

### Список використаних джерел

1. Серьогін В.О. Конституції зарубіжних країн: навч. посіб. / В.О. Серьогін. – Харків: ФІНН, 2009. С. 664.
2. Kropińska Irena. Przekonanie zdrowotne. W poszukiwaniu perspektywy pedagogicznej. 2001. URL : <http://nauka-polska.opi.org.pl/dhtml/raporty/praceBadawcze?rtype=opis&objectId= 21635&lang=pl>
3. Syrek Ewa. Zdrowie i wychowanie a jakość życia. Perspektywy i humanistyczne orientacje poznawcze. Katowice: Wydawnictwo Uniwersytetu Śląskiego, 2008. 225 s.
4. Taranowicz Iwona Janina. Zdrowie i sposoby radzenia sobie z jego zagrożeniami. Analiza socjologiczna. Wrocław: Oficyna Wydawnicza Arboretum, 2010. 312 s.

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### USE OF INNOVATIVE TEXTILE MATERIALS IN THE EDUCATIONAL PROCESS OF TRAINING FUTURE VOCATIONAL TEACHERS

Studying a large amount of information on the Internet sites of developers of innovative technologies gives us the opportunity to state the following: the development of innovative technologies and their implementation in the textile, light industry, and clothing design takes place on fundamentally different grounds. In the design of clothes, it allows to ensure fundamentally new properties of materials, thereby opening up new opportunities for the development of the fashion industry [1].

In the near future, clothes will be transformed depending on the room, weather conditions, various life circumstances and the wishes of the consumer. This year, fashion houses presented a large number of clothing collections that used modern technologies that conquered fashion catwalks: metal spraying, fabric with perforations in the form of geometric shapes, seamless knitwear, 3D prints, nanofabrics with polyamide fibers, clothing with LEDs, fabricaceuticals, «smart» clothing, bioengineering, etc [2].

Today, the use of innovative textile materials in the educational process of training future teachers of professional education is extremely important. Since future experts in the sewing industry must constantly keep up with the times.

At the current stage of the development of innovative technologies, there is a great interest in the creation of textile materials with antibacterial properties all over the world. This is due to the need to protect a person from the influence of pathogenic microorganisms and improve his immune status. Due to their qualities, bacteriostatic textile materials become a protective barrier against the penetration of microorganisms into the human body. The combination of pure biocidal preparations with other processing preparations makes it possible to give textile materials, in particular knitted fabrics, various desired effects of biostability and environmental safety. The environmental safety of textile materials consists of the safety of raw materials and the safety of different types of biocidal preparations and their production technologies [3].

The appearance of nanomaterials with unique physical and chemical properties makes it possible to give textiles new antibacterial characteristics. For this, nanomaterials are used, which contain: copper, zinc, titanium, magnesium, gold, chitosan, but the most popular of biocides today is silver in various forms [4].

Modern textiles produced with the simultaneous use of traditional chemical and mechanical technologies and high nano-, bio- and information-cognitive (NBIC) technologies have greatly expanded the range of their application areas. The combination of classic and modern technologies allowed to obtain new modifications of technical, protective, medical, sports, industrial, military, transport, space and cosmetic textiles with new unique properties. Achieving the desired final consumer properties of materials became possible due to a wide range of various treatments and

impregnations. According to antibacterial properties, bio-resistant textile materials are divided into antifungal, against gram-positive and gram-negative bacteria and cocci, against mites and pathogenic microorganisms. The following impregnation technologies are distinguished: finishing (introduction of a chemical agent at the last stage of production - the dyeing stage), late injection (the fabric is modified at the stage of yarn creation, and the agent is injected directly into the polymer fiber) and inoculation (the fabric is bombarded with charged particles carrying an antibacterial agent). Antibacterial agents used during final impregnation are Amicor from ACORDIS, X-static from NOBLE, Modal Fresh from LENZING and others. With late injection, Meryl Skinlife from NYLSTAR, Rhovyl'As from RHOVYL, Blue Bact from TYBOR and others are used. In the case of vaccination, agents such as Bactekiller from BACTENET, Bioactive from TREVIRA, Roica EF from KASEI are used. Bio-resistant textile materials are used in the production of clothes for medical and linen purposes, clothes for active work and rest, bed linen, pillows, blankets and toys, in the sock, shoe and furniture industries. The most famous companies producing textile materials with bacteriostatic properties are: Acordis Services Ltd (Great Britain), DuPont de Nemours (USA), Bactenet (USA), Trevira (Italy), Tubor (Spain), Elegance (Russia). Antimicrobial treatments of textile materials allow to significantly increase the hygiene of products, reduce the access of transit microflora to human skin, eliminate unpleasant odors, protect the skin from blood-sucking insects and provide effective protection of textile materials against microbiological destruction [3; 4].

Today, the most promising direction of innovative research is the development of nanotechnologies, which have made an impact on both clothing design and the textile industry. Scientists are trying to change the nature of materials at the molecular level (biomimetics). These fabrics are able to acquire the properties of various natural materials, for example, natural silk (which is five times stronger than steel) or lotus petals (which repels water and any fats). In 2006, the Swiss company Schoeller introduced a fabric called 3XDRY, on which sweat stains do not form. This material is able to cool areas of increased sweating and repel almost any dirt. All this was achieved thanks to NanoSphere technology [4].

The idea of creating fashionable "functional" clothes of a new generation came to Olivia Ong's mind. In such clothes, you are guaranteed to never freeze or sweat, and accordingly, you will not get sick regardless of the weather conditions; in addition, these clothes do not require washing at all, and at the same time they neutralize dangerous gases and protect their wearer from smog and gassy air. The process of creating «magic fabrics» is kept secret.

German designer Anke Domaske decided to offer consumers ecological clothing that is completely made from milk. Such clothing improves blood microcirculation and allows you to regulate body temperature. Suzanne Lee, a designer from London, also works in this direction. She found a good way to create eco-friendly clothes, especially without spending on natural fabrics, by simply growing it. In this simple, but scientific way, Suzanne Lee has already created a line of bags, several jackets of current styles and even a whole collection of elegant things that fit like a second skin [5].

Undoubtedly, the brainchild of the creative tandem of Helen Storey, Ph.D. of the English College of Fashion, Institute of Art, London, and chemist Tony Ryan, Ph.D. of the Sheffield Institute, is a unique technology of photocatalytic clothing that cleans the air.

Scientists from the Paris Institute of Industrial Physics and Chemistry have produced «eternal» hosiery products. The fabric will regenerate itself. Stockings will be sewn from elastic material. «At a temperature of plus 23, torn stockings can be restored within a week», assures scientist John Smith.

Scientists from the Georgia Institute of Technology (USA) have filed a patent application for a fabric that has antiviral properties. It contains dyes that, when exposed to light, form free oxygen radicals that can inactivate viruses and, to some extent, bacteria. According to the developers, fabric with dyes can be used in various health care institutions, as a filter material in ventilation systems, in medical gauze masks, as well as in upholstery for airplane cabins, in military uniforms and in various overalls on the weather.

Philips engineers have developed underwear that controls blood pressure and is part of the user's vital parameters monitoring system. In addition to blood pressure parameters, the new device will be able to provide such data as body temperature, pulse rate, and heart rate. All this information will be stored on the ROM of the device and regularly provided to the doctor. If one of the parameters deviates from the norm, the device will alert the user [2].

All kinds of sports companies, such as Nike, Adidas, are already using heat-regulated materials with all their might, and are sewing t-shirts, jackets, and pants from them. Fabrics are ideal for physical exercise: for example, they remove moisture from the surface of the skin, making sports much more pleasant. In other words, after training, your body is dry, and the T-shirt, on the contrary, is wet. Or, for example, such a fabric protects against the wind: you don't need to put on several thick sweaters for a winter run. In general, such sports materials are designed to maintain a normal body temperature under any conditions. In addition, they are often lighter than cotton, practically do not wrinkle and do not require special washing conditions.

#### References

1. Zille A., Almeida L., Amorim T., Carneiro N., Esteves M., Silva C., Souto A. Application of nanotechnology in antimicrobial finishing of biomedical textiles., Mater. Res. Express. 2014. Vol. 1. P. 125-137.
2. Semak B. B., Halyk I. S., Semak B. D. Increasing the biostability and environmental safety of textile materials through their surface modification. Bulletin of the Kyiv National University of Technology and Design, 2007. №4 (36). С. 47-51.
3. Marynchenko I. V., Vasenok T. M. The use of 3d printing technologies in the training of vocational training teachers. Professional pedagogy, 2022. 1(24). С. 251-258. DOI: <https://doi.org/10.32835/2707-3092.2022.24.251-258>
4. Маринченко І. В. Проблеми і перспективи розвитку легкої промисловості України. Modern engineering and innovative technologies. Germany: Sergeieva&Co Karlsruhe, 2020. Том 13. Випуск 2. С. 49-55. DOI: 10.30890/2567-5273.2020-13-02-025
5. Kovalchuk V., Marynchenko I. Implementation of digital technologies in training the vocational education pedagogues as a modern strategy for modernization of professional education. Annales Universitatis Paedagogicae Cracoviensis. Studia ad Didacticam Biologiae Pertinentia, 2019. Vol. 1. Issue 9. С. 122–138. URL: <https://cutt.ly/oUB4SHM>

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### УМОВИ ТА ШЛЯХИ ФОРМУВАННЯ ТЕХНІКО-ТЕХНОЛОГІЧНИХ ЗНАНЬ Й УМІНЬ ШКОЛЯРІВ

Характерним для більшості загальноосвітніх шкіл, зокрема нашого регіону, є низький рівень техніко-технологічних знань школярів. Тут, природно, може постати ціла низка запитань, починаючи від доцільності формування політехнічного світогляду учнів шкіл й до необхідності подальшого технічного поступу світової спільноти взагалі, адже не секрет, що кількість людей, які зазнають негативного впливу сучасних технологій значно зростає. При цьому потерпають і природні системи, що стають об'єктом людської діяльності.

З іншого боку відзначимо таке: 1) кількість жителів на планеті перевищила позначку у 7 мільярдів осіб і кожній потрібне найнеобхідніше: їжа, тепло, житло, належне медичне обслуговування тощо; 2) запаси природних вуглеводнів, як основних на нині джерел енергії, є вичерпними; 3) над людством нависла загроза глобальних кліматичних змін, як результату споживацького підходу до організації та здійснення виробничої діяльності у попередні десятиліття; 4) на сьогодні ми є свідками виникнення нових вірусних захворювань, які практично вибили з колії унормований спосіб життя людей в усьому світі; 5) російсько-українська війна, котра попри масову консолідацію і масовий спротив українського