

# 12<sup>do</sup> hranom zdravlja with food to health



Book of Abstracts of the 12<sup>th</sup> International  
Scientific and Professional Conference  
WITH FOOD TO HEALTH

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Knjiga sažetaka s 12. međunarodnog  
znanstveno-stručnog skupa  
HRANOM DO ZDRAVLJA



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## **BOOK OF ABSTRACTS / KNJIGA SAŽETAKA**

**12<sup>th</sup> International Scientific and Professional Conference**

**WITH FOOD TO HEALTH**

**October 24<sup>th</sup> and 25<sup>th</sup> 2019, Osijek, Croatia**

**12. međunarodni znanstveno-stručni skup**

**HRANOM DO ZDRAVLJA**

**24. i 25. listopada 2019., Osijek, Hrvatska**

**12** hranom  
do zdravlja  
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food  
to health

**Osijek and / i Tuzla, 2019.**

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|---|--|
| <b>BOOK OF ABSTRACTS</b>  | <i>12<sup>th</sup> International Scientific and Professional Conference WITH FOOD TO HEALTH</i>  |
| <b>KNJIGA SAŽETAKA</b>  | 12. međunarodni znanstveno-stručni skup HRANOM DO ZDRAVLJA   |
| <b>Published by /<br/>Izdavači</b>  | <i>Faculty of Food Technology Osijek (University of Osijek) and<br/>Faculty of Technology (University of Tuzla)<br/>Prehrambeno-tehnološki fakultet Sveučilišta u Osijeku i<br/>Tehnološki fakultet Univerziteta u Tuzli</i>   |
| <b>Editors / Urednici</b>   | Jurislav Babić, Drago Šubarić, Midhat Jašić  |
| <b>Executive Editor /<br/>Izvršni urednik</b>   | Antun Jozinović  |
| <b>Technical Editors /<br/>Tehnički urednici</b>  | Ana-Marija Cikoš, Ante Lončarić, Silvija Šafranko, Antonija Šarić  |
| <b>Cover page design /<br/>Dizajn naslovnice</b>  | Studio HS internet d.o.o., Osijek, Croatia / Hrvatska  |
| <b>Printing and Binding /<br/>Tisak i uvez</b>  |  |
| <b>Number of Copies /<br/>Naklada</b>   | 250  |
| <b>Organising Committee /<br/>Organizacijski odbor</b>  | Jurislav Babić ( <i>chairman / predsjednik</i> ), Drago Šubarić ( <i>vice-chairman / zamjenik predsjednika</i> ), Midhat Jašić ( <i>vice-chairman / zamjenik predsjednika</i> ), Đurđica Ačkar, Damir Alihodžić, Almir Azabagić, Ana-Marija Cikoš, Aneda Cipurković, Daniela Čačić Kenjerić, Jelena Đugum, Ivana Flanjak, Ljubica Glavaš-Obrovac, Artur Gryszkin, Igor Jerković, Damir Ježek, Stela Jokić, Antun Jozinović ( <i>secretary / tajnik</i> ), Vlatko Kopic, Tihomir Kovač, Greta Krešić, Ante Lončarić, Jelka Pleadin, Ivana Rukavina, Miralem Smajić, Martina Smolić, Marizela Šabanović, Silvija Šafranko, Antonija Šarić, Krunoslav Zmaić, Silva Wendling |
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| <i>The Conference will be credited according to the ordinance of Croatian medical chamber.<br/>Skup će biti bodovan sukladno pravilnicima Hrvatske liječničke komore.</i> |  |
| <i>A CIP catalogue record of this publication is available from the City and University Library Osijek under the number 141212060.</i>                                    |  |
| CIP zapis dostupan u računalnom katalogu Gradske i sveučilišne knjižnice Osijek pod brojem 141212060.   |  |
| ISBN (Osijek): 978-953-7005-66-5  |  |
| EAN (Osijek): 9789537005665   |  |
| ISSN (Tuzla): 2232-9536   |  |
| Osijek and / i Tuzla, 2019.   |  |

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## **RECYCLING OF FOOD INDUSTRY BY-PRODUCTS: PRODUCTION OF COCOA BEAN SHELL POWDER USING SPRAY DRYING TECHNIQUE**

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Cocoa bean shell, which represents waste generated in the production of cocoa and its products, is proven to contain numerous bioactive components that can be applied in food, cosmetic, and pharmaceutical industry. To valorize this material, it is necessary to develop an adequate method that can provide quality and stable products of cocoa bean shell that contains bioactive components. With that goal in mind, the spray drying technique with two carriers – maltodextrin and whey protein was applied.

The obtained dry extracts were characterized in terms of physico-chemical properties: moisture content, hygroscopicity, bulk density, rehydration, water absorption index and water solubility index, content of total phenols and total flavonoids. Furthermore, the content of bioactive components (theobromine, caffeine, gallic acid, caffeic acid, *p*-coumaric acid, (+)-catechin, (-)-epicatechin and (-)-epicatechin gallate) was performed by HPLC method. By using maltodextrin, an approximately 74% efficacy of the process was achieved, while with whey protein it was 59%. The powders obtained with both carriers had a moisture content below 6%, which secures the extended stability of the extract if it is stored in an adequate manner. Similar results were achieved in the case of hygroscopicity which is the capacity of the material to absorb moisture. This capacity was monitored after 2, 5, 7, 10, and 14 days and it ranged from 12.40 to 16.68% for both powders.

The value of the bulk density of the obtained powders were higher in the case where maltodextrin was used, while whey protein was more efficient and adequate carrier for the preservation of polyphenols. As a result, a higher content of total phenols and flavonoids in dry powders dried with whey protein was determined. Higher content of methylxanthines and phenolic acids, except caffeic acid, was obtained when whey protein was used as a carrier while the content of other analyzed active components was the same regardless of carrier type.

*Keywords:* cocoa bean shell, spray drying, active compounds