BOOK of ABSTRACTS

ICAPP

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:
Mirjana Jovicic, Ljiljana Popovic, Zdravko Sumic, Milica Hadnadjev, Olga Govedarica, Snezana Vucetic i Oskar Bera.

Editor-in-Chief:
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Design and Printing Layout:
Saša Vulić, Tamara Krstić

CIP - Каталогизација 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

а) Технологија - Производња - Апстракти

COBISS.SR-ID 330974471

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FUEL POTENTIAL AND PROPERTIES OF GRAPE POMACE HYDROCHAR

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Increasing fossil fuel depletion that leads to air pollution and global warming have become serious environmental problem. For this reason, a numerous of alternative biofuels have been developed and investigated as potential energy sources to substitute them. One of promising and highly effective technology for conversion of wet and waste biomass into multi-functional materials is a hydrothermal carbonization. In this study grape pomace was hydrothermally carbonized at different temperatures (180, 200 and 220 °C). Produced hydrochars were characterized in order to investigate its potential application as alternative and energy-efficient renewable fuels. The carbon, fixed carbon, sulfur and volatile matter contents were determined in all hydrochar samples. Obtained results showed that temperatures play significant role on the structural characteristics of produced materials. As expected, the carbon content and fixed carbon content in hydrochars were increased with temperature increasing (Table 1). Higher yields of carbon and fixed carbon observed in hydrochars indicated that intensive carbonization of biomass occurred. On the contrary, sulfur and volatile matter content were decreased. Observed reduction may be a result of dehydration and decarboxylation of grape pomace during hydrothermal treatment. These reductions are highly beneficial and improve the efficiency of solids' direct combustion. Decreased volatile matter content can potentially reduce the release of inorganic vapors and pollutant emission during combustion, while decreased sulfur content preventing generation and emission of harmful sulfur oxides, SO_x, compared to the parent biomass. The present study showed that hydrothermal carbonization improved fuel qualities and potential of grape pomace hydrochars among different reaction temperatures.

Table 1. Fuel characteristics of grape pomace and obtained hydrochars

Sample	Cfix (%)	C (%)	S (%)	VM (%)
Grape pomace	17,29	48,87	0,34	75,49
HC-180	22,16	56,01	0,27	68,27
HC-200	25,65	56,95	0,24	64,85
HC-220	27,27	58,38	0,22	62,79

Keywords: Grape pomace, Hydrochar, Hydrothermal carbonization, Fuel

Acknowledgements: *The authors are grateful to the Serbian Ministry of Education, Science and Technological Development for the financial support of this investigation included in the project TR 31003.*