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Assessment of the Antimicrobial Activity of Polymer Materials with Added Nanosilica Modified by Silver Compounds

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The problem of prevention and treatment of the wound infection remains urgent. One of the ways of struggle against a similar complication is the use of the materials with antimicrobial properties. Among them there are polyurethane (PU) and interpenetrating polymer networks (IPNs) with different ratios of polyurethane (PU) and poly(2-hydroxyethyl methacrylate) (PHEMA) containing nanosized silica modified with an antimicrobial agent. The objective of the work was to study the antimicrobial properties of composite materials created on the basis of PU and IPNs, consisting of PU and PHEMA, and nanosilica modified with silver compounds, and to estimate their influence on the biofilm-forming ability of microorganisms. The study was performed using PU and IPNs with 83 % PU and 17 % PHEMA. 10 % of the nanosilica with silver salt immobilized as one "layer" on the surface was inserted into each of them. The antimicrobial activity of the known central venous catheter with the immobilized silver compound and created in this work composites were compared. The microbiological studies included determination of the antimicrobial activity of the investigated samples and determination of their influence on the ability of the microorganisms to form a biofilm. The obtained results of the microbiological studies prove that the proposed samples are equal to the existing analogues and according to some criteria even surpass them.