumer of the garments and can cause certain deviations in the state of health [1].

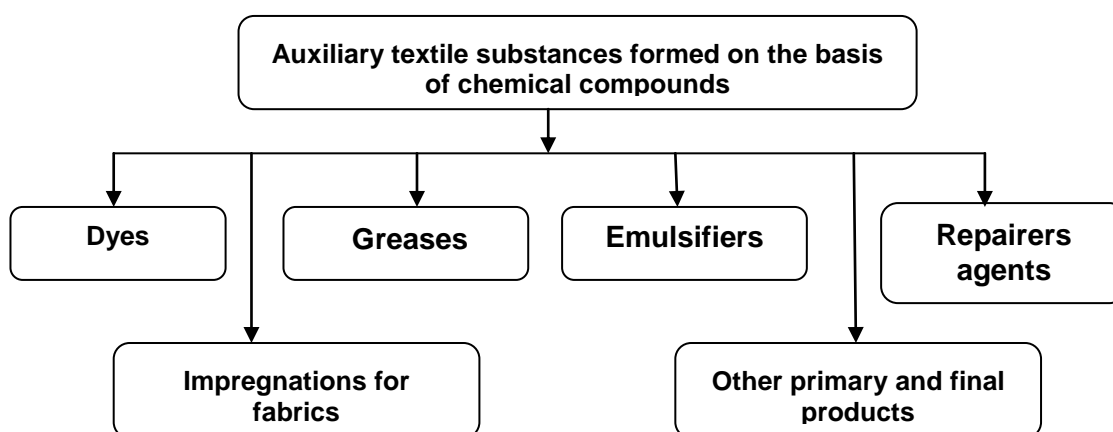


Figure 1: The description of auxiliary textile substances used in textile industry

Since these substances are used together, one with another, it is difficult to predict their joint influence as the studies of their combined harmfulness on the human's organism have not been conducted so far.

The chart of conducting the laboratory sanitary-chemical research according to K. Rapoport as to hygienic estimation of new synthetic fabrics and garments is presented in reference [1].

Depending on the degree of contact with the man's body ECOTEX defines 4 classes of garments by the level of safety requirements raised (Table 1).

The analysis of the data of garments fabrics under investigation presented in works [2, 3] shows the necessity of carrying out the gradation of ecological indices according to the main stages of manufacturing the products.

To foresee at just which stages of manufacturing the conditions of manufacturing the textile products are violated it is necessary to delimit ecological indices. From this It follows the necessity of developing an effective structure of gradation of ecoindices which cause different types of diseases in man's organism.



Table 1: Classification of textile products depending on the level of safety requirements by "ECOTEX" system

Class	Purpose of textile products	Level of safety requirements
Class I	Child's assortment: textile, basic products and accessories used for making wares for children till 2 years old, with the exception of leather clothes	The most strict requirements
Class II	Assortment of wares in a direct contact with a skin, the greater part of whose surface while being used is in a direct contact with man's skin (blouses, shirts, linen and so on)	Strict requirements
Class III	Assortment of wares which do not have a direct contact with skin, only a small part of which is in a direct contact with man's skin (overcoat)	Requirements are less strict
Class IV	Assortment of decorative fabrics and wares made from them, which create the environment of permanent or temporal existence of man (table-cloths, window shades, covers, textile wall-paper and so on).	Strict requirements as to emission of harmful substances in the premise.

The given structure may be presented in accordance with the main stages of manufacturing textile fabrics: the initial treatment, operations of dyeing and printing as well as the final treatment [4, 5]. The results of proposed gradation of ecoindices are given in the Table 2.

Based on this Table the structure of ecological indices has been developed that allows revealing at which stages this or that negative ecologic index might appear. So, the given approach point to the necessity of monitoring in three main directions: monitoring of fiber, dyes and textile-additional substances.

If to monitor these objects at the stages of growing fiber and manufacturing fabrics it won't be necessary to further define ecological indices in the ready-made ware.

So, the situation as to the influence of the so-called pollution by the wares made from textile needs to be studied thoroughly, especially due to appearance of new, not studied enough fabrics at the market.

CONCLUSIONS

Due to the movement for ecologization of all spheres of activity the population of developed countries has become more attentive to the factors which influence the health, but in connection with insufficient possession of information of the society about potential harm of modern textile fabrics for garments the monitoring of harmlessness of fabrics is not carried out fully and not reviewed in the press.

The chemical analysis of textile from wearing factories of Transcarpatian region (Ukraine) have shown the presence of harmful compounds (chloric phenols, herbicides, pesticides, heavy metals etc.) in amounts which are dangerous for factory workers and customers.

The necessity to conduct the monitoring of harmlessness of new kinds of fabrics and technologies of their treatment with the account of the weakened immune state of man's health has been noted by the authors.



Table 2: Gradation of ecological indices according to the main stages of manufacturing the products

Ecological index	Negative effect on man	Stage of production	Cause of observation
1	2	3	4
Chloric phenols	Oncological effect (liver and kidney)	Growing of fiber	Application of herbicides
Presence of herbicides and pesticides	Cancerous effect	Growing of natural fiber	Application of herbicides
DDT			
Tocsaphen			
Heptachlorine			
2,4-D			
2,4,5-T	Mutagenic properties		
Type of dye (cancerous or allergic)	Cancerogenics (gall-bladder, liver, kidney etc.), allergy	Dyeing of textile fabrics	Application of not-certified dyes
Acidity of solution	Skin irritation and allergy	All stages	Type of dye or supporting compounds
<i>Heavy metals</i>		Dyeing, printing	Type of dye, due to specifics of technological processes, due to ecosystem pollution
Chromium	Affection of liver and kidney		
Aluminium	Neurotoxic effect		
Copper	Hepatite, anaemia, affection of liver		
Cadmium	Distraction of bones, respiratory affections		
Cobalt	Affection of central nervous system and thyroid gland		
Nickel	Affection of heart, liver		
Mercury	Affection of kidney, nervous system, vision, hearing		
Other aprets, thermo-reactive rosins	Skin irritation and allergy, distanced effects	Final treatment of textiles	Due to specifics of technological processes
Free formaldehyde	Destruction of mucilaginous envelope, nervous disorders, vision and digestion disturbance,	Final treatment of textiles	Application of formaldehyde containing compounds
Stability of dyeing to physical-mechanical actions	Skin irritation and allergy	Dyeing, printing	Type of dye; violation of production process

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