

BIOSTABILITY OF WOOD COMPOSITE MATERIALS

The relevance of the topic is that new wood composite materials, which are intended primarily for housing construction, should not be destroyed by cellulose-destroying enzymes of various microorganisms. In this regard, the study of the biostability of these materials is relevant and has important scientific and practical significance.

Wood composite materials (WCM) are materials created on the basis of wood and other components, such as polymers, resins or mineral additives. They are widely used in construction, furniture industry, production of finishing materials and other industries due to their availability, environmental friendliness and technological effectiveness. However, one of the key factors limiting their use is biostability – the ability of the material to resist the effects of biological agents, such as fungi, bacteria, insects and microorganisms.

For wood composite materials, this is especially important, since wood is a natural organic material that is easily biodegradable. The main biological threats to DCM include:

- Fungal infections (mold, rot);
- Insect pests (boring beetles, termites);
- Bacteria and microorganisms.

The biostability of wood composite materials depends on several factors:

- Material composition: the presence of binders (resins, polymers) can increase resistance to biodamage.
- Density and structure of the material: denser materials are less susceptible to moisture penetration and, as a result, biological damage.
- Humidity: high humidity creates favorable conditions for the development of fungi and microorganisms.
- Protection with protective compounds: the use of antiseptics, fire retardants and other protective agents significantly increases biostability.

The following methods are used to increase the biostability of wood composite materials:

Chemical treatment: impregnation of the material with antiseptics, fungicides and insecticides. These substances suppress the growth of microorganisms and protect against insects.

- Heat treatment: exposure to high temperatures (thermal modification) changes the structure of the wood, making it less attractive to biological agents.
- Use of synthetic binders: adding polymers and resins to the material increases its resistance to moisture and bio-damage.
- Application of protective coatings: varnishes, paints and films create a barrier to the penetration of moisture and microorganisms.

Modern research is aimed at creating environmentally friendly and effective methods for increasing biostability. For example, using nanoparticles to impregnate materials, which allows achieving a high degree of protection with a minimum amount of chemicals; development of bioprotective compounds based on natural components, such as plant extracts or essential oils; using modified wood fibers that have increased resistance to biodamage.

High biostability of wood composite materials allows: to increase the service life of products; to reduce the costs of repair and replacement of materials; to expand the areas of application of DCM, including use in conditions of high humidity or contact with soil.

Biostability of wood composite materials is an important parameter determining their durability and scope of application. Modern technologies allow to significantly increase the resistance of wood composite materials to biological threats, which makes them competitive and environmentally friendly materials. Further research in this area will contribute to the development of new, more effective and environmentally friendly solutions for the protection of wood composites.

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