

D.K. Zabolotny Institute of Microbiology and
Virology of the National Academy of Sciences of
Ukraine

The 6th Scientific Conference of Young
Researchers

**“Youth and Modern Problems of
Microbiology and Virology”**

November 26-25, 2025

Abstract book



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November 25 - 26, 2025, Kyiv, Ukraine



In memory of our colleague



Lidiia Babenko

Candidate of Biological Sciences, Senior Research Scientist
Department of Problems of Interferon and Immunomodulators
D.K. Zabolotny Institute of Microbiology and Virology of the National
Academy of Sciences of Ukraine



November 25 - 26, 2025, Kyiv, Ukraine



The 6th scientific conference
“Youth and Modern Problems of Microbiology and Virology”
 Program

Tuesday 25.11.2025

Welcome word

10:30 – 11:00 **Mykola Spivak** – *Professor, Doctor of Biological Sciences, Academician of the NAS of Ukraine, Director of the D.K. Zabolotny Institute of Microbiology and Virology of the NAS of Ukraine (IMV NAS of Ukraine)*

Session I

11:00 – 13:15 **Moderator: Marichka Zlatohurska**, *Candidate of Biological Sciences, IMV NAS of Ukraine*

On-site **Yana Maliarenko** – *Student, IMV NAS of Ukraine*, “Organic acid-mediated phosphate solubilization by *Talaromyces funiculosus* strains”

On-line **Illia Kostiuk** – *PhD student, IMV NAS of Ukraine*, “Quantitative polyresistance assessment of a native chernozem microbial community to combined heavy metal exposure”

On-site **Andriy Lynnyk** – *PhD student, IMV NAS of Ukraine*, “*Lentilactobacillus buchneri* as the protective and enriching culture in breadmaking industry”

On-site **Svitlana Harmasheva** – *Student, IMV NAS of Ukraine*, “Screening of gamma-aminobutyric acid producers among yeasts”

On-site **Mykola Zarudniak** – *PhD student, IMV NAS of Ukraine*, “Screening the effectiveness of chemical and biological plant protection products on walnuts bacterial pathogens”

On-site **Marichka Zlatohurska** – *Candidate of Biological Sciences, IMV NAS of Ukraine*, “Prohead II heterogeneity in *Staphylococcus aureus* bacteriophage 812”

On-site **Nadiia Shevchuk** – *PhD student, IMV NAS of Ukraine*, “Genotypic and phenotypic characteristics of endophytic *Bacillus* strains with phytoprotective activity”

On-line **Anna Kaplun** – *Student, V.N. Karazin Kharkiv National University*, “Effect of seed bacterisation with lactic acid bacteria on composition and chemotactic activity of wheat root exudates”

On-site **Alina Kharchuk** – *PhD student, IMV NAS of Ukraine*, “Mechanical properties and biocompatibility of poly- β -hydroxybutyrate (PHB) and PHB-hydroxyapatite materials for biomedical applications”

13:15 **Coffee break**



November 25 - 26, 2025, Kyiv, Ukraine



Wednesday 26.11.2025

Session II

10:30 – 12:45

Moderator: Mariia Loboda, PhD, IMV NAS of Ukraine

- On-site **Ivan Roman** – *PhD, Ivan Franko National University of Lviv*, “Candidatus *Tectomicrobia* – terra incognita of microbial diversity and biotechnological potential”
- On-site **Sofiia Pylypchuk** – *Student, ESC “Institute of Biology and Medicine” of Taras Shevchenko National University of Kyiv*, “The effect of *Lactiplantibacillus plantarum* fermentation on the betalain content in beetroot juice”
- On-line **Maria Protsenko** – *Student, National University of Food Technologies*, “Formation and characterization of selenium nanoparticles synthesized using *Saccharomyces cerevisiae* M437 and the prospects for their application in the food industry”
- On-site **Iryna Bida** – *PhD student, IMV NAS of Ukraine*, “The resistance of soil microorganisms to heavy metal compounds”
- On-line **Vitalii Ivanitsa** – *PhD student, Odesa I. I. Mechnikov National University*, “Isolation of myxobacteria from Black Sea algae”
- On-site **Oleksandra Mormil** – *Student, Taras Shevchenko National University of Kyiv*, “Primary genomic characterization of *Klebsiella* bacteriophages isolated in Ukraine”
- On-site **Valeriia Novalska** – *PhD student, IMV NAS of Ukraine*, “Natural isolates and their antagonistic activity against phytopathogenic bacteria”
- On-line **Jovana Bogdanovic** – *PhD student, Universitat Politècnica de Catalunya*, “Zein nanoformulation for the delivery of phenolic biofungicides and targeted control of *Penicillium expansum*”
- On-site **Andrii Sylchuk** – *PhD student, IMV NAS of Ukraine*, “Newly isolated *Actinomycetes* strains: genome annotation, evolutionary relationships, bioactivity, and biotechnological potential”

12:45

Coffee break



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YEAST-BASED BIOTECHNOLOGICAL APPROACH TO GLUTATHIONE PRODUCTION

Dolia L.¹, Starovoitova S.^{1,2}

¹National University of Food Technologies, Kyiv, Ukraine

²D.K. Zabolotny Institute of Microbiology and Virology of the NAS of Ukraine, Kyiv, Ukraine

dolya.lyba@gmail.com

Glutathione (GSH) is a key intracellular antioxidant that maintains redox homeostasis and protects cells from oxidative damage. Its deficiency is associated with metabolic, cardiovascular, and neurodegenerative disorders, which determines the relevance of developing efficient biotechnological methods for its production.

The majority of clinical data on GSH efficacy pertains to the treatment of liver diseases. GSH deficiency directly contributes to the development of numerous hepatic pathologies, whereas replenishment of GSH levels improves liver function, reduces inflammation, and alleviates fibrosis in patients with chronic hepatitis B. Moreover, combinations of antioxidants with GSH have been shown to decrease serum transaminase levels—enzymes typically elevated in liver damage—compared with placebo, and are well tolerated in patients with chronic hepatitis C.

According to data from the Ministry of Health of Ukraine, the total number of patients with viral hepatitis B and C in 2021 was approximately 1.9 million individuals. Based on this prevalence, it is estimated that by 2025, the number of patients suffering from hepatitis B and C will be around 1.5 million. To meet the demand of all patients, 22,500 kg of glutathione would be required.

As of 2025, no domestic enterprise in Ukraine manufactures this supplement. Only one company produces a dietary supplement using Japanese raw materials. The main global producers of this essential antioxidant are the United States, Italy, Poland, and Japan. Considering the significant share of imported products on the Ukrainian market, it is proposed to establish production of GSH to cover 0.8% of the total national demand, corresponding to approximately 180 kg of product per year.

Based on an analysis of current scientific publications, as well as the comparative assessment of nutrient medium cost, cultivation duration, and conditions, and GSH yield, *Saccharomyces cerevisiae* HBSD-W08 was selected as the primary producer due to its high economic feasibility for industrial-scale production. Compared with other investigated strains, this producer demonstrates an enhanced level of GSH biosynthesis, reaching 3.73 g/L of GSH and 16.7 g/L of biomass under the following conditions: 48 hours of cultivation, 30 °C, and 200 rpm.

Particular attention was given to the optimization of nutrient medium composition in order to increase the efficiency of the biotechnological process. According to the calculations, the optimized medium for inoculum accumulation (g/L) consists of glucose – 34.0; peptone – 2.5; MgSO₄ – 10.0; (NH₄)₂SO₄ – 10.0; KH₂PO₄ – 0.13. At the production cultivation stage, it is advisable to additionally supplement the medium with glutamic acid (0.10 g/L) as a direct precursor for GSH biosynthesis. Although *S. cerevisiae* is a facultative anaerobe, aerobic conditions must be maintained during microbial synthesis, since the presence of oxygen promotes more intensive biomass growth and increases GSH biosynthetic productivity.

Since the nutrient medium contains magnesium and phosphate salts that can form insoluble precipitates, auxiliary operations include preparing appropriate titration agents (HCl and NaOH) to adjust the pH during sterilization of the salt mixture and subsequently restore it to its optimal value for producer growth. The use of concentrated (15%) solutions prevents excessive dilution of the culture medium.

The conducted techno-economic and biotechnological assessment demonstrates that the establishment of domestic GSH production using *S. cerevisiae* HBSD-W08 is a promising and feasible direction for Ukraine's biotechnology sector, contributing to import substitution and the development of national pharmaceutical manufacturing capacity.

