

BOOK of ABSTRACTS



International Conference
on Advanced Production and Processing

**1st International Conference
on Advanced Production and Processing
10th-11th October 2019
Novi Sad, Serbia**

Title:

Book of Abstracts of the 1st International Conference on Advanced Production and Processing publishes abstracts from the following fields: Innovative Food Science and Bioprocesses, Nutraceuticals and Pharmaceuticals, Sustainable Development, Chemical and Environmental Engineering, Materials Design and Applications, Petroleum Refining and Production.

Publisher:

University of Novi Sad, Faculty of Technology Novi Sad,
Bulevar cara Lazara 1, 21000 Novi Sad, Serbia

For publisher:

prof. Biljana Pajin, PhD, Dean

Editorial board:

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Editor-in-Chief:

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Design and Printing Layout:

Saša Vulić, Tamara Krstić

CIP - Каталогизacija у публикацији
Библиотеке Матице српске, Нови Сад

658.5(048.3)

INTERNATIONAL Conference on Advanced Production and Processing (1 ; 2019 ;
Novi Sad)

Book of abstracts [Elektronski izvor] / 1st International Conference on Advanced
Production and Processing, 10th-11th October 2019 Novi Sad ; [editor-in-chief Senka
Vidović]. - Novi Sad : Faculty of Technology, 2019

Nasl. s naslovnog ekrana.

ISBN 978-86-6253-102-5

a) Технологија - Производња - Апстракти

COBISS.SR-ID 330974471



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Innovative Food Science and Bioprocesses



THE EFFECT OF GENOTYPE (G), GROWING ENVIRONMENT (E), AND THEIR INTERACTION (G x E) ON THE CHEMICAL COMPOSITION OF WHEAT BRAN

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Wheat bran is a rich source of dietary fibres, some of essential fatty acids and contains important quantities of starch, protein, vitamins, minerals and phytic acid. It is also well known for its powerful anticarcinogenic and antioxidant properties. Field experiments with a collection of 23 wheat genotypes were conducted during two growing seasons in order to evaluate the effects of genotype (G), growing environment (E) and their interaction (G x E) on the nutrient composition of wheat bran. The samples of the bran portion of wheat grain were obtained as by-products of milling on the MLU 202 laboratory flour mill. Oil content was obtained by exhaustively extracting samples in a soxhlet apparatus using petroleum ether as the extractant. Tocopherols were determined by using extraction with hexane and normal-phase high-performance liquid chromatography with detection in fluorescent region. The mobile phase consisted a mixture of hexane:ethyl acetate (70:30, v/v). The results have shown that all sources of variation significantly affected chemical composition of wheat bran fraction. Total oil contents of wheat bran varied between 3.03-5.37% in the first and between 2.68-4.96% in the second growing season for investigated genotypes. Gas chromatography analyses of wheat bran oil showed major fatty acids to be linoleic, oleic and linolenic acids with wider range of variation expressed in the second growing season. Total tocopherols content in wheat bran extracts ranged from 16.3 to 77.6 mg/kg in the first and from 28.08 to 107.49 mg/kg in the second growing season. Significant differences in oil content and its chemical composition were found among the genotypes, indicating the great genetic potential for improvement. Also, the effect of the environment on all investigated compounds was highly significant, indicating the possibility to produce wheat with high levels of selected health components and antioxidant activities in a specific growing environment.

Keywords: tocopherols, wheat, wheat bran, HPLC, fluorescence detector

Acknowledgements: This study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (the project no. TR 31066).



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1st International Conference on Advanced Production and Processing 10th-11th October 2019, Novi Sad, Serbia



International Conference
on Advanced Production and Processing



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Dr Zorana Đinđića 1, 21000 Novi Sad, Serbia



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