## **ACTA SCIENTIARUM POLONORUM**

Scientific journal (quartely), issued since 2002, whose founder and advocate is the Conference of the Rectors of Universities of Life Sciences

# Technologia Alimentaria

Food Science and Human Nutrition

15(1) 2016

January - March



Bydgoszcz Kraków Lublin Olsztyn Poznań Siedlce Szczecin Warszawa Wrocław ACTA Scientiarum Polonorum Technologia Alimentaria was founded by all Polish Agricultural Universities in 2001 and it is published by Poznań University of Life Sciences Press.

#### **Executive Board of Acta Scientiarum Polonorum**

Jerzy Sobota (Wrocław) – *chairman*, Józef Bieniek (Krakow), Barbara Gąsiorowska (Siedlce), Wiesław Nagórko (Warsaw), Janusz Prusiński (Bydgoszcz), Ewa Sobecka (Szczecin), Krzysztof Szkucik (Lublin), Waldemar Uchman (Poznań), Ryszard Źróbek (Olsztyn)

The papers are published in English only, in four issues yearly.

This journal is the open access and non-profit enterprise. The published papers may be collected, read and downloaded free of charge – with Author's rights reserved. We have adopted a Creative Commons licence CC BY-NC (Attribution-NonCommercial).



### Aim and scope

The original scientific peer-reviewed papers published in ACTA Scientiarum Polonorum Technologia Alimentaria journal cover main aspects of food science from raw materials properties through processing aspects up to quality of final products and their nutritional properties, usability and dietetics.

It involves fundamental and applied research, including selected subjects of food science and human nutrition with pointing out at their interface.

All of these problems can be put into following topics:

## Food Technology

- influence of all processing parameters on food quality and safety
- systems and methods of controlling and modification of food properties
- food biotechnology and microbiology
- any subject at the interface between food processing and food quality and human nutrition (paper connected with these technological problems are preferred)

#### **Functional Food**

- functional foods development
- production of novel food
- effects of processing and storage on the stability and biological activity of bioactive food components and their metabolites

#### **Human Nutrition**

- clinical tests of foods
- consumer preferences of standard and novel food
- diet and nutritional status assessment
- nutritional and health impacts of foods and food components

## Abstracting/indexing

Web of Science Core Collection – Emerging Sources Citation Index, Medline, PubMed, Scopus, EBSCO, Food Science and Technology Abstracts®, CAB International, Chemical Abstracts Service, Index Copernicus, Ulrich's Database, Directory of Open Access Journals, Agro, Agris-FAO, Embase, ProQuest, CrossRef, Scimago, HINARI, JSTOR, Socolar.

## Scientific Board of Acta Scientiarum Polonorum Technologia Alimentaria

**Editorial Chief** 

Julita Regula

Department of Human Nutrition and Hygiene Poznań University of Life Sciences, **Poland** chairman@food.actapol.net phone: +48 61 848 7339

**Associate Editors** 

Dariusz Dziki

Food Engineering
Department of Thermal Engineering
University of Life Sciences in Lublin

**Poland** 

Isabel M.P.L.V.O. Ferreira

Chemistry & Biochemistry

Department of Chemistry and Biochemistry

University of Porto, Portugal

Jacek Słupski

Food Technology
Department of Raw Materials and Fruit
and Vegetable Processing
University of Agriculture in Krakow

Poland

Joanna Suliburska

Functional Food & Food Additives
Department of Human Nutrition
and Hygiene

Poznań University of Life Sciences, Poland

Jarosław Walkowiak

Human Nutrition
Department of Gastroenterology
and Metabolism
Poznan University of Medical Sciences
Poland

**Former Editors** 

 $Waldemar\ Uchman-Editor\ in\ chief\\ 2002-2015$ 

Poznań University of Life Sciences, Poland

**Zofia Lisiewska** – Associate editor 2002–2015 University of Agriculture in Krakow

**Poland** 

Secretary of Editorial Board

Aleksander Siger

Poznań University of Life Sciences, **Poland** secretary@food.actapol.net,

phone: +48 61 848 7356

Members

Maria Daniel vaz de Almeida University of Porto, Portugal

Bhaskar C. Behera

Agharkar Research Institute, India

**Zbigniew Dolatowski** 

University of Life Sciences in Lublin

Poland

Bartlomiej Dziuba

University of Warmia and Mazury in Olsztyn, **Poland** 

Sylvian Guyot

INRA Centre de Rennes, France

Karl Heinz Herzig

University of Oulu, Finland

Berthold Victor Koletzko

University of Munich, Medical Centre **Germany** 

Zbigniew Krejpcio

Poznań University of Life Sciences, Poland

Andrea Laukova

Slovak Academy of Sciences, Slovakia

Andrzej Lenart

Warsaw University of Life Sciences – SGGW, **Poland** 

Carlos Lifschitz

Italian Hospital of Buenos Aires, Argentina

Bertrand Matthäus

Max Rubner-Institut (MRI), Germany

Abdalbasit Adam Mariod

King Abdulazis University Jeddah

Saudi Arabia

Paul Edward Mozdziak

North Carolina State University, Raleigh

**United States** 

Jan Oszmiański

Wrocław University of Environmental

and Life Sciences, Poland

Semih Ötles

Ege University, Turkey

Werner Praznik

University of Natural Resources and Applied Life Science, Austria

Mikołaj Protasowicki

West Pomeranian University of Technology, Szczecin, **Poland** 

, . . . .

Roman Przybylski

University of Lethbridge, Canada

**Eddy Robberecht** 

Universiteit Gent, Ghent, Belgium

**Kazim Sahin** 

Firat University, Turkey

Alexander Shleikin

St. Petersburg State University, Russia

**Martin Stern** 

Universitätsklinikum Tübingen Medizinische Fakultät, Tübingen

Germany

Michał Świeca

University of Life Sciences in Lublin

Poland

Alexey A. Tinkov

Orenburg State Medical Academy, Russia

**Diana Thomas** 

University of Sydney, Australia

## **Managing Team**

Lucyna Borowczyk – text editor, lbor@up.poznan.pl, phone: +48 61 848 7807, fax: +48 61 848 7808

Hanna Chudzik – statistics consultant

Małgorzata Kapuścińska – English language consultant Stanisław Tuchołka – computer typesetting, panbook.pl

### **Publisher and Owner**

University Publisher Poznań University of Life Sciences Press

Witosa 45, 61-693 Poznań, Poland

phone: +48 61 848 7776, fax: +48 61 848 7808

e-mail: wydawnictwo@up.poznan.pl, http://www.wydawnictwo.up-poznan.net

ISSN 1644-0730 (print) ISSN 1889-9594 (online)

Edition up to 50 copies. 13.4 publisher's sheets.

© Copyright by Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu

Print: Zakład Graficzny Uniwersytetu Przyrodniczego w Poznaniu

Wojska Polskiego 67, 60-625 Poznań