A COMPARATIVE STUDY OF THE ANTIBACTERIAL ACTIVITY OF OINTMENT BASED ON DIPEROXYAZELAIC AND BENZALKONIUM CHLORIDE AND «PEROXYGEL 3%» PREPARATION

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Introduction. It is known that inflammation of the skin are accompanied by inflammation bacterial contamination and therefore require the use of antimicrobial prolonged action. This effect can be achieved by using external antimicrobial agents in the form of ointments, creams and gels. Azelaic Acid – natural saturated dicarboxylic acid, has a wide range of biological properties, is used in skin care products, mainly for the treatment of acne, reducing hyperfunction of the sebaceous glands, eliminating hyperpigmentation.

Hydrogen peroxide has almost universal antimicrobial action, which is related to its oxidative high resolution. Released as a result of microbial decomposition of H_2O_2 tissue proteases and reactive oxygen species (ROS) oxidize sulfhydryl and hydroxyl groups of proteins and lipids, causing the death of germs. Deadline specified time reducing background bacteria sensitivity to hydrogen peroxide and the emergence of drug-resistant variants of the bacteria. Further scientific research in the chemistry of hydrogen peroxide, improving its stability, combined processing facilities give hope to address the shortcomings of this valuable. Benzalkonium chloride (BzAlk) has bacteriostatic and microbial effect on gram in relatively large doses - in Gram-negative bacteria and candida. Used as an antiseptic to treat acne, folliculitis, seborrhea a concentration of 0.025-0.1%. So interesting was a development of new combined dosage forms for external application, which would combine the advantages of relatively stable organic peroxide and QAC.

Aim. The aim of the study was a comparative study of antimicrobial activity of the ointment based of our proposed new substance - diperoxyazelaic acid (nonanebis (peroxoic acid), hereinafter both **DPAA**) (HO_3C-$(CH_2)_7$-CO_3H) in the combination with benzalkonium chloride and European branded drug – «Peroxygel 3%» («GEMI» (Karchev, Poland).

Materials and methods. DPAA cyntecize the known method Sverna, mp. + 90-90,5ºS (with decomposition), active oxygen content (AOC) was 14.2%. Benzalkonium chloride, pharmacopeia purity is containing basic substance C_9H_{13}ClNR 99. 0% (China). We studied ointment composition: 1.0 wt. % DPAA,

benzalkonium chloride 0.05% sodium edetate (0.01 wt.%), The rest - polyethylene oxide basis: PEO-400 (80 wt.%), PEO-1500 (20 wt.%). The product comparison «Peroxygel 3%» produced by Pharmaceutical Production Enterprise «GEMI» (Karchev, Poland), 15 g tubes (Series 011014). Composition of drug: 100 g product containing hydrogen peroxide 30% 10 g; Excipients: dynatriyedetat, poloxamers 407, 96% ethanol, concentrated phosphoric acid, peeled water. According to WHO to evaluate antibacterial and antifungal activity of drugs as a test culture museum used strains and clinical isolates (*Candida tropicalis*, *Candida krusei*, *Candida glabrata*). Microbial load was $1 \cdot 10^6$ colony-forming units to 1 ml of the nutrient medium.

Results and discussion. Comparative antimicrobial activity of the samples studied drugs given in a Table 1.

Table 1

Test culture	**Zones of growth inhibition test cultures mm (*n* = 3)**	
	Ointment with DPAA 1%, BzAlk 0,05%	**«Peroxygel 3%»**
St. Aureus ATCC 25923	35,1±1,9	55,5±2,6
E.coli ATCC 25922	28,4±1,2	59,0±1,1
Ps.Aeruginosa ATCC 27853	27,6±2,0	43,5±1,5
B.subtilis ATCC 6633	28,1±1,5	26,2±0,8
Candida tropicalis	36,2±0,8	36,6±1,4
C.albicans ATCC 653/885	37,0±1,1	34,7±2,8
Candida krusei	36,1±1,2	35,5±2,5
Candida glabrata	33,2±2,2	24,6±2,2

Conclusion. New combination of ointments with DPAA 1% of benzalkonium chloride 0.05% based on PEO sufficiently high inherent antifungal activity and spore activity which almost not inferior to branded drug "Peroxygel 3%." Due to much lower levels in the API new processed ointment, it can be considered promising for further in-depth research.