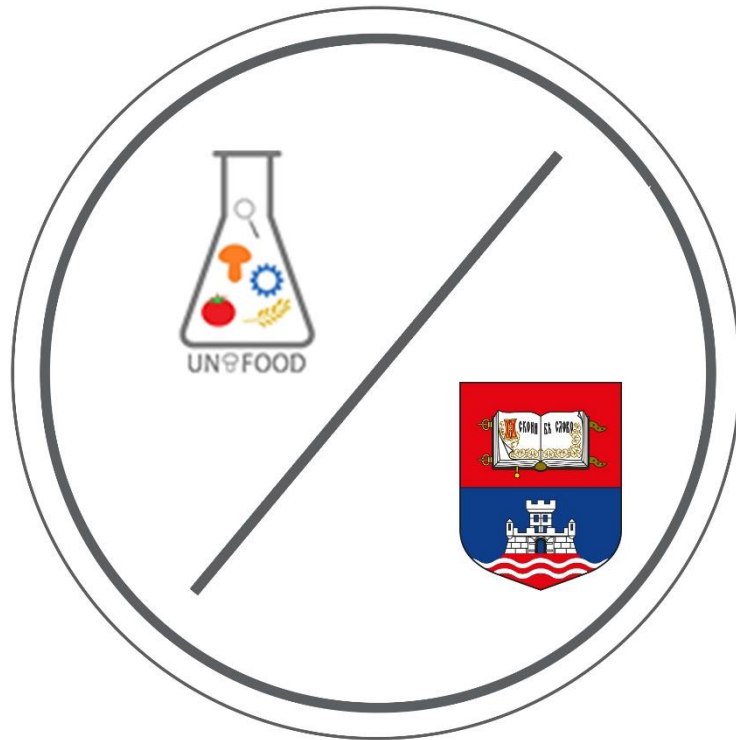


UNIFOOD CONFERENCE



University of Belgrade

Book of Abstracts

Belgrade, September 24-25, 2021

CIP - Kategorizacija u publikaciji Narodna biblioteka Srbije, Beograd

CIP - Каталогизација у публикацији - Народна библиотека Србије, Београд

663/664(048)

UNIFOOD conference (2021 ; Beograd)

Program i zbornik radova = Book of Abstracts / Unifood conference, Belgrade, September 24-25, 2021 ; [editors Mirjana Pešić, Živoslav Tešić].

- Belgrade : University of Belgrade, 2021 (Beograd : Razvojno-istraživački centar Grafičkog inženjerstva TMF).
- 197 str. ; 30 cm

Tiraž 30.

ISBN 978-86-7522-066-4

a) Храна - Апстракти

COBISS.SR-ID 47517705

UNIFOOD Conference, Belgrade September 24-25 2021

Book of Abstracts

Published by

University of Belgrade
Studentski trg 1
11000 Belgrade
www.bg.ac.rs,
email: kabinet@rect.bg.ac.rs

For Publisher

Ivanka Popović, rector

Editors

Mirjana Pešić
Živoslav Tešić

Cover Design Layout

Ivana Isaković

Circulation

30

ISBN 978-86-7522-066-4

Print

Razvojno-istraživački centar Grafičkog inženjerstva
Faculty of Technology and Metallurgy, Karnegijeva 4, Belgrade

Published

2021.



VARIATION IN SOME ESSENTIAL ELEMENTS AND ANTIOXIDANTS CONTENT IN ORGANICALLY PRODUCED SPELT AND MAIZE GRAINS

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Frequent variations and extremes in meteorological factors, affect not just yield, but also grain composition of produced crops. Organic crop production has many challenges, particularly under the rain-fed conditions, when water supply is limited and crops could be additionally subjected to the harsh environment. Aim of the research was to follow variations in grain composition of organically produced spelt wheat (var. Nirvana) and red grain maize (var. Rumenka) during 2011-2017 period, which included meteorologically different seasons. Analysed grain components included essential elements: Ca, Mg, Zn, Fe and Mn (determined by ICP-OES), as well as antioxidants, such as polyphenols, yellow pigments (YP), total glutathione (GSH) and phytate (Phy) (determined spectrophotometrically). Results revealed that the lowest concentrations of polyphenols, YP and GSH and slightly reduced Phy in the grains of both, spelt and maize were present during the season with extremely high precipitation, as 2014 was. Nevertheless, drier seasons had positive impact on the accumulation of all examined antioxidants and the highest values were obtained during meteorologically optimal years. Based on the content of essential elements, 2014 was also important for reduced Mg, Fe, Zn and Mn accumulation in spelt grain. For maize, seasons with drought (2012 and 2013) were significant for reduced accumulation of all examined elements. The highest values of all essential elements were noticed in 2016 and 2017, seasons with relative uniform precipitation distribution and optimal temperature during grain filling periods of spelt and maize. Principal component analysis revealed that drier periods present during grain filling induced high variations of GSH, Phy and Mg concentrations in spelt grain, as well as high variations of YP, Mg, Fe, Mn and Zn concentrations in maize grain. It could be assumed that growing season is an important factor affecting nutritional quality of organically produced crops, such as spelt and maize.

Keywords: Essential minerals, Antioxidants, Organic agriculture, Temperature, Precipitation amount.

Acknowledgements: This work was partially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Grant no. TR-31037).