



**Journal of Microbiology,  
Biotechnology and Food Sciences**

**ISSN 1338-5178**

is there life?

**JMBFS**

**scientific journal**

**October - November 2012, vol. 2**



# Journal of Microbiology, Biotechnology and Food Sciences

(JMBFS)

ISSN 1338-5178

*Peer-reviewed scientific journal*

**The Journal of Microbiology, Biotechnology and Food Sciences** is an Open Access, peer-reviewed online scientific journal published by the Faculty of Biotechnology and Food Sciences (Slovak University of Agriculture in Nitra). The major focus of the journal is publishing regular (original) scientific articles, short communications and reviews from animal and plant microbiology (including bacteria, fungi, yeasts, algae, protozoa and viruses), microbial, animal and plant biotechnology and physiology, plant and animal genetics, molecular biology, agriculture and food chemistry and biochemistry, food control, evaluation and processing and environmental sciences.

The Journal of Microbiology, Biotechnology and Food Sciences is published 6 times per year in electronic version.

## EDITORS OF JMBFS

**doc. Ing. Miroslava Kačániová, PhD.** SUA, Nitra, Slovakia

**doc. Ing. Peter Haščík, PhD.** SUA, Nitra, Slovakia

**Ing. Lukáš Hleba** SUA, Nitra, Slovakia

## REVIEWERS OF JMBFS

**prof. Ing. Ján Tomáš, CSc.** Slovak University of Agriculture in Nitra, Slovakia

**prof. Ing. Juraj Čuboň, CSc.** Slovak University of Agriculture in Nitra, Slovakia

**prof. MVDr. Peter Massányi, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**prof. RNDr. Zdenka Gálová, CSc.** Slovak University of Agriculture in Nitra, Slovakia

**doc. RNDr. Dana Urminská, CSc.** Slovak University of Agriculture in Nitra, Slovakia

**doc. Ing. Marcela Capcarová, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**doc. Ing. Adriana Kolesárová, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**doc. Ing. Norbert Lukáč, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**doc. Ing. Dana Tančinová, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**Ing. Zuzana Mašková, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**Ing. Soňa Felšöciová, PhD.** Slovak University of Agriculture in Nitra, Slovakia

**prof. Ing. Peter Chrenek, DrSc.** Animal Production Research Centre in Nitra, Slovakia

**doc. RNDr. Alexander Sirotkin, DrSc.** Animal Production Research Centre in Nitra, Slovakia

**Ing. Vladimír Foltys, PhD.** Animal Production Research Centre in Nitra, Slovakia

**prof. RNDr. Mária Bauerová, PhD.** Constantine The Philosopher University in Nitra, Slovakia

**doc. RNDr. Miroslav Bauer, PhD.** Animal Production Research Centre in Nitra, Slovakia

**prof. MVDr. Vladimír Kmeť, DrSc.** Slovak Academie of Sciences in Košice, Slovakia

**prof. Dr. Dietmar Haltrich,** Department of Food Sciences and Technology, University of Natural Resources and Life Sciences, Vienna, Austria

**Ass. Prof. Dipl.-Ing. Dr. Klaus Dürrschmid,** Department of Food Science and Technology University of Natural Resources and Life Sciences, Vienna, Austria

**doc. Ing. Roman Labuda, PhD.** Romer Labs Division Holding GmbH in Tulln, Austria

**Ing. Silvia Labudová, PhD.** Erber AG, Tulln, Austria

**prof. Ing. Vojtech Rada, CSc.** Czech University of Agriculture in Prague, Czech republic

**prof. Ing. Stanislav Kráčmar, DrSc.** Tomas Bata University in Zlin, Czech Republic

**doc. Ing. František Buňka, PhD.** Tomas Bata University in Zlin, Czech Republic

**doc. RNDr. Leona Buňková. PhD.** Tomas Bata University in Zlin, Czech Republic

**Ing. Robert Gál, Ph.D.** Tomas Bata University in Zlin, Czech Republic

**MVDr. Ivan Holko, Ph.D.** Tomas Bata University in Zlin, Czech Republic

**prof. Ing. Ladislav Zeman, CSc.** Mendel University in Brno, Czech Republic

**Ing. Tomáš Vyhnánek, Ph.D.** Mendel University in Brno, Czech Republic

**Dr. Malgorzata Dżugan, PhD.** University of Rzeszow in Rzeszow, Poland

**Dr. hab. Joanna Barłowska.** University of Life Sciences in Lublin, Poland

**prof. Dr. Romas Gružasuskas.** Lithuanian Veterinary Academy in Kaunas, Lithuania

**dr. Agila Dauksiene.** Lithuanian Veterinary Academy in Kaunas, Lithuania

**Dr. Nenad Vuković.** University of Kragujevac, Faculty of Science, Serbia

**prof. Dr. Giuseppe Maiorano.** University of Molise, Campobasso, Italy

**prof. Dr. Angel Antonio Carbonell Barrachina.** University of Miguel Hermandéz, Spain

**prof. Dr. Manabendra Dutta Choudhury, PhD.** Assam University Silchar, India

**prof. Dr. Shamim Ahmed.** Microbiology Division, Institute of Ophthalmology, J. N. Medical College, Aligarh Muslim University, Aligarh, India

**prof. Baher Effat, PhD.** National Research Center in Giza, Egypt  
**Siree Chaiseri, Ph.D.** Kasetsart University in Bangkok, Thailand

**PUBLISHER** Faculty of Biotechnology and Food Sciences  
**PUBLISHER CONTACT** Slovak University of Agriculture  
Faculty of biotechnology and food sciences  
Tr. Andreja Hlinku 2  
949 76 Nitra  
Slovakia

**MAIN WEB SITE** [www.fbp.uniag.sk](http://www.fbp.uniag.sk)  
**E-MAIL** [dekfbp@uniag.sk](mailto:dekfbp@uniag.sk)  
**ISSUE** October – November 2012, vol. 2, no. 2

**PERSONAL CONTACT** **Ing. Lukáš Hleba**  
Slovak University of Agriculture  
Faculty of Biotechnology and Food Science  
Departement of Microbiology  
Tr. Andreja Hlinku 2  
94976 Nitra  
Slovakia

**E-MAIL** [lukas.hleba@gmail.com](mailto:lukas.hleba@gmail.com)  
**PHONE NUMBER** + 421 904 189 191

**JMBFS CONTACT** [www.jmbfs.org](http://www.jmbfs.org)  
[jmbfs@jmbfs.org](mailto:jmbfs@jmbfs.org)  
[info@jmbfs.org](mailto:info@jmbfs.org)