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STUDY OF THE PHYSICO-MECHANICAL PROPERTIES OF PIG LEATHER WITH ANTIBACTERIAL COATING FOR SHOE INSOLE MATERIALS

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Shoe lining plays an important role in ensuring comfort and durability, strengthening the base of the shoes, retaining heat, and ensuring hygiene. Natural pig leather is the most often used natural material for shoe linings. Due to its ability to absorb moisture this material provides a high degree of comfort and durability improving sanitary-hygienic properties. So, the main component in leather structure is protein, which makes it an easy growth substrate for microorganisms such as bacteria and fungi. Often when bacteria proliferated on the shoes causes unpleasant odors and skin diseases on human foot.

Numerous research studies have been directed at resolving this problem. In the leather industry, nanotechnology is at an early stage and has not yet reached wide applications. Nanometal oxides are being investigated for application in different fields, which also include leather materials. It has been shown that some nanometal oxides such as Ag2O, ZnO, MnO2, CuO, etc. lead to rupture of the bacterial cell wall. TiO2, CuO and Fe3O4 nanoparticles have a great ability to penetrate the cell membrane, MgO and CaO nanoparticles are highly alkaline, causing damage to the cell membrane. TiO2 and ZnO nanostructures have been widely studied as antimicrobial agents due to their photocatalytic activity under UV light and possess excellent antibacterial properties.

The present research is focused on the investigation of the physico-mechanical properties of pig leather with finishing coating including metal oxides.

It was found that there was no significant change in the physico-mechanical characteristics of the treated shoe lining materials with the antibacterial finishing coating compared to the untreated pig leather samples. No deterioration in tear strength properties. The experimental data have been compared with the requirements of the ISO standards for shoe lining materials and they fully meet these requirements.

Keywords: *leather insole, antibacterial finishing, physico-mechanical characteristics*