

**DEVELOPMENT OF A STYLISH SPORTS SUIT FOR MEN BASED ON
ANTIBACTERIAL MATERIALS**

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Annotation: This article studied the scientific basis for the use of antibacterial tissue materials in the design of modern sports suits for men. Antibacterial modification-in particular, the nanoparticle TiO_2 , as well as the hygienic, chemical-physical and operational advantages of chitosan and bamboo fibers in sportswear were analyzed. The properties of materials such as respiration, biological compatibility with the skin, elimination of microorganisms, elimination of odor formation and long-term stability were studied. The resulting scientific results justify the possibility of creating highly hygienic, functional and comfortable sportswear based on antibacterial textiles.

Keywords: antibacterial textile, sports suit, TiO_2 nanoparticle, chitosan, bamboo fiber, photocatalytic materials, sportswear ergonomics, hygiene, functional design, modern sports textiles.

A sharp increase in the requirements for modern sportswear, increased need for criteria such as hygiene, heat exchange, skin compatibility, bacteriological safety in the process of physical activity of athletes require the use of innovative materials [1].

Antibacterial modified textile materials are recognized as one of the most promising areas for the production of sportswear in recent years.

The photocatalytic properties of TiO_2 nanoparticles in particular have high efficiency in breaking down microorganisms, neutralizing odors and increasing the hygienic stability of the fabric [2]. Technological flexibility, anatomical-ergonomic comfort, aesthetic requirements and operational durability of the material are important factors when choosing a material for tracksuits [3].

The function of sportswear is to protect the athlete's body from external and internal factors, as well as to ensure comfort during high physical load. Materials must meet the following criteria:

- Respiration (≥ 200 -500 mm/s) — ensuring air exchange [4].
 - Moisture transfer and quick build — up-regulation of sweat separation.
 - Hygroscopicity-keeping the skin dry.
 - Stretchability and elasticity in one direction — ensuring ergonomics of movement.
 - Antibacterial protection-reduction of microorganisms to 99.9%.
 - Combination of aesthetic appearance and design — an important part of the image of an athlete.
- Studies show that the hygienic quality of sportswear directly depends on the nature of the fibers used [4]. Therefore, antibacterial components are of particular importance in the composition of sports materials.

Antibacterial fibers are characterized by the application of a special bioactive modification to their composition or surface. The most common components:

TiO_2 (titanium dioxide) nanoparticles. TiO_2 has photocatalytic activity when exposed to ultraviolet light, breaking down bacteria and fungi, neutralizing odor, being a non-toxic and highly stable substance [5].

Hitozan. Natural biopolymer, skin-compatible, breathable, allergy-free and environmentally friendly antibacterial component.

These substances significantly improve the hygienic and functional properties of sportswear.

The following technologies are used in the production of sports textiles:

Sol-gel impregnation technology. Allows you to evenly place TiO_2 nanoparticles on the fabric.

Plasma modification. Forms active groups at the molecular level, enhances the adhesion of the antibacterial component to the fabric.

Microcapsulation technology. By depositing antibacterial substances into the capsule, it ensures their long-term slow separation [6].

Biopolymer coating. Chitosan, alginate and other biocomponent-based coatings are widely used in environmentally friendly and medical sportswear.

These technologies serve to increase the service life of sports suits, eliminate odors and ensure hygienic stability of the fabric.

When choosing a Material, the following factors are decisive: anatomical–ergonomic compatibility; elasticity and regeneration coefficient; antifungal and antibacterial activity of the fabric; heat exchange and hygroscopicity; specific requirements of the sports direction; technological processing capabilities; environmental safety and stability.

TiO_2 modified fibers are recommended as one of the most useful options for active sports such as light constructions, running, fitness, cycling, trekking [7].

The above scientific analyzes have shown that antibacterial textile materials create high hygienic, ergonomic and functional advantages in the design of modern sports suits for men. The integration of TiO_2 nanoparticles into the sportswear of substances effectively eliminates germs, reduces odor, prolongs the service life of the fabric and increases compatibility with the skin. Also, the expansion of a healthy lifestyle among young people will further increase the demand for this type of high-tech sportswear. The above scientific analyzes have shown that antibacterial textile materials create high hygienic, ergonomic and functional advantages in the design of modern sports suits for men. The integration of TiO_2 nanoparticles into the sportswear of substances effectively eliminates germs, reduces odor, prolongs the service life of the fabric and increases compatibility with the skin. Also, the expansion of a healthy lifestyle among young people will further increase the demand for this type of high-tech sportswear.

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