Therefore, we were interested in studying these properties of the obtained compounds − 3-[2-(morpholin-4-yl)ethyl]-N-phenyl-1,3-thiazol-2(3*H*)-imine derivatives.

Preceeding such an investigation, a *in silico* study of toxicological properties was carried out using computer programmes ROSC-Pred-*online* for prediction of rodent organ-specific carcinogenicity and GUSAR-*online* for prediction of acute toxicity. This preliminary stage could support the biological application.

According to the results obtained, tested 3-[2-(morpholin-4-yl)ethyl]-N-phenyl-1,3-thiazol-2(3*H*)-imine derivatives have favorable toxicological properties. belong and are recommended for pharmacological screening.

To study antimicrobial activity, the method of diffusion into agar (the method of "wells") was used. Pharmacological screening were performed *in vitro* against gram-positive and gram-negative microorganisms according to the recommendations of the Ministry of Health of Ukraine. To evaluate this type of activity of the substances reference strains opportunistic bacteria were used: *Staphylococcus aureus* ATCC 25923, *Bacillus subtilis* ATCC 6633, *Pseudomonas aeruginosa* ATCC 27853, *Proteus vulgaris* ATCC 4636, *Escherichia coli* ATCC 25922.

According to the results obtained, tested morpholine-containing 1,3-thiazol-2(3*H*)-imine derivatives have a high potency as antimicrobial agents. The tested substances with methoxy and dimethoxy substituents showed high sensitivity to gram-positive microorganisms − *Staphylococcus aureus* and *Bacillus subtilis* with growth inhibition zones 24-26 mm. The substance with the ethoxy substituent showed slightly lower activity − the growth inhibition zone was 20-22 mm. Against gram-negative microorganisms (*Pseudomonas aeruginosa* and *Proteus vulgaris*) all substances demonstrated moderate antibacterial activity with growth inhibition zones of 16-18 mm and fungicidal activity against the fungus *Candida albicans* with growth inhibition zones of 20-21 mm.

These data indicate the prospects for further studies of these substances.

## APPLICATION OF PROBIOTICS FROM SPORO-FORMING BACTERIA IN MEDICAL PRACTICE

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Introduction. About 90 years in healthcare use live lacto, bifido and colibacteria. Currently, the best documented probiotic bacteria used in human therapy are lactic acid bacteria. However, they do not always show sufficient antagonistic action against pathogenic strains of bacteria and some fungi, which gave impetus to the search for new microorganisms among bacteria of the genus *Bacillus, Brevibacillus, Clostridium, Sporolactobacillus.* A large number of active substances are produced by spore-forming bacteria, so they can be used to solve a long-standing problem - a side effect of antibiotics.

The aim of the study was to analyze all existing drugs based on spore-forming bacteria and justify the prospects of their use to combat one of the side effects of antibiotics - dysbacteriosis.

Materials and methods: analysis of scientific literature and results of advanced research in the field of immunology, microbiology and pharmacology.

Results and discussion. Analyzing the literature, it was found that the most suitable group of spore-forming bacteria for the development of such drugs are bacteria of the genus *Clostridium, Bacillus, Bravibacillus and Sporolactobacillu*s. Bacteria of these genera are capable of self-destruction from the gastrointestinal tract, bind heavy metals, have anti-allergic, immunostimulatory effect.

Among the most common and of considerable practical interest are bacteria of the genera *Bacillus*.

Probiotic strains of the *Bacillus* genus constitute the microbiota of the human environment, and are typically found in soil, water, a number of non-dairy fermented foods, as well as in human and animal GIT. Representatives of the genus *Bacillus* do not normally colonize lower the digestive tract, acting in as a transient microflora. Nevertheless, more than 20 new species of probiotics were obtained from them: *coagulans, subtilis, clausii, cereus, toyoi, lichemiformis, mesentericus, polymyxa* etc.

Of the many species of *Bacillus* and related genera, most do not cause disease and are not well characterized in medical microbiology. There are a few species, however, that cause important diseases in humans. Anthrax, a classical disease in the history of microbiology, is caused by Bacillus anthracis. Anthrax remains an important disease of animals and occasionally of humans. Because of its potent toxins, B anthracis is a major potential agent of bioterrorism and biologic warfare. Bacillus cereus and Bacillus thuringiensis cause food poisoning and occasionally eye or other localized infections.

Analyzing data from the existing literature, most probiotics are used for humans, and other groups of drugs are used in veterinary medicine.

Currently, more than 100 drugs have been developed, which partially or completely consist of spore-containing bacteria. These include: Biosporin - a drug developed at the Kiev Research Institute of Microbiology and Virology named after I. D.K. Zabolotny (Ukraine) based on natural strains *B. subtilis* and B. *licheniformis*; the drug "Enterogermina" (Sanofi-Aventis, France) containing the active ingredient - polyantibiotic-resistant spores of *Bacillus clausii* strains (N / R, O / C, SIN and T), originally identified as *Bacillus subtilis*, for oral administration (belongs to the subgroup of profits - bioenteroseptics and represents a living microorganisms that do not occur as part of the obligate human microbiota (transient microflora), but capable of eating mine the opportunistic microbiota intestines); Bactisporin Bactisubtil, Colibacterin, Sporobacterin, Flonivin BS, BioPlus 2B, Endosporin, Medilac and other.

Conclusions. Analyzing the literature, it was found that drugs based on spore-forming bacteria stop intestinal disorders even more than probiotics, but are used less often. They are associated with pathogenic and toxigenic bacteria and are foreign to the normal gut microbiota. This area is very promising and requires more evidence-based medicine.