

## **Certificate of Implementation**

### **of the Results of Scientific Research Work into the Educational Process**

The results of scientific research carried out by the Department of Molecular Genetics and Biotechnology at the Institute of Cell Biology, NAS of Ukraine, in accordance with the thematic plan for scientific research (2020–2024), were implemented into the educational process at the Institute of Biotechnology, University of Rzeszow (Poland). The implementation is included the following:

#### **Lecture Material and Independent Work**

Lecture materials were updated, and topics for independent work were developed within the framework of the discipline:

- "General microbiology", taught to 1. year students;
- „Industrial biotechnology” taught to 2. year students;
- “Bioprocess technology and engineering”, taught to 2. year students.

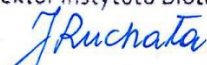
The lecturer for this course is Professor Andriy Sibirny.

#### **Practical Classes:**

The following research results were incorporated into the practical training for students in the **1 and 2** years of study:

- Improvement of production strains through mutagenesis, application of chemical and physical agents (UV radiation), determination of optimal process parameters (duration of exposure, dosage).
- Preparation of a purified alcohol oxidase enzyme using a producer strain and its application in determination of ethanol content during alcoholic fermentation.
- Fermentation - laboratory-scale bioethanol production, analysis of the efficiency of the bioethanol production process using the Alkotest method for various strains and different substrates.
- Recombinant yeast strains capable of oversynthesis of riboflavin (vitamin B2) under different growing conditions.
- Control of bioreactor processes. Optimization of overproduction of metabolites produced by microorganisms

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