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USE OF COTTON CELLULOSE AS AN ALTERNATIVE RAW MATERIAL IN THE PRODUCTION OF ABSORBENT PAPER GRADES

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The pulp and paper industry is one of the fundamental sectors of the national economy that meets the needs of society for sanitary, hygienic, packaging, and printing products. At the same time, it is among the most resource-intensive industries, characterized by significant consumption of electricity, water, and wood, as well as by a considerable environmental impact. Therefore, the search for alternative and environmentally friendly raw materials is a relevant task for modern science and production.

One of the promising directions today is the use of cotton cellulose as a fibrous raw material for manufacturing absorbent paper grades. Cotton cellulose is a product derived from purified cotton fiber, characterized by high chemical purity (α-cellulose content up to 99 %) and a high degree of polymerization. The material exhibits excellent strength, whiteness (80–90%), chemical resistance, and favorable paper-forming properties [1].

Compared to wood cellulose, cotton cellulose has a lower lignin and impurity content, which allows its production with fewer purification stages, and lower water and energy consumption. The use of cotton linters - short fibers remaining on cotton seeds after ginning - enables effective utilization of agricultural by-products, reduction of environmental impacts, and enhancement of the renewability of the raw material base.

The high whiteness, softness, and absorbency of cotton cellulose make it suitable for the production of absorbent paper products such as tissues, paper towels, toilet paper, and specialized technical papers. Comparative studies of fibers of different origins have shown that cotton fibers possess greater length and higher whiteness than wood fibers, which positively affects both the aesthetic and functional properties of the final paper products.

In Ukraine, there has been renewed interest in cultivating cotton as an industrial crop. In 2024, a law was adopted to accelerate the registration of cotton varieties (including genetically modified ones) and to stimulate cotton cultivation in the country [2].

Initial experiments have demonstrated the successful ripening of cotton plants under Ukrainian climatic conditions. The scaling up of this process could establish a domestic base for the production of cotton cellulose and reduce dependence on imported raw materials.

Thus, the use of cotton cellulose in the production of absorbent paper grades represents a promising direction for the development of the Ukrainian pulp and paper industry. This approach will contribute to reducing resource intensity and environmental load while ensuring the quality and competitiveness of Ukrainian paper products.

REFERENCES

1. Osyka, V.A., & Koptiukh, L.A. *Paper Packaging Materials: Monograph.* Kyiv: Kyiv National University of Trade and Economics, 2017. – 441 p.

2. On Amendments to Certain Laws of Ukraine Concerning the Dissemination of Cotton Varieties in Ukraine. Vidomosti Verkhovnoi Rady of Ukraine (VVR), 2024, No. 29, Art. 205. URL: https://zakon.rada.gov.ua/laws/show/3645-IX#Text