

STEFAN CEL MARE UNIVERSITY OF SUCEAVA

**Journal
Food and Environment Safety
of the
Suceava University**

FOOD ENGINEERING

*Volume XI, Issue 1
15 March 2012*

*Available online
<http://www.fia.usv.ro/fiajournal>*

©

**Published by
University Publishing House of Suceava**

EDITOR-IN-CHIEF:	
Sonia GUTT	Ștefan cel Mare University of Suceava, Romania
EDITORIAL BOARD	
Petru ALEXE	Dunărea de Jos University of Galați, Romania
Thiery ABRAHAM	Enzymes & Derivates, Bruxelles, Belgium
Marcel AVRĂMIUC	Ștefan cel Mare University of Suceava, Romania
Șerif BALDIRAN	Amasya University, Amasya, Turkey
Marija BODROŽA-SOLAROV	University Novi Sad, Institute for Food Technology, Serbia
Cristina-Gabriela CONSTANTINESCU (POP)	Ștefan cel Mare University of Suceava, Romania
Dirk FLOTTMAN	Technical University of Aalen, Germany
José Antonio GABALDÓN HERNÁNDEZ	Catholic University of Murcia (UCAM), National Technological Centre of the Canning and Food Industry (CTC) Molina de Segura (MURCIA), Spain
Georg GUTT	Ștefan cel Mare University of Suceava, Romania
Cristina-Elena HREȚCANU	Ștefan cel Mare University of Suceava, Romania
Ștefania IORDACHE	Valahia University of Târgoviște, Romania
Heinz – Dieter ISENGARD	Hohenheim University, Germany
Süleyman KALELI	Süleyman Demirel University, Isparta, Turkey
Nijole KAZLAUSKIENE	Institute of Ecology of Nature Research Center, Vilnius, Lithuania
Norbert KREUZINGER	Vienna University of Technology, Institute for Water Quality, Resources and Waste Management, Austria
Angel MARTINEZ SANMARTIN	Centro Tecnológico Nacional de la Conserva y Alimentación, Murcia, Spain
Feiza MEMET	Maritime University of Constanța, Romania
Christian NEUSUSS	Technical University of Aalen, Germany
Regina PROSKUVIENE	Vilnius Pedagogical University, Lithuania
Alice ROȘU	Ștefan cel Mare University of Suceava, Romania
Rodica ROTAR	Ștefan cel Mare University of Suceava, Romania
Osman Kamil SAG	Piri Reis Maritime University, Istanbul, Turkey
Jurgen SCHRAM	Krefeld University, Germany
Rodica STURZA	Technical University of Moldova, Chisinau - Republic of Moldavia
Yarema TEVTUL	Yuriy Fedkovych Chernivtsi National University, Ukraine
Gagik TOROSYAN	State Engineering University of Yerevan, Armenia
Never TOROSYAN	CSRO Institute, Yerevan, Armenia
Yeva TOROSYAN	European Regional Educational Academy, Yerevan, Armenia
Igor WINKLER	Yuriy Fedkovych Chernivtsi National University, Ukraine
Gheorghe ZGHEREA	Dunărea de Jos University of Galați, Romania

AIMS AND SCOPE

The scientific journal *Food and Environment Safety* is a quarterly publication (4 issues per year) of the Faculty of Food Engineering, Ștefan cel Mare University of Suceava, Romania, that is indexed in the International Databases: Index Copernicus Journals Master List, Ulrich's and Chemical Abstract (CAS). Also, it is acknowledged B+ by the main Romanian funding organization for university and postgraduate research programmes - National University Research Council (CNCSIS).

The purpose of *Food and Environment Safety* journal is to provide a means of rapid publication for significant contributions to the improvement and diversification of specific activities in the field of food engineering, food and environment safety, biotechnologies, chemical engineering, biosensors, agriculture and applied sciences as well. Moreover, the journal assures promotion of research results in the field of food production and, from the nutritional and toxicological point of view, it underlines the importance of applying the best analyzing and control methods for consumer's protection, food technologies, industrial biotechnologies and environment protection as well to increase life quality.

Food Engineering Faculty journal has been published since 2000 like *Analele Universitatii Ștefan cel Mare Suceava, Sectiunea Colegiul Tehnic* (ISSN 1583-2295). Between 2002 and 2004 the journal was published biannually like *Analele Universitatii Ștefan cel Mare Suceava, Sectiunea Inginerie Alimentara* (ISSN 1583-2295), then from 2005 till 2009, it was issued biannually like *ANNALS of Suceava University - Food Engineering* (ISSN 1842-4597), indexed in Index Copernicus data base and acknowledged by the National University Research Council (CNCSIS), Romania. In 2010, the Food Engineering Faculty journal changed its name in *Food and Environment Safety* (ISSN 2068 - 6609).

The cover of the journal was made by **Niculai Moroșan**.

Available online: <http://www.fia.usv.ro/fiajournal>
Address for submission, e-mail fiajournal@fia.usv.ro

CIP description of National Library

The scientific journal *Food and Environment Safety* (ISSN 2068 – 6609) is published by **University Publishing House of Suceava**, Romania.

Postal address of the University Publishing House of Suceava:

Ștefan cel Mare University, Suceava, Universitatii str. No. 13, 720229, Suceava, Romania

www.usv.ro, <http://www.usv.ro/index.php/ro/1/Editura%20USV/238/3/15>

Tel: +40 230 216 147, **Fax:** +40 0230 520 080

Editorial contact information:

Faculty of Food Engineering, Ștefan cel Mare University, Suceava, Universitatii str., No. 13, 720229, Suceava, Romania,

Phone/Fax: +40 230 520267, www.fia.usv.ro

Editor-in-Chief: Prof. Ph.D,Eng. Sonia GUTT, gutts@fia.usv.ro

Assoc. Prof. Ph.D, Eng. Gabriela CONSTANTINESCU (POP), gabriela.constantinescu@fia.usv.ro

Assoc. Prof. Ph.D Cristina HRETANU, cristina.hretanu@fia.usv.ro

Copyright © University Publishing House of Suceava. All right reserved