Annex No. 11 to the MU Directive on Habilitation Procedures and Professor Appointment Procedures

PUBLIC LECTURE EVALUATION

Masaryk University	
Faculty	Faculty of Science
Procedure field	Molecular Biology and Genetics
Applicant	Mgr. Pavel Dvořák, Ph.D.
Lecture date	January 20, 2023
Lecture topic	Inženýrství bakterií a jejich metabolických drah pro biotechnologické zpracování odpadních látek [Engineering bacteria and their biochemical pathways for biotechnological processing of waste compounds]
Persons present (number)	36
Designated evaluators (board members)	prof. RNDr. Jiří Doškař, CSc. (on-site) doc. Mgr. Monika Vítězová, Ph.D. (on-site) prof. RNDr. Tomáš Cajthaml, Ph.D. (online)

In the opening part of the lecture, Dr. Pavel Dvořák explained the importance of bacteria as biocatalysts of a number of natural processes and described examples of the use of these microorganisms in traditional and modern industrial biotechnologies. He then emphasized the role of the scientific disciplines of systems biology, metabolic engineering and synthetic biology, which make it possible to modify the properties of production microorganisms and improve the efficiency of biotechnological processes. This was followed by an overview of historical milestones in the development of these scientific disciplines and the bioengineering of microorganisms in general.

In the second part of the lecture, Dr. Dvořák focused on the area of processing waste materials that can be used as cheap substrates for the biotechnological production of chemicals with added value. The space was mainly devoted to the processing of waste plant biomass – lignocellulose – with genetically modified bacteria. In the last part of the presentation, some concrete engineering procedures of bacteria for lignocellulosic biotechnologies were demonstrated using examples of recent studies led by Dr. Dvořák and his collaborators. Their works were included in the context of studies published by foreign authors. At the end of the lecture, further developments in this area of the applicant's interest were outlined.

In the course of the lecture, Dr. Dvořák also commented on some of the questions raised by opponents in their assessments of the habilitation thesis.

Dr. Dvořák also did not forget to summarize his pedagogical experience and his experience with the popularization of science.

In the following discussion Dr. Dvořák answered the questions of the board members and the attendees:

1. Jaké je riziko „degradace stromů” pomocí GMO, na kterých pracujete?
   [What is the risk of "tree degradation" with the GMOs you are working on?]

2. Konstrukt produkující pyruvát nespotřebovává glukózu. Jak to vysvětlíte?
   [The pyruvate-producing construct does not consume glucose. How do you explain it?]
3. Jaký typ kultivace používáte? Stacionární fáze není v růstových křivkách viditelná a hned nastupuje fáze odumírání.
   [What type of cultivation do you use? The stationary phase is not visible in the growth curves and the death phase begins immediately.]
4. Jak vysvětlíte tak dlouhou lag fázi?
   [How do you explain such a long lag phase?]
5. Provádíte přenosy genů do jiných organismů než je E. coli? Jsou postupy stejné nebo jiné?
   [Do you transfer genes into organisms other than E. coli? Are the procedures the same or different?]
6. Jak stabilní jsou produkční GMO kmeny?
   [How stable are production GMO strains?]
7. Jaké jsou možnosti degradace lignocelulózového substrátu v reálných podmínkách?
   [What are the possibilities of lignocellulosic substrate degradation in real conditions?]
8. Jakou perspektivu mají konsorcia mikroorganismů nebo modifikovaných “superorganismů“?
   [What is the perspective of consortia of microorganisms or modified "superorganisms"?]
9. Jaké genetické úpravy ještě plánujete, např. povrchových struktur bakterií?
   [What genetic modifications are you still planning, e.g. surface structures of bacteria?]
10. Jaká vstupní surovina je pro vás skutečným odpadem? Jak zajistíte dostatek substrátu?
    [Which substrate is real waste for you? How do you ensure enough substrate?]
11. Uvažujte o využití čistírenského kalu jako substrátu?
    [Do you consider using sewage sludge as a substrate?]

Conclusion

The lecture delivered by Pavel Dvořák, entitled “Engineering bacteria and their biochemical pathways for biotechnological processing of waste compounds” and delivered as part of the habilitation procedure, **demonstrated** sufficient scholarly qualifications and pedagogical capabilities expected of applicants participating in a habilitation procedure in the field of Molecular Biology and Genetics.

The lecture took place in a hybrid form at 10.00 a.m. – 11.30 a.m. The above-mentioned members of the board attended the lecture and provided its evaluation. All designated evaluators are familiar with the text of the evaluation and agree with it.

Date: January 20, 2023

Jiří Doškař ……
signature

Monika Vítězová ……
signature