PROCEDURE FOR RAPID DETERMINATION OF STERILITY OF INJECTABLE SOLUTIONS

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Introduction. Microbiological testing plays a pivotal role in the production of pharmaceutical drug substances and drug products. It is indispensable for ensuring patient safety, particularly considering that individuals taking these medicines may already be in a compromised state and susceptible to infections. Contamination of drugs with unacceptable microorganisms poses a significant risk to the pharmaceutical industry, jeopardizing product integrity and patient well-being. Regulatory procedures encompass various quality control methods, and their implementation is crucial for the thorough identification of prohibited germs before product release, preventing the need for market withdrawals. Components of injectable solutions labeled as "sterile" must maintain a level of sterility as close as possible from the outset to prevent the introduction of pyrogenic substances of microbial origin.

Aim of the study. Development of a culture medium for the rapid determination of the sterility of injectable solutions, formulation of an integral microbiological control procedure, and the establishment of a method of use.

Material and methods. The research utilized standard materials and reagents registered in the Republic of Moldova. Sterility tests were conducted concurrently with established reference methods. Injectable solutions, including intravenous additives (potassium chloride, heparin), vitamins (retinol, riboflavin-mononucleotide, cyanocobalamin, tocopherol acetate), antibiotics (cephaloridine, cefazolin), and intravenous infusions (isotonic sodium chloride solution, Glucose 5% solution), served as samples for analysis. Microbial culture strains were daily reseeded to maintain their cultural-biochemical characteristics. The microbial strains studied or used included *Escherichia coli* ATCC 11775, *Pseudomonas aeruginosa* ATCC 27853, *Klebsiella pneumoniae* ATCC 700603, *Proteus mirabilis* ATCC 25933, *Acinetobacter baumannii* ATCC 747, *Enterobacter faecalis* ATCC 29212, *Staphylococcus aureus* ATCC 29213, *Bacillus cereus* ATCC 11778, *Candida albicans* ATCC 10231, and *Candida krusei* ATCC 6258.

Results. The developed procedure involves inoculating the test material into the culture medium, followed by incubation and subsequent sterility control of injectable solutions. The MSD-I culture medium, presented in microfilm form, comprises all essential components necessary for multiplication and rapid sterility determination within a range of 4-5 hours to 9-24 hours. The duration depends on the initial concentration in 1 mL or gram of the product, where single cells require 9-24 hours, and concentrations of 103-105 CFU/mL or gram can be determined within 4-5 hours of incubation at 37°C. The MSD-I medium demonstrates selectivity, sensitivity, specificity, efficiency, cost-effectiveness, and user-friendliness. The storage period for this medium is 2 years (observation period).

Conclusions. A procedure has been developed for the rapid determination of the sterility of injectable solutions. It is characterized by its simplicity and accessibility, making it suitable for microbiological laboratories at various levels.