ПРИЛОГ 4: ОСТАЛА ДОКУМЕНТА ОД ЗНАЧАЈА

Садржај:

1. ЦИТИРАНОСТ ПРИЛОЖЕНИХ РАДОВА

Извор: SCOPUS (на 31.07.2023. године)

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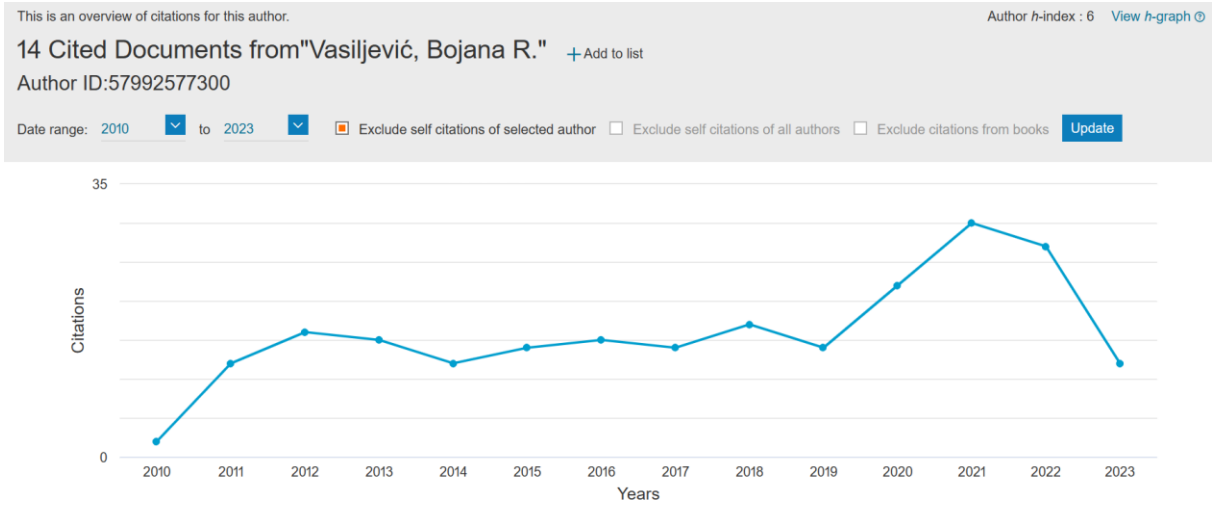
h-index = 6



	Documents	Citations	<2010	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Subtotal	>2023	Total
		Total	0	2	12	16	15	12	14	15	14	17	14	22	30	27	12	222	0	222
1	Microwave-induced synthesis of zinc-phthalocyanine with impr...	2023																0		0
2	Surface functionality as a key parameter for the conductivit...	2022															2	2		2
3	Investigation of the Potential of Bile Acid Methyl Esters as...	2022														2		2		2
4	Black titania: Turning the surface chemistry toward visible-...	2022															1	1		1
5	Microwave-assisted green synthesis of bile acid derivatives ...	2021														2	1	3		3
6	Aggregation Behavior and Micellar Properties of Sodium Salts...	2021									1	1			1			3		3
7	Green and facile microwave assisted synthesis of (metal-free...	2019											1	7	13	12	6	39		39
8	Microwave-assisted synthesis of bile acids derivatives: An o...	2019													1			1		1
9	Microwave-assisted synthesis of biologically active amide de...	2018										1			1	1		3		3
10	The influence of naphthenic acids and their fractions on cel...	2015								1	2		1	1		1		6		6
11	Trifolium pratense L. as a potential natural antioxidant	2014						2	4	4	1	6	3	8	10	5	2	45		45
12	Fractionation of complex mixtures of naphthenic acids, their...	2012				1			2		1	2	2					8		8
13	Microwave-assisted forced degradation using high-throughput ...	2011			1	1	2	2	1	2	1	1	2	1	1			15		15
14	Sintered silicon carbide: A new ceramic vessel material for ...	2010		2	11	14	13	8	7	8	8	6	5	5	3	4		94		94

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Prekodravac J., Giannakoudakis D.A., Colmenares J.C., Nair V., Vasiljević B., Kepić D., Advanced Materials for Sustainable Environmental Remediation: Terrestrial and Aquatic Environments, Chapter: Black Titania: turning the surface chemistry towards visible light absorption, (photo) remediation of hazardous organics and H2 production, Elsevier, pp. 361-398 (2022), ISBN 978-0-323-91894-7.

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Marinović M.A., Petri T.E., Grbović M.Lj., Vasiljević R.B., Jovanović-Šanta S.S., Bekić S.S., Ćelić S.A., Investigation of the Potential of Bile Acid Methyl Esters as Inhibitors of Aldo-keto Reductase 1C2: Insight from Molecular Docking, Virtual Screening, Experimental Assays and Molecular Dynamics, Molecular Informatics, 41, 2100256, 2022. https://doi.org/10.1002/minf.202100256

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Prekodravac R.J., Budimir D.B., Kleut N.D., Vasiljević R.B., Rajić B.V., Ciasca G., Todorović-Marković B.; Surface functionality as a key parameter for the conductivity of microwave synthesized CQDs thin films, Diamond and Related Materials, 129, 109366, 2022. https://doi.org/10.1016/j.diamond.2022.109366

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2. ОДЛУКА О ИЗБОРУ У ЗВАЊЕ НАУЧНИ САРАДНИК (2015. год.)

Република Србија
МИНИСТАРСТВО ПРОСВЕТЕ,
НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА
Комисија за стицање научних звања

Број:660-01-00011/122
30.09.2015. године
Б е о г р а д

На основу члана 22. става 2. члана 70. став 5. Закона о научноистраживачкој делатности ("Службени гласник Републике Србије", број 110/05 и 50/06 – исправка и 18/10), члана 2. става 1. и 2. тачке 1 – 4.(прилози) и члана 38. Правилника о поступку и начину вредновања и квантитативном исказивању научноистраживачких резултата истраживача ("Службени гласник Републике Србије", број 38/08) и захтева који је поднео

Природно-математички факултет у Новом Саду

Комисија за стицање научних звања на седници одржаној 30.09.2015. године, донела је

ОДЛУКУ
О СТИЦАЊУ НАУЧНОГ ЗВАЊА

Др Бојана Васиљевић
стиче научно звање
Научни сарадник

у области природно-математичких наука - хемија

О Б Р А З Л О Ж Е Њ Е

Природно-математички факултет у Новом Саду

утврдио је предлог број 04-01-30/31 од 26.02.2015. године на седници Наставно-научног већа Факултета и поднео захтев Комисији за стицање научних звања број 0601-45/132 од 30.03.2015. године за доношење одлуке о испуњености услова за стицање научног звања ***Научни сарадник***.

Комисија за стицање научних звања је по претходно прибављеном позитивном мишљењу Матичног научног одбора за хемију на седници одржаној 30.09.2015. године разматрала захтев и утврдила да именована испуњава услове из члана 70. став 5. Закона о научноистраживачкој делатности ("Службени гласник Републике Србије", број 110/05 и 50/06 – исправка и 18/10), члана 2. става 1. и 2. тачке 1 – 4.(прилози) и члана 38. Правилника о поступку и начину вредновања и квантитативном исказивању научноистраживачких резултата истраживача ("Службени гласник Републике Србије", број 38/08) за стицање научног звања ***Научни сарадник,*** па је одлучила као у изреци ове одлуке.

Доношењем ове одлуке именована стиче сва права која јој на основу ње по закону припадају.

Одлуку доставити подносиоцу захтева, именованој и архиви Министарства просвете, науке и технолошког развоја у Београду.

ПРЕДСЕДНИК КОМИСИЈЕ
Др Станислава Стошић-Грујичић,
научни саветник

МИНИСТАР
Др Срђан Вербић

3. ПОТВРДА О УЧЕШЋУ НА ТЕМИ

ИНСТИТУТ ЗА НУКЛЕАРНЕ НАУКЕ "ВИНЧА"
ИНСТИТУТ ОД НАЦИОНАЛНОГ ЗНАЧАЈА ЗА РЕПУБЛИКУ СРБИЈУ
УНИВЕРЗИТЕТ У БЕОГРАДУ

Мике Петровића Аласа 12-14
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Ваш знак: Наш знак 601-291/2023-030 Винча, 01.08.2023

ПОТВРДА О УЧЕШЋУ НА ИСТРАЖИВАЧКОЈ ТЕМИ

Овим документом потврђујем да је др Бојана Васиљевић, научни сарадник Института за нуклеарне науке "Винча", учесник на програму истраживања Програм 1 Нови материјали и нанонауке, са насовом теме „Синтеза и примена нових функционалних материјала" ИД 0302306, руководилац теме др Милена Мариновић-Цинцовић.

У Београду

01.08.2023. године

Др Милена Мариновић-Цинцовић

Руководилац теме

Проф. Др Снежана Пајовић

Директор Института "Винча"

4. ПОТВРДА О УЧЕШЋУ НА БИЛАТЕРЛАНОМ ПРОЈЕКТУ

ИНСТИТУТ ЗА НУКЛЕАРНЕ НАУКЕ "ВИНЧА"
ИНСТИТУТ ОД НАЦИОНАЛНОГ ЗНАЧАЈА ЗА РЕПУБЛИКУ СРБИЈУ
УНИВЕРЗИТЕТ У БЕОГРАДУ

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Ваш знак: Наш знак: Београд-Винча,

Предмет: Допис о учешћу у пројектним задацима Билатералног пројекта

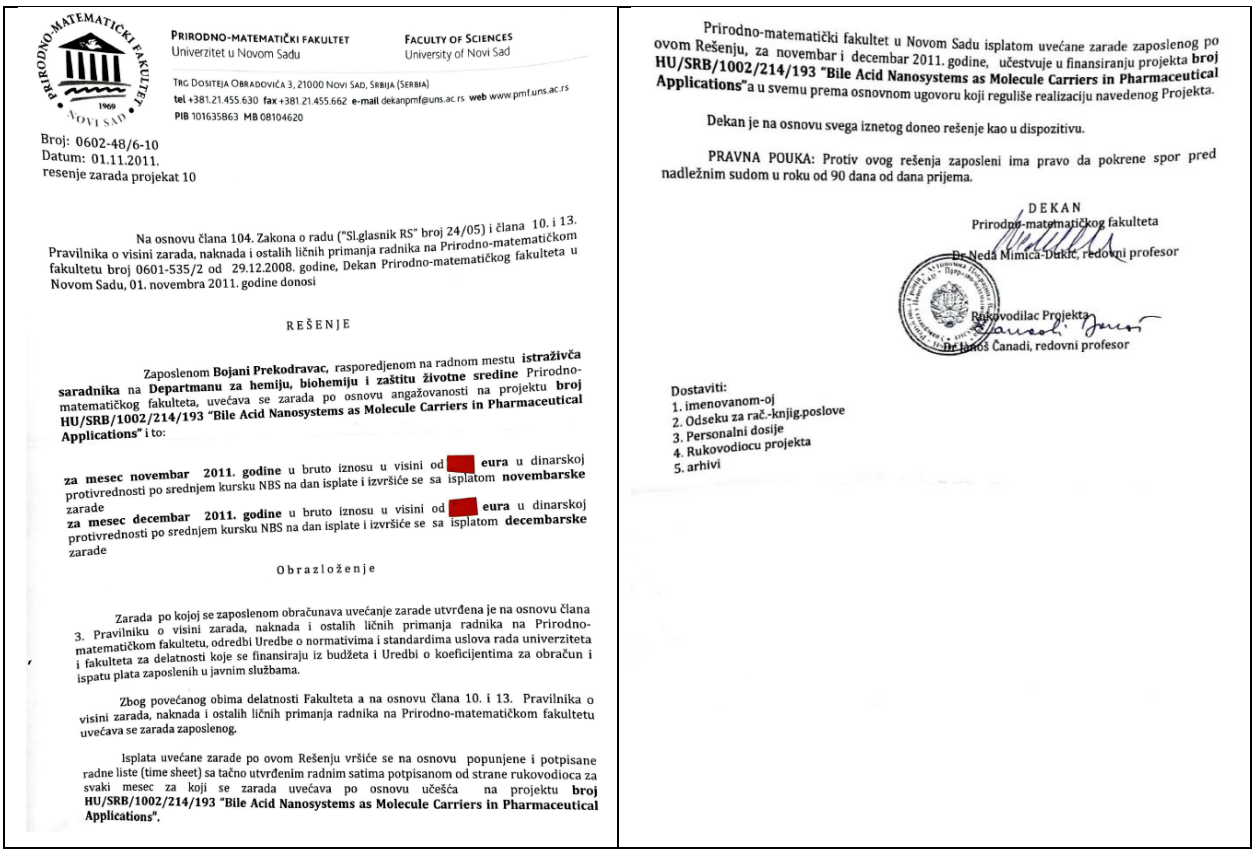
Овим документом потврђујем да је др Бојана Васиљевић, научни сарадник Института за нуклеарне науке „Винча“ – Институт од националног значаја за Републику Србију, Универзитета у Београду, **учесник билатералног пројекта** између Републике Србије и Аустрије „Нанохибриди угљеничних квантних тачака за фотокаталитичку производњу водоника и третман вода“ (број уговора 337-00-577/2021-09/10).

У Београду, 25.09.2023. године

Руководилац Пројекта
др Јована Прекодравац, научни сарадник
Институт за нуклеарне науке „Винча“
Институт од националног значаја за Републику Србију,
Универзитет у Београду.

Директор Института за нуклеарне науке „Винча“
Проф. Др Снежана Пајовић, научни саветник,
Института за нуклеарне науке „Винча“
Институт од националног значаја за Републику Србију,
Универзитет у Београду

5. ПОТВРДА О УЧЕШЋУ НА IPA ПРОЈЕКТУ



PRIRODNO-MATEMATIČKI FAKULTET
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PIB 101635863 MB 08104620

Broj: 0602-48/6-10
Datum: 01.11.2011.
resenje zarada projekat 10

Na osnovu člana 104. Zakona o radu ("Sl.glasnik RS" broj 24/05) i člana 10. i 13. Pravilnika o visini zarada, naknada i ostalih ličnih primanja radnika na Prirodno-matematičkom fakultetu broj 0601-535/2 od 29.12.2008. godine, Dekan Prirodno-matematičkog fakulteta u Novom Sadu, 01. novembra 2011. godine donosi

REŠENJE

Zaposlenom **Bojani Prekodravac,** rasporedjenom na radnom mestu **istraživča saradnika** na **Departmanu za hemiju, biohemiju i zaštitu životne sredine** Prirodno-matematičkog fakulteta, uvećava se zarada po osnovu angažovanosti na projektu **broj HU/SRB/1002/214/193 "Bile Acid Nanosystems as Molecule Carriers in Pharmaceutical Applications"** i to:

za mesec novembar 2011. godine u bruto iznosu u visini od [redacted] **eura** u dinarskoj protivrednosti po srednjem kursku NBS na dan isplate i izvršiće se sa isplatom **novembarske** zarade
za mesec decembar 2011. godine u bruto iznosu u visini od [redacted] **eura** u dinarskoj protivrednosti po srednjem kursku NBS na dan isplate i izvršiće se sa isplatom **decembarske** zarade

Obrazloženje

Zarada po kojoj se zaposlenom obračunava uvećanje zarade utvrđena je na osnovu člana 3. Pravilniku o visini zarada, naknada i ostalih ličnih primanja radnika na Prirodno-matematičkom fakultetu, odredbi Uredbe o normativima i standardima uslova rada univerziteta i fakulteta za delatnosti koje se finansiraju iz budžeta i Uredbi o koeficijentima za obračun i ispatu plata zaposlenih u javnim službama.

Zbog povećanog obima delatnosti Fakulteta a na osnovu člana 10. i 13. Pravilnika o visini zarada, naknada i ostalih ličnih primanja radnika na Prirodno-matematičkom fakultetu uvećava se zarada zaposlenog.

Isplata uvećane zarade po ovom Rešenju vršiće se na osnovu popunjene i potpisane radne liste (time sheet) sa tačno utvrđenim radnim satima potpisanom od strane rukovodioca za svaki mesec za koji se zarada uvećava po osnovu učešća na projektu **broj HU/SRB/1002/214/193 "Bile Acid Nanosystems as Molecule Carriers in Pharmaceutical Applications".**

Prirodno-matematički fakultet u Novom Sadu isplatom uvećane zarade zaposlenog po ovom Rešenju, za novembar i decembar 2011. godine, učestvuje u finansiranju projekta **broj HU/SRB/1002/214/193 "Bile Acid Nanosystems as Molecule Carriers in Pharmaceutical Applications"** a u svemu prema osnovnom ugovoru koji reguliše realizaciju navedenog Projekta.

Dekan je na osnovu svega iznetog doneo rešenje kao u dispozitivu.

PRAVNA POUKA: Protiv ovog rešenja zaposleni ima pravo da pokrene spor pred nadležnim sudom u roku od 90 dana od dana prijema.

DEKAN
Prirodno-matematičkog fakulteta
Dr Neda Mimica-Dukić, redovni profesor

Rukovodilac Projekta
Dr Janos Čanadi, redovni profesor

Dostaviti:
1. imenovanom-oj
2. Odseku za rač.-knjig.poslove
3. Personalni dosije
4. Rukovodiocu projekta
5. arhivi

6. ПОТВРДА О ИМЕНОВАЊУ КООРДИНАТОРА ЕРАСМУС+ ПРОГРАМА 2021-2027

ИНСТИТУТ ЗА НУКЛЕАРНЕ НАУКЕ „ВИНЧА“
ИНСТИТУТ ОД НАЦИОНАЛНОГ ЗНАЧАЈА ЗА РЕПУБЛИКУ СРБИЈУ
УНИВЕРЗИТЕТА У БЕОГРАДУ
Деловодни број: 016-4/2023-030
Датум: 09.02.2023. године

На основу члана 36. Статута Института за нуклеарне науке „Винча“, директор Института за нуклеарне науке „Винча“, Института од националног значаја за Републику Србију, Универзитета у Београду, дана 09.02.2023. године:

ОДЛУКУ

I *Именује се* др Бојана Васиљевић из Београда, запослена на радном месту научни сарадник у Институту „Винча“ за координатора ЕРАЗМУС+ програма 2021-2027 испред Института за нуклеарне науке „Винча“- Института од националног значаја за Републику Србију- Универзитета у Београду.

II Ова одлука ступа на снагу даном доношења.

Директор Института „Винча“
Проф. др Снежана Пајовић

7. ЧЛАНСТВО У КОМИСИЈИ ЗА ОДБРАНУ МАСТЕР РАДА

Матер рад Александре Телечки

UNIVERZITET U NOVOM SADU
PRIRODNO-MATEMATIČKI FAKULTET
DEPARTMAN ZA HEMIJU, BIOHEMIJU
I ZAŠTITU ŽIVOTNE SREDINE

Aleksandra Telečki

Sinteza B- i C-homo laktamskih derivata holne kiseline

-Master rad-

Novi Sad, 2020.

Predgovor:

*Ovaj master rad je urađen na Departmanu za hemiju, biohemiju i zaštitu životne sredine Prirodno-matematičkog fakulteta u Novom Sadu pod mentorstvom **dr Ksenije Pavlović**, docenta Prirodno-matematičkog fakulteta u Novom Sadu, koja je predložila temu i rukovodila radom.*

*Veliku zahvalnost, u prvom redu, dugujem mojoj mentorki, **dr Kseniji Pavlović**, na svesrdnoj pomoći, kao i na bezrezervnoj podršci prilikom izrade eksperimentalnog dela i prilikom pisanja ovog rada. Neizmerno se zahvaljujem na besprekornom uzoru, savetima, strpljenju, velikodušnom osmehu i na svakom zajedničkom trenutku, koji su bezvremeno ušuškani u mom srcu.*

*Zahvaljujem se **dr Jovani Ajduković**, vanrednom profesoru Prirodno-matematičkog fakulteta u Novom Sadu, na pokazanom interesovanju za ovaj rad. Takođe, zahvaljujem se **dr Bojani Vasiljević**, naučnom saradniku Prirodno-matematičkog fakulteta u Novom Sadu, na savetima, druženju prilikom izrade eksperimentalnog dela ovog rada, kao i na pokazanom interesovanju za isti.*

*Želela bih da se zahvalim i **MSc Dušanu Škoriću**, istraživaču-saradniku Prirodno-matematičkog fakulteta u Novom Sadu, na pomoći pri snimanju NMR spektara.*

*Neopisivu zahvalnost dugujem mojoj **porodici i prijateljima** na pruženoj ljubavi i podršci.*

Aleksandra Telečki

UNIVERZITET U NOVOM SADU

PRIRODNO-MATEMATIČKI FAKULTET

DEPARTMAN ZA HEMIJU, BIOHEMIJU I ZAŠTITU ŽIVOTNE SREDINE

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Autor: AU	Aleksandra Telečki

Predsednik:	dr Jovana Ajduković, vanredni profesor PMF-a u Novom Sadu
Mentor:	dr Ksenija Pavlović, docent PMF-a u Novom Sadu
Član:	dr Bojana Vasiljević, naučni saradnik PMF-a u Novom Sadu

MASTER RAD GDE JE DR BOJANA VASILJEVIĆ ČLAN KOMISIJE

D-3620
TELEČKI, Aleksandra

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Član komisije Bojana Vasiljević

Podatak preuzet iz BISIS baze

Knjižničar

Ljubica Dimitrijević

8. УЏБЕНИК ЗА СТУДЕНТЕ

Univerzitet u Novom Sadu ○ Prirodno-matematički fakultet
Departman za hemiju, biohemiju i zaštitu životne sredine

Ljubica Grbović ○ Ksenija Pavlović ○ Bojana Vasiljević

MIKROTALASI
U ZELENOJ ORGANSKOJ HEMIJI

ISBN 978-86-7031-565-5

GLAVNI I ODGOVORNI UREDNIK (PMF)

Prof. dr Milica Pavkov Hrvojević, redovni profesor,
dekan Prirodno-matematičkog fakulteta u Novom Sadu

RECENZENTI

Prof. dr Marija Sakač, redovni profesor,
Prirodno-matematički fakultet, Univerzitet u Novom Sadu

Prof. dr Jasna Čanadanović-Brunet, redovni profesor,
Tehnološki fakultet, Univerzitet u Novom Sadu

TEHNIČKA OBRADA SLIKA I DIZAJN KORICA

Darko Grbović

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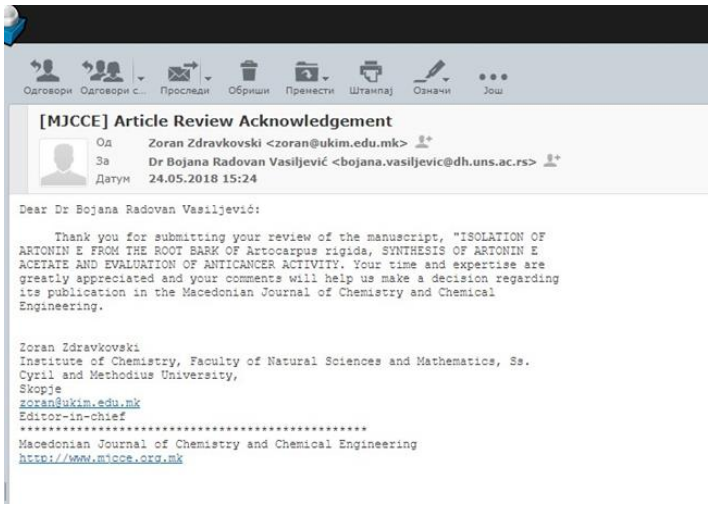
www.dh.uns.ac.rs

Odlukom Nastavno-naučnog veća Prirodno-matematičkog fakulteta u Novom Sadu sa 25. sednice održane 09.09.2020. rukopis je prihvaćen kao univerzitetski udžbenik

9. ПОТВРДЕ О РЕЦЕНЗИЈАМА НАУЧНИХ РАДОВА



Одговори | Одговори с... | Проследи | Обриши | Пренести | Штампај | Означи | Још

[MJCCE] Article Review Acknowledgement

Од Zoran Zdravkovski <zoran@ukim.edu.mk>
За Dr Bojana Radovan Vasiljević <bojana.vasiljevic@dh.uns.ac.rs>
Датум 24.05.2018 15:24

Dear Dr Bojana Radovan Vasiljević:

Thank you for submitting your review of the manuscript, "ISOLATION OF ARTONIN E FROM THE ROOT BARK OF Artocarpus rigida, SYNTHESIS OF ARTONIN E ACETATE AND EVALUATION OF ANTICANCER ACTIVITY. Your time and expertise are greatly appreciated and your comments will help us make a decision regarding its publication in the Macedonian Journal of Chemistry and Chemical Engineering.

Zoran Zdravkovski
Institute of Chemistry, Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University,
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zoran@ukim.edu.mk
Editor-in-chief
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Macedonian Journal of Chemistry and Chemical Engineering
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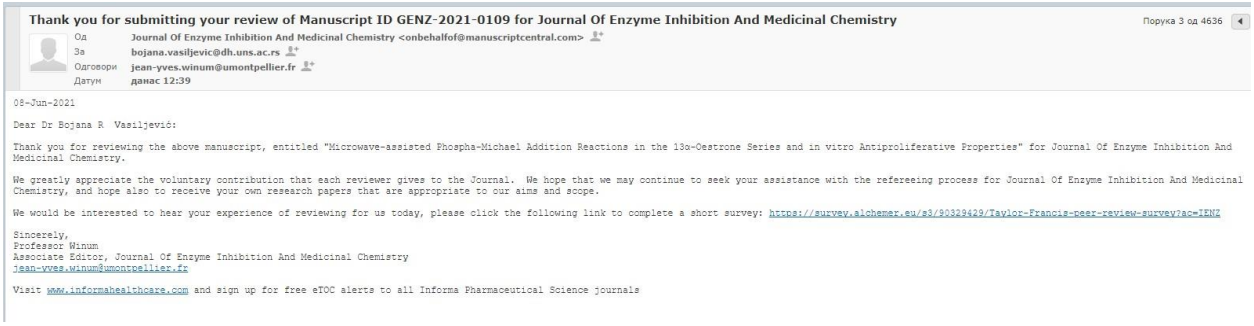

Thank you for submitting your review of Manuscript ID GENZ-2021-0109 for Journal Of Enzyme Inhibition And Medicinal Chemistry

Порука 3 од 4636

Од Journal Of Enzyme Inhibition And Medicinal Chemistry <onbehalfof@manuscriptcentral.com>
За bojana.vasiljevic@dh.uns.ac.rs
Одговори jean-yves.winum@umontpellier.fr
Датум данас 12:39

08-Jun-2021

Dear Dr Bojana R Vasiljević:

Thank you for reviewing the above manuscript, entitled "Microwave-assisted Phospha-Michael Addition Reactions in the 13α-Oestrone Series and in vitro Antiproliferative Properties" for Journal Of Enzyme Inhibition And Medicinal Chemistry.

We greatly appreciate the voluntary contribution that each reviewer gives to the Journal. We hope that we may continue to seek your assistance with the refereeing process for Journal Of Enzyme Inhibition And Medicinal Chemistry, and hope also to receive your own research papers that are appropriate to our aims and scope.

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Sincerely,
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jean-yves.winum@umontpellier.fr

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We are pleased to confirm that

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has reviewed 5 papers for the following MDPI journals in 2023:

Scientia Pharmaceutica, Catalysts, Applied Sciences, Sustainability, Molecules

Shu-Kun Lin
Dr. Shu-Kun Lin, Publisher and President
Basel, 26 July 2023

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10. ПОГЛАВЉЕ У КЊИЗИ

Београд, 04.04.2023. године

др Јована Прекодравац

Иниститут за нуклеарне науке „Винча“

Универзитет у Београду

Поштована др Прекодравац,

Разматран је захтев за категоризацију поглавља у монографији, који је електронским путем достављен Матичном научном одбору за хемију 10.10.2022. године.
Матични научни одбор за хемију је донео одлуку да према критеријумима из важећег Правилника о стицању истраживачких и научних звања 159/2020, научни резултат аутора др Јоване Прекодравац и др Дејана Кепића

Jovana Prekodravac, Dimitrios A. Giannakoudakis, Juan Carlos Colmenares, Vaishakh Nair, Bojana Vasiljević, Dejan Kepić (2023), „Black titania: Turning the surrface chemistry toward visible-light absorption, (photo) remediation of hazardous organics and H2 production“, Chapter 14 In: *Novel Materials for Environmental Remediation Applications*, Editors: Dimitrios A. Giannakoudakis, Lucas Meili and Ioannis Anastopoulos, Elsevier, Inc., pp. 361-398, ISBN 978-0-323-91894-7, DOI 10.1016/B978-0-323-91894-7.00010-4

припада поглављу категорије М13/монографије М11

За др Бојану Васиљевић научни резултат

Jovana Prekodravac, Dimitrios A. Giannakoudakis, Juan Carlos Colmenares, Vaishakh Nair, Bojana Vasiljević, Dejan Kepić (2023), „Black titania: Turning the surrface chemistry toward visible-light absorption, (photo) remediation of hazardous organics and H2 production“, Chapter 14 In: *Novel Materials for Environmental Remediation Applications*, Editors: Dimitrios A. Giannakoudakis, Lucas Meili and Ioannis Anastopoulos, Elsevier, Inc., pp. 361-398, ISBN 978-0-323-91894-7, DOI 10.1016/B978-0-323-91894-7.00010-4

не припада поглављу категорије М13/монографије М11.
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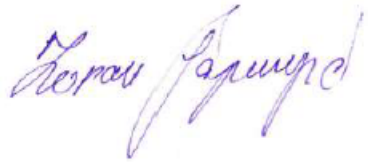

Др Зоран Шапоњић
Председник Матичног научног одбора за хемију

11. НАГРАДЕ И СЕРТИФИКАТИ

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This is to certificate that

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attended the EMDESK Expert Session entitled 'Quick guide for planning your Horizon Europe applications - Expert Insights',
given as a webinar on the 11th of Februar 2021, 14:00 CET.

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Бојана Васиљевић

учествовала је у следећим
модулима 'TRAIN' програма:

1. Дидактика и дизајн курикулума у високом образовању
2. Припрема пројектних апликација и менаџмент пројеката
3. Комуникационе и презентационе вештине

одржаним у октобру 2017. године,

на Универзитету у Новом Саду.

Ректор Универзитета у Новом Саду

Проф. др Душан Николић

12. ДОКАЗИ УЧЕСТВОВАЊА НА КОНФЕРЕНЦИЈАМА

Саопштења са међународног скупа штампана у целини М33

PROCEEDINGS OF THE

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October 9-10, 2017

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Hungary

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Tünde Alapi
István Ilisz

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2017.
Szeged, Hungary

Lecture Proceedings

ECO-FRIENDLY MICROWAVE-ASSISTED SYNTHESIS OF BIOLOGICALLY ACTIVE NAPHTHENIC ACID *N*-CYCLOHEXYL AMIDES

Bojana Vasiljević[1], Ljubica Grbović[1], Ksenija Pavlović[1], Mirjana Popsavin[1], Slavko Kevrešan[2], Vera Cirin-Novta[1]

[1]University of Novi Sad, Faculty of Sciences, Department of Chemistry, Biochemistry and Environmental Protection, Trg Dositeja Obradovića 3, 21 000 Novi Sad, Serbia
[2]University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21 000 Novi Sad, Serbia
e-mail: bojana.vasiljevic@dh.uns.ac.rs

Abstract
Inside the framework of green chemistry, a noticeable results were obtained in microwave-assisted solvent-free synthesis of biologically active *N*-cyclohexyl amides of naphthenic acids (NAs). Naphthenic acid amides were synthesized directly from free carboxylic acids in the absence of solvent and catalyst. Synthesized *N*-cyclohexyl amides of naphthenic acid were evaluated for their auxin activity.

Introduction
The stable and polar amide functionality is an important unit among the organic molecules present in natural-occurring materials (e.g., peptides and proteins). It is also found in many synthetic substances as intermediates or as active pharmaceutical products or prodrugs [1]. Due to its interest in organic synthesis, the preparation of amides from the corresponding amines is an important and well-known transformation, but the main drawbacks of these reactions are long reaction time, low yield, use of organic solvents and expensive or toxic reagents [2,3,4].
Over the last years, a large number of publications have clearly shown that many types of chemical transformations can be carried out successfully under microwave irradiation [5]. Most importantly, microwave processing frequently leads to dramatically reduced reaction times, higher yields, easier work-up matching with the goal of green chemistry, atom economy, and selectivity of reactions. In addition to their wide application, utilization of microwave technology in the amide solvent-free synthesis is not frequently described in the literature [6,7,8].
Napthenic acids (NAs) represent a complex mixture of alkyl-substituted aliphatic and cyclic monocarboxylic acids of the general formula $C_nH_{2n-z}O_2$, where n is the number of carbon atoms and z the hydrogen deficiency due to ring formation, obtained from oil and oil derivatives by alkaline extraction. In addition to a wide application in the chemical industry, these compounds exhibit biological activity. Low concentrations (up to 0.5 mg/L) of NAs and their salts have been studied for a long time as substances exhibiting biological activity, such as plant growth hormones [9,10] but at high concentrations (above 50 mg/L), NAs are corrosive and toxic substances [11] and for these reasons they represent serious contaminants of refinery wastewaters and act as environmental pollutants.
Having in mind the nature of naphthenic acids and amide group as an important functionality due to its presence in great number of biomolecules, the aim of the present work was to designed simple, eco-friendly method of forming biologically active amide derivatives of naphthenic acids by using microwave irradiation.

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Szeged, Hungary

Lecture Proceedings

DEGRADATION OF ORGANIC DYES UNDER VISIBLE LIGHT

Jovana Prekodravac[1], Bojana Vasiljević[2], Dejan Kepić[1], Milica Budimir[1], Duška Kleut[1], Biljana Todorović-Marković[1]

[1]Institute of nuclear sciences Vinča, University of Belgrade, Belgrade, Serbia
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Abstract
We performed the "bottom-up" synthesis of N–doped CQDs *via* swift and easy one–step microwave–assisted method. The percentage of bound nitrogen in this short amount of time was about 11 at% in the form of pyrridinc/NH_2, pyrrolic–N and graphitic–N. The synthesized N–doped CQDs showed good photocatalytic activiti in organic dyes degradation after only 30 min of expoisure to the visible light.

Introduction
The water polution is one of the major problem of today. Industries discharge waste matter, containing organic dyes, into natural water resources without any treatment [1]. These organic dyes, such as rose bengal (RB) and methylene blue (MB) are extrimely genotoxic, mutagenic and cytotoxic [2–6]. So far, various semiconductor materials have been used as photocatalysts for the removal of different dyes from aqueous solutions. Different parameters affect the rate of the dye degradation, such as pH, concentration and light intensity [1]. Here we performed the photocatalytic degradation of RB and MB in the presence of visible light.

Experimental
Synthesis of N–CQDs was performed from water solution of glucose in the presence of ammonia hydroxide (NH_4OH, 25%). Aqueous solution were irradiated in closed–vessel system of CEM Discover BenchMate single mode microwave reactor for only 1 minute, at fixed temperature (100 °C) and power (100 W, 200 W). After synthesis, the samples were dialized for 5 days and filtrated through filters from 450 nm to 10 nm. For the photocatalytic activity study, the N–CQD_{100} or N–CQD_{200} samples were dispersed in RB (0.03 mM) and MB (0.03M) water solutions and treated under visible light at different condditions.

Results and discussion
The Atomic force microscopy (AFM) was used for analysis of morphology and structure of synthesized N–CQDs (Fig 1.) showing that samples (N–CQD_{100} and N–CQD_{200}) have good morphology with spherical like shapes. Taking into account the anomalies related to measurements of particles thickness [7] and diameter [8] we calculated the real particle diameter distribution by analysing 100 dots for each sample. The measured real particle diameters were in the range from 5 to 30 nm.

PROCEEDINGS OF THE

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2020.
Szeged, Hungary

Lecture Proceedings

MICROWAVE-ASSISTED SYNTHESIS OF N-DOPED CARBON QUANTUM DOTS FOR THE PHOTOCATALYTIC REMOVAL OF METHYLENE BLUE FROM WASTEWATER

Dejan Kepić[1], Jovana Prekodravac[1], Bojana Vasiljević[1], Dragana Jovanović[1], Duška Kleut[1], and Biljana Todorović Marković[1]

[1] Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade, P.O.B. 522, 11001 Belgrade, Serbia
e-mail: d.kepic@vin.bg.ac.rs

Abstract
Wastewater treatment is an emerging problem in the industrialized world. The development of new semiconducting materials with the potential to be used in photocatalysis is the focus of the scientific community. Here, we present the synthesis of N-doped carbon quantum dots (N-CQDs) using microwave radiation. N-CQDs were synthesized by irradiation of glucose solution in the presence of ammonia hydroxide as a nitrogen doping agent at low temperature (100 °C), low applied microwave power (100 and 200 W), and for a short period of time (60 s). The possible application of N-CQDs as a catalyst for photocatalytic degradation of Methylene Blue (MB) dye under blue light, green light, red light, and daylight was investigated. The highest values of MB degradation were observed for the samples exposed to red light with a maximum of 58.8 % for N-CQDs sample prepared at the reactor power of 200 W exposed to red light for 2 h.

Introduction
With the rapid industrial development and production of goods, industrial effluents became a big problem for the environment. The release of toxic chemicals in water, soil, and air constantly increases in the past decades, which consequently increases the need for the special treatment of waste material. Various organic dyes commonly used in the industry show mutagen and cytotoxic behavior [1]. Among different methods for the removal of dyes from wastewater, photochemistry has big potential to solve this problem. The size of the bandgap of semiconducting catalysts dictates the wavelength of the absorbed light. Recently, scientists put an effort to find semiconducting material with smaller bandgaps to improve visible light absorption. Besides, to exploit the ability of reactive oxygen species (ROS) to breakdown the dye molecules, it is important to find a catalyst with bandgap close to the redox potential of $H_2O/\cdot OH$ couple. To date, many heterogeneous catalysts are reported for the removal of dyes from wastewater [2-4].
The emerging interest in carbon nanomaterials brought to the scene new materials for the application in photocatalysis [5]. A new zero-dimensional carbon-based nanomaterial, carbon quantum dots (CQDs), recently draw attention due to their extraordinary properties. They are water dispersible, non-toxic, biocompatible, and economically and environmentally friendly, and they possess semiconducting character with a tunable energy bandgap that can be directed by the introduction of selected functional groups or heteroatom into their structure [6,7]. Nitrogen proved to be an effective heteroatom for doping of various carbon nanomaterials since it greatly influences the electronic properties of the material [8-10]. Although many methods for the N-doping of CQDs are reported so far, the majority of them are complex, time-consuming, and expensive. On the other hand, microwave-assisted synthesis accelerates chemical reactions at low temperatures and therefore can be applied for fast and efficient synthesis of N-doped CQDs (N-CQDs).

PROCEEDINGS OF THE

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2020.
Szeged, Hungary

MICROWAVE SYNTHESIS OF N–CQDs: EFFECT OF WAVELENGTH ON DEGRADATION OF ORGANIC POLLUTION IN WATER

Jovana Prekodravac[1], Bojana Vasiljević[1], Dragana Jovanović[1], Dejan Kepić[1], Svetlana Jovanović Vučetić[1], Milica Budimir[1] and Biljana Todorović Marković[1]

[1]Vinča Institute of Nuclear Sciences – National Institute of Republic of Serbia, University of Belgrade, Belgrade, Serbia
e-mail: prekodravac@vin.bg.ac.rs

Abstract
Industries today realis high amounts of different hazards into the environment without any pre–treatment, which is why the remediation from organic pollution still represents one of the most important issues in waste water treatment. Organic dyes from textile industry are one of the extremely geno–toxic and cyto–toxic pollutants. Thus, finding the appropriate photocatalyst for the treatment of contaminated water under sunlight is still a challenging work from economical and green chemistry approach. Here we present a microwave assisted synthesis of nitrogen doped carbon quantum dots with high efficiency in degradation of Rose Bengal organic dye from water under visible, blue, green and red light irradiation in batch system. The effect of microwave irradiation power and time on size and photocatalytic activity of synthesized dots were also investigated.

Introduction
Organic dyes, as waste materials released daily into the environment without special treatment from the textile industry, are causing significant environmental issues [1]. Dyes such as Rose Bengal (RB), Methylene Blue (MB), Congo Red (CR) and Methyl Orange (MO) are extremely gene–toxic, mutagenic and cytotoxic organic dyes [2–4]. Therefore, the researchers are focused on developing different methods for overcoming these difficulties. Semiconductor heterogeneous photocatalysis proved to be an encouraging method for the degradation of industrial dyes. However, photocatalysis still requires research efforts in finding new semiconducting materials with smaller bandgaps for enhancing visible light absorption [5]. Carbon quantum dots (CQDs) come from carbon based nanomaterial family with significant attention from economic and environmental aspects. CQDs are water dispersible materials, due to a large number of oxygens–related groups (carbonyl, carboxyl and hydroxyl) whose properties could be significantly influenced through chemical modification [6–10]. Most of synthetic methods for synthesis and doping of CQDs are complex, economically affordable or time consuming [11, 12], quite the reverse, microwave (MW) assisted method can accelerate chemical reactions at milder reaction conditions. Here we report MW assisted synthesis of N–

SYNTHESIS OF BILE ACID AMINES VIA MICROWAVE IRRADIATION

Vasiljević Bojana[1], Jovana Prekodravac[1], Dragana Jovanović[1]

[1] Vinča Institute of Nuclear Science-National Institute of Republic of Serbia, University of Belgrade, Belgrade, Serbia
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Abstract
Herein, we present microwave-assisted reductive amination of oxo derivative of deoxycholic acid with morpholine in the presence of sodium-cyanoborohydride. These chemical transformation produces a majority of the 3β-amino isomer **5** as a new compound after five minutes of irradiation. In addition, formylated bile acid have been proved as excellent starting material for the synthesis of bile acid's *N*-morpholino amine. Microwave-assisted reactions of formylation in the absence of catalyst, selective deformylation, as well as further oxidation with N-bromosuccinimide gained 3-oxo derivatives of deoxycholic acid acid in high yield. Compared to the conventional protocol a remarkable reduction in overall processing time from hours to a few minutes was achieved.

Introduction
Microwave-assisted organic synthesis has revolutionized organic chemistry [1]. These new technique is considered as an important approach toward green chemistry, medicinal chemistry and drug development, since small molecules can be built in a fraction of time required by conventional heating methods [2].
In the chemistry of bile acids there are significant advantages in the replacement of hydroxyl group by amino functionality [3]. Till date various aminosterols have been discovered, but their synthesis usually need longer heating time and tedious apparatus setup, which resulted in the higher cost of the process and the excessive use of solvents [4-6]. Only few reports on the use of microwave irradiation in chemistry of bile acids confirmed its efficiency in synthesis of various bile acids derivatives [7]. Furtheremore, synthesis of bile acids oxo derivatives as well as insertion of protecting groups presents one of the time consuming steps in organic synthesis. The acetyl protecting group has generally been more widely used than any other function-protecting group due to its stability in various reaction conditions and its ease of removal. However, reactions of acetylation are usually accompanied with unpure products and demand for further purification. Neverthelles, formylated bile acid have been proved as excellent starting material for the synthesis of different bile acid derivatives [8,9]. Taking that under consideration our goal is in investigating and expanding microwave technology in the chemistry of bile acids.
Herein we reported the synthesis of new bile acid amine, 3β-(*N*-morpholino)-12α-hydroxy-5β-cholanoic acid, via fast and efficient microwave irradiation. In-core microwave heating lead to pure formylated and partially deformylated 3α,12α-dihydroxy-5β-cholanoic acid (deoxycholic acid, DCA).

Experimental
All reagents and solvents were obtained from commercial suppliers and used without further purification. Microwave-assisted reactions were carried out in a CEM Discover BenchMate single-mode microwave reactor (300 W max magnetron power output) in 10 mL sealed process Pyrex vials with magnetic stirring. Reaction temperatures were monitored by an external infrared (IR) sensor. Reaction cooling is performed by compressed air automatically after the heating period has elapsed. Reactions were monitored by thin layer chromatography (TLC) on

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ADSORPTION OF Pb^{2+} IONS ON GAMMA IRRADIATED PLUM POMACE BIOCHAR

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Abstract
Removal of heavy metals is important because of their toxic effects on living organisms and unwanted anthropogenic effects. Biochar is suitable as an adsorbent of heavy metals due to its advantages such as various sources of biomass, a large number of microporous channels and surface functional groups, as well as due to its economic viability. There is no data about the plum pomace biochar usage as adsorbent for lead removal. In this study, the plum pomace biochar modified with gamma irradiation (IrPP) is used for the removal of Pb^{2+} ions from the aqueous solution. The SEM micrographs revealed that surface morphology of plum pomace is suitable for metal adsorption. The results of adsorption kinetics demonstrated that the removal process of Pb^{2+} ions onto IrPP follows a pseudo-second kinetic model, which is confirmed by a better agreement between $q_{e,cal}$=227 mg g^{-1} and $q_{e,exp}$=224 mg g^{-1}. Therefore, based on preliminary research, it can be concluded that IrPP originating from biowaste is a promising, eco-friendly sorbent of heavy metal from wastewater.

Introduction
Due to the uncontrolled release of toxic substances from various industrial facilities into the environment, the problem of environmental pollution has arisen. A large number of scientific researches are directed towards the protection and preservation of the environment, and thus of human health.
Biomass as a natural mixture of hydrocarbons is an excellent precursor for obtaining carbon materials. The use of biomass has significant economic and technical advantages. Waste lignocellulosic biomass is used as a raw material for fuel production, heat energy, as well as for adsorption of heavy metals and organic pollutants. In many countries, waste biomass is disposed of in open landfills, which pollutes the environment instead of being used as an energy source or adsorbent [1,2].
In this work, high temperature pyrolysis was used to convert plum pomace into carbon materials.
Plum occupies a leading position in fruit growing, and is mostly grown in the western part of Serbia. About 80% of the total production of plums is processed into brandy. Extensive production of plums, and then processing of plums in order to obtain brandies, increases the amount of waste biomass that is generated as a by-product of processing. Uncontrolled disposal of pomace can pose a great risk to the environment [3].
In this paper, pyrolysis of plum pomace was performed to obtain carbon material that can be used as an adsorbent of heavy metals. Surface modification of obtain carbon material was done by irradiating the material at the source of Co^{60} gamma radiation to improve the adsorption capacity. Scanning electron microscopy (SEM) was used to analyse the morphology of plum pomace before and after irradiation.

THERMAL KINETIC ANALYSIS OF THE SPENT MUSHROOM SUBSTRATE AND HYDROCHAR

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Abstract
A carbon-rich product, hydrochar, was synthesized by hydrothermal carbonization (HTC) of spent mushroom substrate (SMS), at temperature of 260 °C. The thermal kinetic analysis has shown that hydrothermally treatment improve the combustion behavior of hydrochar. The kinetic parameters were determined by Kissinger and Ozawa methods. The SMS-260 had a significantly lower activation energy compared to the SMS, which means that this hydrochar needs a smaller amount of energy to start combustion. Generally, the preliminary results show that HTC is an effective way to transform SMS into alternative solid biofuel.

Introduction
The growing world population and industrial development require more energy than can be supplied by conventional means [1]. Excessive use of fossil fuels is accompanied by an increase in emissions of carbon dioxide, nitrogen oxides and other harmful particles, which has negative consequences for the environment [2]. Therefore, in order to reduce the problem of this kind, the increasing focus is on the use of biomass as a renewable energy source. The advantage of biomass is easy transformation into another form of energy, using various thermochemical processes. HTC compared to other thermochemical methods has shown numerous advantages such as lower reaction temperatures, shorter process duration, the possibility of using biomass without prior drying, low ash content in the obtained products, prevention of CO_2 and other harmful gases during biomass processing, etc [3].
The conversion of biomass to a hydrochar using HTC takes place in an aqueous medium, at a moderate temperature (180–260 °C) and autogenous pressure (2–10 MPa) [4]. The properties of the hydrochar are regulated by process parameters (pressure, temperature, reaction time, and biomass and water ratio) [4]. Depending upon the process conditions used, the hydrochars can be formed with significantly improved fuel characteristics.
In addition, the data obtained from the thermal kinetics of hydrochar can be of great importance for the design of combustion equipment on an industrial scale [5,6]. Therefore, in this study, SMS from Agaricus bisporus production was carbonized using HTC technology at 260 °C and then kinetic anlysis was carried out of SMS and hydrochar using TG data at three heating rates.

Experimental
Material and synthesis of hydrochar
SMS was obtained from the local mushroom production Ekofungi, located in Belgrade. Synthesis of hydrochar were performed in a autoclave reactor (Carl Roth, Model II). About 10 g of SMS was mixed with 150 mL of deionized water and heated at 260 °C for 60 min. After that, the reactor was cooled down to room temperature. The obtained hydrochar denoted as SMS-260.

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ANTIOXIDANT AND PROOXIDANT FEATURES OF N-CQD IN PHOTOCATALYTIC TESTING OF AQUATIC MEDIA

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Abstract
The modern age science is still searching for an effective photocatalytic material for the treatment of colored discharges from different industries which cause severe environmental issues. The excellent properties of nitrogen doped carbon quantum dots (N-CQD) enable their successful application as photocatalytic material in organic dye removal triggered under light absorption. With this in mind we first present a successfully performed microwave-assisted synthesis method, a green, simple and economically affordable method for N-CQD synthesis with high nitrogen percentage incorporated in the form of pyrrolic, pyridinic/NH_2 and graphitic/NH_3^+ groups. The pro-oxidant and antioxidant features of the synthesized N-CQD were further presented, with high removal efficiency of synthesized N-CQD towards the methylene blue (MB) organic dye, as one of the leading water pollutants with a major risk to aquatic and human life.

Introduction
The MB dye, is extremely dangerous with strong effect on human beings as well as on the environment [1–3]. Efforts for removal of organic toxic dyes from natural sources, through adsorption or in the presence of photoactive materials, over the years caught significant research attention [4,5]. Due to ease functionalization, optical properties and high stability upon irradiation, CQD found application in treatment of different pollutants [6]. N-doped CQD are interesting carbon nanoparticles with particle sizes less than 10 nm and outstanding photo-luminescent properties. The presence of oxygen containing functional groups provides a good solubility of N-CQD in water media allowing their application as photocatalyst in organic dyes treatment.
Guided by the idea that 25% of sunlight is actually a blue light, we explored the time dependent photoactivity of N-CQD towards removal of MB dye from water under blue light irradiation (470 nm). Apart from efficient production of hydroxyl radicals (•OH), we discovered the potential antioxidant activity of synthesized N-CQD.

Experimental
The N-doped CQD were synthesized using green precursor and microwave assisted method as described previously [7]. The antioxidant potential of N-CQD was measured using DPPH•. The freshly prepared methanol solutions of DPPH• was mixed with different concentrations of N-CQD (20–200 μM) water solution in total volume of 1200 μl. Samples were incubated for 30 min in dark at room temperature, followed by monitoring of the DPPH• absorption at 515 nm by UV-Vis absorption spectrometry. Evaluation of the antioxidant activity of N-CQD examination by $KMnO_4$ reduction assay was performed following the protocol from Ruiz et. al [8]. After incubation in dark conditions for 1h, the change in the absorption intensity of charge transfer transitions at 506, 525, 545 and 566 nm, along with the solution color change was monitored. The prospect of hydroxyl radicals (•OH) to be the ROS in charge for removal of

EFFICIENT SYNTHESIS AND DETAILED THERMAL STUDIES OF ZINC PHTHALOCYANINE

Bojana Vasiljević, Slavica Porobić, Marija Kojić, Jovana Prekodravac, Milena Marinović-Cincović, Dragana Marinković

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Abstract
A facile and efficient, one step synthesis of macrocyclic molecule zinc phthalocyanine (ZnPc), was proposed. Dark violet crystals of ZnPc dye were obtained in high boiling point solvent of dimethylformamide (DMF) in the presence of 2,2,6,6-tetramethylpiperidine (TMP) as a catalyst. Detailed thermogravimetric and kinetic analysis revealed high thermal stability of the investigated compound.

Introduction
In today's world, it's hard to find scientist who hasn't worked or be in touch with organic dyes. As a result, complex structures of metallophthalocyanines (MPs) with near-infrared incidence continue to pique the study community's curiosity. Phthalocyanines (Pcs) are aromatic heterocycles consisting of a planar conjugated system with 18 π-electrons and 4 isoindole subunits bridged by meso positioned nitrogen atoms. They feature a distinctive UV-Vis absorption spectrum with two primary bands, the weak Soret band at 300-400 nm and the Q-band located at around 600-800 nm. A compelling MPcs chemistry experienced its greatest growth in last two decades, revealing molecules that meet the high demands of photodynamic therapy (PDT), chemical sensor technology, non-linear optics (NLO) and dye-sensitized solar cells (DSSC). Furthermore, they have been used as electrocatalysts in fuel-cell reactors for dioxygen reduction. Notably, the nature of the coordinated central metal ion has a big impact on their photochemical characteristics. Thus, singlet oxygen production is poor in MPcs with paramagnetic metal centers. Closed shell and diamagnetic ions, such as Zn^{2+}, Ga^{3+}, and Si^{4+}, play a vital role in MPc complexes and contribute great features such as high singlet oxygen production, which is critical for photosensitizer PDT efficiency [1, 2].

The synthetic process for creating MPcs is constantly improving over the years based on the available research data [1, 3]. MPcs are frequently produced via cyclotetramerization of phthalonitrile or phthalic acid analogues, in the presence of a metal or metal salt, at high temperatures and reaction durations of several hours [2, 4]. Numerous investigations have been conducted to improve the synthesis approach of unsubstituted ZnPc, which is one of the most spectroscopically studied phthalocyanines [5]. On the contrary to the potential utility of these approaches, reaction condditions necessary for these reactions are very long reaction time and high temperature, resulting in a low obtained macromolecule yield.

In order to obtain a new and efficient catalysts for the ZnPc synthesis, adequate for organic solvents, we have examined the catalytic activity of 2,2,6,6-tetramethylpiperidine (TMP) in reaction of cyclotetramerization of phthalonitrile in dimethylformamide (DMF). Investigation toward extension of this procedure to other derivatives is in progress.
In addition, comprehensive thermal stability research of ZnPc crystals provides a realistic assessment for their real application.

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SURFACE CHEMISTRY OF "BORON" DOPED CARBON QUANTUM DOTS

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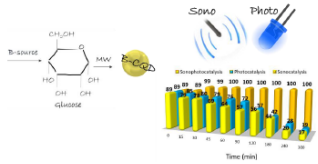

Abstract
Carbon quantum dots (CQDs), are a novel class of carbon nanomaterials that exhibit outstanding physical, chemical, and optical characteristics in addition to strong light absorption. By substituting some of the carbon atoms in CQDs for heteroatoms like N, B, P, and S, it is possible to modify the surface chemistry and electronic properties of the structures, boosting their catalytic activity. Adding B dopant to CQDs changes its surface chemistry and morphology, opening up a wide range of potential uses. The presented study illustrates a quick and environmentally friendly method for producing B-CQDs through microwave-assisted method. According to TEM characterization, the generated B-CQDs had a spherical form, an average diameter of 12 nm, and were negatively charged particles with good water dispersibility and no discernible aggregation. The thorough surface chemistry characterization revealed the presence of B-O and B-C bonds, as well as oxygen-containing surface functional groups in the form of hydroxyl, carbonyl, and carboxyl groups. Additionally, using an RB organic dye as a model molecule, the sonocatalytic, photocatalytic, and synergistic effects of the two processes were investigated.

Introduction
A variety of top-down and bottom-up techniques for CQDs production have been developed over the years [1,2]. While the top-down method indicates the breaking of macromolecules into small-sized CQDs the bottom-up method generally refers to the polymerization and carbonization of simple molecules into CQDs. Because of effective microwave irradiation utilization, the microwave pyrolysis process is one of the bottom-up methodologies that has attracted widespread attention [3,4]. This simple method of producing CQDs rich in oxygen-containing groups allows for faster reactions, reduced energy usage, greater reaction yields, and increased particle size homogeneity while being environmentally friendly. When thinking about

DEVELOPMENT OF NOVEL GAMMA RADIATION DOSIMETER BASED ON METALLOPHTHALOCYANINE

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Abstract
In this study, zinc phthalocyanine was evaluated as a possible chemical dosimeter for gamma rays at low-medium dose ranges in solution form and PVA film. The zinc phthalocyanine was successfully synthesized with a high yield under microwave irradiation at 200 °C. The calibration curves of absorbance versus dose of gamma irradiation show excellent linearity over a wider dose range (1 - 25kGy). After being irradiated, the samples' color changed from blue to yellow.

Introduction
Dosimetry is an essential element in the quality control of radiation processing, assuring the correct and uniform supply of radiation doses to a given area. As a result, a variety of dosimetry systems with various dosage sensitivities and dose ranges are utilized for common radiation applications[1]. Such systems present different types of radiochromic solution, gel, and film dosimeters that can be used in low-dose radiotherapy dosimetry due to direct radiation-induced permanent change in the color of dyed materials[2], and high-dose radiation applications such as sterilization, food irradiation, polymers applications, and agriculture[3]. Importantly, the degree of coloration is proportional directly to the amount of absorbed dose[4].
Organic dyes are among the most studied and used chemical dosimeters[5,6]. They have been utilized in solution form or embedded in various polymeric films to measure the distribution of the absorbed dose. These radiochromic thin film dosimeters are often used in radiation processing for routine dose control during gamma and electron-irradiation. The least researched dosimeters among the organic dyes are metallophthalocyanines (MPcs)[7,8], a symmetrical 18π-electron aromatic macrocycle. Their attractive color, together with tremendous chemical and thermal stability, has led us to research more reliable, stable, and less expensive dosimeter systems.
The present work aims to investigate the response of the change in the absorbance versus gamma-irradiation at low-medium dose ranges for zinc phthalocyanine (ZnPc). Microwave-assisted synthesis of ZnPc was successfully performed in a mono-mode microwave reactor at 200 °C. Organic dye has been utilized in the solution or embedded in a polymeric film for dosimetry application.

Experimental
All chemicals: zinc (II) acetate dihydrate, $Zn(CH_3CO_2)_2 \cdot 2H_2O$ (>99%, Sigma-Aldrich), 1,2-dicyanobenzene, $C_6H_4(CN)_2$ (≥98%, Sigma-Aldrich), 2,2,6,6-tetramethylpiperidine, TMP (≥99%, Sigma-Aldrich), polyvinyl alcohol, PVA (95.5-96.5% hydrolyzed, M.W. approx. 85 000-124 000, Sigma-Aldrich), *N, N*-dimethylformamide, DMF (>99%, Alfa Aesar), dimethyl sulfoxide, DMSO (>99%, Fisher Chemicals), and methanol (≥ 99%, Sigma Aldrich) were of

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Content

T1-P-5

EFFECTS OF DERIVATIVES OF NATURAL NAPHTHENIC ACID ON THE GROWTH OF FIVE *PSEUDOMONAS* STRAINS

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KEYWORDS: naphthenic acids; naphthenic acids derivatives; microbiological tests

INTRODUCTION: It is known that the pollutants of the environment are the substances that are emitted in sufficient concentrations leading to pollution of the land, water, plants, animals, microorganisms and people. For that purpose it's important to examine the potential of microorganisms for the purpose of biodegradation i.e. using some pollutants as a source of carbon atoms and energy.

OBJECTIVES: In this work we examined the influence of naphthenic acids (NAs) and their derivatives (methyl esters, amides, alcohols, hydroxamic acids) on the growth stimulation of five *Pseudomonas* sp. strains by monitoring the growth of these strains in liquid cultures.

METHOD / DESIGN: Bacterial isolates *Pseudomonas* sp. were grown in liquid King B medium, at 28 °C for 24 h in Microbiology Laboratory, Faculty of Agriculture, University of Novi Sad. The incubation of bacterial isolates was performed on a rotary shaker (120 rpm) and the final concentration of 10^8 CFU mL^{-1} were obtained after 24 h. The selected bacterial isolates were subjected to 450 µL of naphthenic acids or naphthenic acids derivatives after which the incubation was proceeded. Control treatments were the bacterial strains that are used alone. The growth of a bacterial isolates were determined on spectrophotometer at OD600 after 24 h and 48 h. The assay was carried out in triplicates.

RESULTS: The results of microbiological experiments indicated higher stimulative effect of NA methyl esters and NA primary amides, or more precisely, they are more used by test microorganisms for strain proliferation in contrast to alcohols and hydroxamic derivatives. The results and the structure will be presented in detail.

CONCLUSIONS: The research has shown that the largest degree of biodegradation have the naphthenic acids with a smaller number of carbon atoms and number of rings, namely that the acyclic naphthenic acids are more available to biodegradation than the cyclic. It has been confirmed that the naphthenic acids and their tested derivatives stimulated the multiplication of *Pseudomonas* sp. strains. For further characterization of biodegradation degree, besides the examination of the change in strength of the test microorganisms it would be necessary to determine the concentration of derivatives of naphthenic acids after different periods of incubation.

T1-P-4

MICROWAVE-ASSISTED SYNTHESIS OF BIOLOGICALLY ACTIVE NAPHTHENIC ACIDS DERIVATIVES

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KEYWORDS: derivatives of naphthenic acids; microwave-assisted synthesis; microbiological and antiproliferative activity

INTRODUCTION: Within the framework of *green chemistry*, a noticeable results were obtained in the solvent-free synthesis of ester and amide derivatives of naphthenic acids (NAs) under microwave irradiation. Naphthenic acid benzyl and choline esters, anilides and morpholides were synthetised directly from free carboxylic acids in the absence of solvent and catalyst. The synthesized natural products were evaluated for their *in vitro* antiproliferative activity against MCF-7, MDA-MB-231, HT-29, MRC-5 and A549 human tumor cell lines and susceptibility to growth stimulation of *Pseudomonas* sp. strains.

OBJECTIVES: Development of versatile, mild and efficient method for the synthesis of potentially biologically active compounds from natural materials.

METHOD / DESIGN: Growth inhibition was evaluated by *MTT colorimetric test*. Bacterial isolates *Pseudomonas* sp. were grown in liquid King B medium, at 28 °C for 24h in Microbiology Laboratory, Faculty of Agriculture, University of Novi Sad. The incubation of bacterial isolates was performed on a rotary shaker (120 rpm) and the final concentration of 10^8 CFU mL^{-1} were obtained after 24h. The selected bacterial isolates were subjected to 450 µL of NAs or NA derivatives after which the incubacion was proceeded. Control treatments were the bacterial strains that are used alone. The growth of a bacterial isolates were determined on spectrophotometer at OD_{600} after 24h and 48h. The assay was carried out in triplicates.

RESULTS: It was observed that the complex mixture of carboxylic acids, with great structure variety, reacted efficiently with different amines or alcohols under high-temperature heating in closed-vessel system of microwave reactor. Efficient, uncatalysed derivatisation of NAs were carried out under solvent-free conditions. Synthetised NA derivatives and NAs have shown a notable antiproliferative activity against certain human neoplastic cells, but were completely inactive towards the normal MCF-7 and MRC-5 cell line. The results of microbiology experiments have shown the growth stimulation of the examined strains with increase of the incubation time.

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Sborník příspěvků

10P-07
SWIFT SYNTHESIS OF N–DOPED GQDs BY MICROWAVE IRRADIATION

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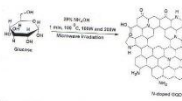
Introduction of heteroatom's such as nitrogen (N) into the graphene quantum dots (GQDs), enable tailoring of photoluminescence (PL) properties of GQDs[1].

We fabricated N-doped GQDs *via* swift and easy one-step microwave-assisted method. Synthesis was performed from water solution of glucose and GQD as precursors in the presence of ammonia hydroxide (NH_4OH, 25%). Aqueous solutions were irradiated in closed-vessel system of CEM Discover BioMate single mode microwave reactor for only 1 minute, at fixed temperature (100 °C) and power (100 W, 200 W).

The results obtained by different characterisation techniques showed that synthesized N-doped GQDs were approximately 10 nm in size and 1 nm in height. The percentage of bound nitrogen in this short amount of time is about 11 % in the form of pyridinic/NH_2, pyrrolic-N and graphitic-N (Scheme 1).



Scheme 1. **N-doped GQDs synthesis by MW irradiation from glucose as precursors**

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10P-08
GOLD NANOPARTICLES/EXFOLIATED GRAPHENE HYBRID OBTAINED BY GAMMA IRRADIATION

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Gold nanoparticles decorated graphene sheets present a good surface-enhanced Raman spectroscopy (SERS) platform for the development of ultrasensitive analytical applications [1]. Here, we prepared gold nanoparticles/exfoliated graphene hybrid by gamma irradiation of chloroauric acid as a precursor in the presence of electrochemically exfoliated highly oriented pyrolytic graphite (HOPG). The effects of various irradiation doses (1, 5, 10 and 20 kGy) on the size and shape of synthesized nanoparticles were studied. It was found that the presence of HOPG leads to the formation of gold nanoparticles of triangular, spherical, hexagonal, trapezoidal and rod-shape morphology. On the other hand, irradiation of chloroauric acid solution without HOPG results mainly in irregular shaped nanoparticles, however, certain amount of square shaped nanoparticles is observed. According to statistical analysis of gold nanoparticles/graphene hybrid, nearly half of the nanoparticles have sizes in the 11-20 nm range for all of the applied doses. The increase of irradiation dose results in the increase of the amount of smaller nanoparticles (up to 10 nm in size). Nevertheless, for the highest applied dose agglomeration of nanoparticles takes place leading to the formation of particles that exceed 100 nm in size. Presented synthetic route is fast, simple and low-cost since it does not require the use of a gold nanoparticle stabilizer.

The research was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (project no. 172003 and DS021), and bilateral project Serbia-Slovakia (SK-SRB-2016-0035). D. K. acknowledges the support of COST Action CA15107.

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BOOK of ABSTRACTS

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MICROWAVE-ASSISTED SYNTHESIS OF BILE ACID DERIVATIVES AS POTENTIAL LIGANDS OF GLUCOCORTICOID RECEPTOR AND ALDO-KETO REDUCTASE (AKR1C)

Ljubica M. Grbović[1], Ksenija J. Pavlović[1], Bojana R. Vasiljević[2], Sofija S. Bekić[1], Maja A. Marinović[2], Edward T. Petri[2], Anđelka S. Ćelić[2]

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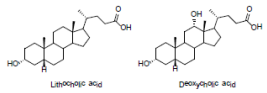
Bile acid derivatives are widely used in modern medicine and pharmacy, where they can increase absorption of various drugs and also serve as therapeutic agents. Interest in microwave-assisted organic synthesis is rapidly increasing. This unconventional energy source drastically reduces reaction times and side product formation, while increasing final yields. From an ecological perspective, microwave-assisted synthesis reduces solvent requirements for reactions and during product isolation, in line with the principles of „green chemistry". Here we describe microwave-assisted synthesis of 4-bromo-3-oxo derivatives of lithocholic and deoxycholic acids, as well as conjugated 3-oxo derivatives of litocholic and deoxycholic acids, by dehydrohalogenation of the corresponding 4-bromo-3-oxo derivatives, which were obtained by oxidative halogenation using *N*-bromosuccinimide. Synthesis conditions will be presented in detail. Synthesized compounds were tested for affinity to glucocorticoid receptor in vitro, using a yeast-based fluorescence assay. Potential of the synthesized compounds as inhibitors of human aldo-keto reductase 1C (AKR1C) was tested using recombinant enzyme and an in vitro enzymatic assay. Several compounds displayed selective affinity for the glucocorticoid receptor or AKR1C suggesting their potential for design of compounds with anti-inflammatory or anti-cancer properties.



Lithocholic acid Deoxycholic acid

Keywords: *Microwave-assisted green chemistry, Bile acid derivatives, Anti-inflammatory, Glucocorticoid receptor, Aldo-keto reductase*

Acknowledgements: *The authors thank the Ministry of Education, Science and Technological Development of the Republic of Serbia for financial support (Grant No. 172021).*

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Content

into the animals' back in both groups. The experimental group started peroral treatment with disulfiram 200 mg/kg daily via a gastric probe 3 days before tumor inoculation. After 19 days, when the tumors were approximately 2-3 cm in the control group, all animals were sacrificed. The blood was collected for glucose and other analyses. The tumors were excised and weighed and their volume (by water displacement method) and diameters were measured (*Figure*). The tumor samples were histologically and immunohistologically assessed and the main organs toxicologically analyzed. Tumor volume was also determined using the formula $Lx5^2/2$, where L was the longest and S the shortest diameter. Ki-67-positive cells in the tumor samples were quantified; images were taken and processed by software UTHSCSA Image Tools for Windows Version 3.00. Statistical significance of differences in tumor weight, volume, number of Ki-67-positive cells and other parameters were determined by the one way ANOVA.

Figure: BHK fibrosarcoma: subcutaneous localization in a hamster

RESULTS:
Disulfiram inhibited fibrosarcoma growth in hamsters without toxicity and without influence on blood analyses.

CONCLUSIONS:
Inhibition of proteasome activity by disulfiram as an anti-tumor strategy might be an effective and safe therapeutic approach in novel nontoxic therapies and relapse prevention for human cancers.

T3-P-52 Microwave-assisted synthesis and *in silico* ADMET properties of bile acids lactones

Ksenija Pavlović, Ljubica Grbović, Srdan Bjedov, Denis Uka, Andrea Nikolić, Marija Sakač[156], Bojana Vasiljević[157]

KEYWORDS: microwave-assisted synthesis; bile acid; lactone; ADMET

INTRODUCTION:
In modern synthetic chemistry, alternative energy sources are increasingly relevant, and one of them are microwaves. The use of microwave energy is considered as an acceptable technique in the principles of "green chemistry", but it is also a useful approach to syntheses because it enables more efficient and selective reactions. Baeyer-Villiger oxidation is the most com-

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157 Vinča Institute of Nuclear Sciences, University of Belgrade, Mike Petrovića Alasa 12-14, 11351 Vinča, Beograd

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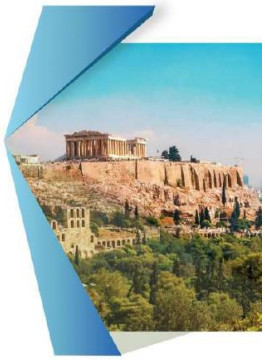

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Surface functionality role in the conductivity of microwave synthesized CQDs thin films

Jovana R Prekodravac[1]*, Milica Budimir[1]*, Bojana R Vasiljević[1], Dejan Kepić[1], and Biljana Todorović Marković[1]

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Carbon quantum dots (CQDs) as 0D carbon nanomaterials with extraordinary physicochemical properties have a broad range of applications [1]. Some of the most intriguing are in the form of a thin film for electronic devices and membrane nanofiltration. Solid-state CQDs applications usually involve conjugation and nanocomposite preparation with polymeric matrix in the form of a CQDs thin film deposited on the polymer surface, incorporated into the polymer, or as a sandwich between polymer matrices. In recent years, different CQDs have found universal applications as a membrane system for nanofiltration, water desalination, and osmotic power production among others [2,3]. The CQDs features, as well as their ease of processing, add value to their potential use in biomedicine as well, particularly as antibacterial and antibiofouling coatings. Here we present the surface chemistry effect on morphological and electronic features of N-CQD and FeN-CQD thin films deposited on Mica discs and silicon (Si) wafers applying spin-coating and drop-casting deposition methods.

For N-CQD and FeN-CQD sample preparation, the microwave-assisted method was applied. The reaction conditions were set at a microwave power of 100 W for a one-minute reaction [4]. The N-CQD and FeN-CQD were made from glucose water solution as a carbon source and in the presence of a nitrogen and iron precursor. Samples of N-CQD and FeN-CQD at the concentration of 0.5 mg ml^{-1} were deposited on Mica discs applying the spin-coating method at 3 500 rpm spreading 20, 40 or 60 µl of sample to deposit 1 to 3 layers of N-CQD and FeN-CQD samples on a surface of 1 cm^2. Because of the tremendous centrifugal force upon spin, the sample deposition on the Si-wafer surface was performed using the drop-casting approach as it was more suitable.

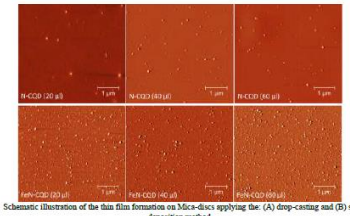

Figure 1. Schematic illustration of the thin film formation on Mica-discs applying the: (A) drop-casting and (B) spin-casting deposition method

Examining the morphological properties, we concluded that regardless of the type or amount of deposited materials on Mica discs by the spin-coating technique, the preparation of homogeneous thin films was achieved. By increasing the volume of deposited material more dense and homogeneous thin films were produced. Due to the more hydrophobic properties of the Si substrate, the drop-casting approach was more appropriate for thin film deposition on the Si wafer surface, revealing the material aggregation at greater concentrations of deposited CQDs, impacting the resulting thin film RMS (Figure 1). The x–CQD thin film morphology was significantly influenced by film thickness, which can be adjusted by the concentration of the depositing solution. Both thin film samples demonstrated good conductivity, continuously rising with the applied current (Figure 2).

Surface chemistry of new CQDs produced using a microwave-assisted approach as an effective organic pollution removal agent in water medium

Jovana R Prekodravac[1]*, Bojana R Vasiljević[1], Dejan Kepić[1], Milica Budimir[1] and Biljana Todorović Marković[1]

1 Institute of the Nuclear Sciences Vinča – National Institute of the Republic of Serbia, University of Belgrade, P.O.B. 522, Belgrade, Serbia

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The pursuit of appropriate photocatalytic material for the treatment of colored industrial discharges, as a major environmental problem, continues in the modern age [1]. The zero-dimensional carbon nanostructures (carbon quantum dots–CQD) with exceptional physicochemical characteristics have a wide range of potential uses, including photocatalytic remediation of organic water contaminants [2]. Here we present nitrogen (N-CQD) and iron/nitrogen co-doped (Fe/N-CQD) quantum dot nanomaterials produced by a microwave–assisted approach as a one–step, environmentally friendly, and cost–effective method. The photoactivity of produced materials on a case study of a specific water pollutant reduction was investigated by exploring the synergistic effect of light source illuminations and the surface chemistry of the materials.

The N–CQD and Fe/N–CQD were synthesized by the simple microwave–assisted method starting from glucose water solution. The reaction mixture containing carbon, nitrogen and/or iron source was heated in a microwave reactor for 1 minute at a fixed temperature (100 °C), followed by cooling down to room temperature [3].

Detailed AFM characterization of produced nanomaterials showed the formation of spherical like shapes with average real particle diameter between 15 and 40 nm. From the EDS results, obtained CQD had a high content of C (64–66 at%) and O (21–24 at%), while XPS analysis showed the presence of N in the form of pyridinic, pyrrolic and graphitic–N, and Fe as Fe^{2+}/Fe^{3+} (Table 1). Photocatalytic experiments were performed in batch reaction conditions using two light irradiation sources, applying the commercially available lamp (*L*) source (470 nm, 10W) and a closed cylindrical reactor (*R*) with six LEDs (370 nm, 6W) made in our team.

Table 1. The XPS elemental analysis of the N–CQD and Fe/N-CQD samples.

Sample	Elemental analysis			
	C	O	N	Fe
N–CQD	66.4 at%	23.5 at%	10.1 at%	/
Fe/N–CQD	63.8 at%	27.5 at%	6.7 at%	2.0 at%

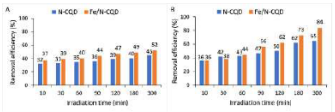
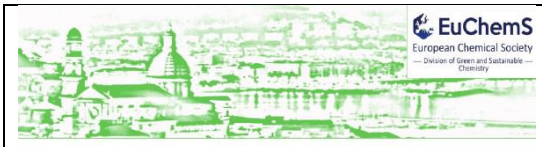


Figure 1. The histograms represent the photoactivity of N–CQD and Fe/N–CQD under (A) the *L* and (B) the *R* as irradiation sources.

When comparing the home–made *R* type irradiation source to a commercially available *L* source, the obtained results showed that the *R* source was more efficient in MB degradation regardless of the photocatalyst's surface chemistry (Figure 1). The *L* source as a free–standing lamp provokes more light scattering than the *R* source. In comparison, the *R* design, which consisted of a closed cylindrical tube with a particular *LED* configuration, allowed for more homogenous light dispersion. The Fe/N–CQD showed improved photoactivity in MB degradation compared to the N–CQD. When Fe/N coordination bonds occur, the electron density on the N atoms decreases, which is believed to be due to electron transfer from the N to the Fe atoms. Consequently, the Fe/N dopants



6th EuChemS Conference on Green and Sustainable Chemistry

Book of Abstracts

SALERNO

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Content Overview

Novel microwave-induced formation of ZnPc and ZnPc/N-CQDs composites: Green synthesis and determination of photocatalytic properties

Bojana Vasiljević[a], Dušan Milivojević[a], Ivica Vujičić[a], Jovana Prekodravac[a], Milica Carević[a], Milica Budimir[a], Dušan Mijin[b], Dragana Marinković[a]
[a] University of Belgrade, Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia, University of Belgrade, P. O. Box 522, 11001 Belgrade, Serbia,
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The importance of a continuous design of effective and sustainable synthetic pathways for leading-edge research and development cannot be overstated. In this context, microwave chemistry continues to test the boundaries of today's science in producing valuable compounds that can be used as photosensitizers in the photodynamic therapy of cancer. In this instance, metallophthalocyanines (MPcs) are preferable singlet oxygen ($^1O_2$) generators due to their superior optical and lasing properties.[1] Here we present a novel, fast and efficient synthesis of zinc phthalocyanine ($ZnPc_{MW}$) in a closed vessel system of a microwave reactor. Direct volumetric and efficient heating by microwaves at the temperature of 250 °C enables a higher yield of the desired compound (89 %) in a fraction of the time (5 min), required by applying the conventional heating method ($ZnPc_{CON}$, 360 min/69 %). A greener and more economically friendly concept has been accomplished in the absence of additional reactants and catalysts. The singlet oxygen production potential of ZnPc crystals synthesized under microwave irradiation (Figure 1, $ZnPc_{MW}$) was found to be higher than that of crystals produced using the traditional heating approach, according to electron paramagnetic resonance (EPR) data. Furthermore, the impact of gamma irradiation on the stability of organic dye as an active ingredient of PDT drugs and medical supplies was assessed with regard to the sterilization process.

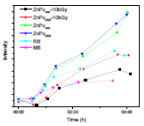

Figure 1. Singlet oxygen production of $ZnPc_{CON}$, $ZnPc_{MW}$, RB, MB, and crystals irradiated at 10 kGy in DMSO at the red light.

A macrocyclic compound used in combination with other photoactive moieties is an ideal building block for the construction of attractive composites bearing advanced photocatalytic activity. Microwave heating of ZnPc and N-doped carbon quantum dots[2] lead to the formation of ZnPc/N-CQDs composites at 180 °C for 5 min. Synthesized composites showed potential for application in photocatalytic water remediation of organic pollutants.

Acknowledgments

The research was funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (grant number 451-03-47/2023-01/200017).

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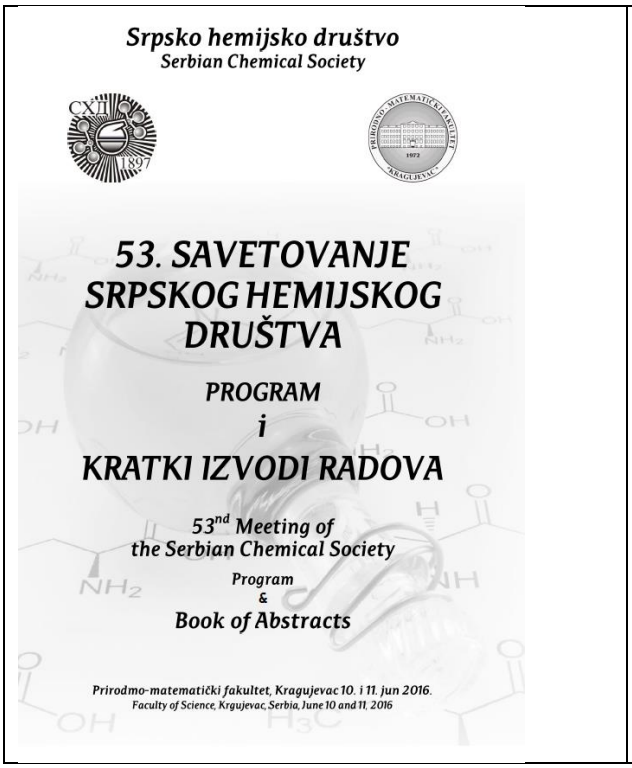
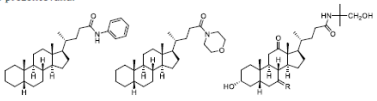


OH P20

Sinteza i biološka aktivnost odabranih amida žučnih kiselina

Srđan I. Bjedov, Bojana Vasiljević, Ljubica Grbović, Ksenija Pavlović, Marija Sakač
Departman za hemiju, biohemiju i zaštitu životne sredine, Prirodno-matematički fakultet, Univerzitet u Novom Sadu, Trg D. Obradovića 3, Novi Sad, Srbija

Žučne kiseline su važni signalni molekuli koji aktiviraju brojne receptore (FXR, TGR5, PXR, VDR) i tako utiču na homeostazu žučnih kiselina i glukoze, liponeogenezu, inflamatorne procese i supresiju tumora.[1, 2] Pleiotropna aktivnost ovih molekula, relativno niska cena, enantiomerna čistoća, čini žučne kiseline dobrim supstratima za razvoj potencijalnih farmakoloških agenasa. Jedan od uspešnih načina modifikacije žučnih kiselina za dobijanje novih biološki aktivnih derivata je sinteza *N*-supstituisanih amida.[3] Ovde želimo da saopštimo sintezu amida **1** i **2** posredstvom mikrotalasa u odsustvu rastvarača i amida **3** i **4** dobijenih konvencionalnom sintezom. Na nekim od sintetizovanih molekula ispitana je antikancerogena aktivnost. Sinteza i biološka aktivnost amida će biti detaljno prezentovana.



Synthesis and biological activity of some bile acid amides

Srđan I. Bjedov, Bojana Vasiljević, Ljubica Grbović, Ksenija Pavlović, Marija Sakač
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Bile acids are important signalling molecules able to activate a number of receptors (FXR, TGR5, PXR, VDR), such affecting the bile acids and glucose homeostasis, liponeogenesis, inflammatory processes and tumor suppression.[1, 2] Pleiotropic activity makes bile acid good substrates for developing potential pharmacological agents. One of the most successful way to modify bile acids to biologically active derivatives is the synthesis of *N*-substituted bile acid amides.[3] Here we report synthesis of bile acid amides **1** and **2** obtained by microwaves mediated synthesis under solvent-free conditions and amides **3** obtained by conventional synthesis. Some of synthesized molecules were screened for anti-cancer activity. Synthesis and biological activity of amides will be discussed in detail.

Zahvalnica: Ovaj rad je finansiran od strane Ministarstva prosvete, nauke i tehnološkog razvoja (Projekat ON172021).

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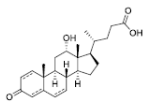
SADRŽAJ / CONTENTS

OH P 3

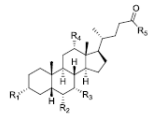
Sinteza glukokortikoidnih žučnih kiselina

Srđan I. Bjedov, Ksenija Pavlović, Ljubica Grbović, Bojana Vasiljević, Marija Sakač
Departman za hemiju, biohemiju i zaštitu životne sredine, Prirodno-matematički fakultet, Univerzitet u Novom Sadu, Trg D. Obradovića 3, Novi Sad, Srbija

Žučne kiseline (ŽK) su steroidni molekuli koji pored važne uloge koju imaju u digestiji lipida su i značajni signalni molekuli koji aktiviraju brojne receptore (FXR, TGR5, PXR, VDR...) i tako utiču na homeostazu ŽK i glukoze, liponeogenezu, inflamatorne procese i supresiju tumora.[1,2] Pleiotropna aktivnost ovih molekula čini ŽK dobrim supstratima za razvoj potencijalnih farmakoloških agenasa. Ovde želimo da saopštimo sinteze enonskih **1** i oksimino **2** derivata ŽK kao potencijalnih liganada za glukokortikoidni receptor. Detalji sinteze ovih jedinjenja će biti prezentovani.



4–en, 1,4 ili 4,6-dien
1



R_1, R_2, R_3, R_4 = =H, =OAc ili =N–OH; R_5 = –OH ili –OCH_3
2

Synthesis of glucocorticoid bile acids

Srđan I. Bjedov, Ksenija Pavlović, Ljubica Grbović, Bojana Vasiljević, Marija Sakač
Department of Chemistry, Biochemistry and Environmental Protection, Faculty of Sciences, University of Novi Sad, Trg D. Obradovića 3, Novi Sad, Serbia

Bile acids (BAs) are steroidal molecules which beside important role in lipid digestion are also signaling molecules able to activate a number of receptors (FXR, TGR5, PXR, VDR...) and thus affect the BA and glucose homeostasis, liponeogenesis, inflammatory processes and tumor suppression.[1,2] Pleiotropic activity makes bile acid good substrates for developing potential pharmacological agents. Herein we would like to report the synthesis of BA enone **1** and oxime **2** derivatives as potential ligands for the glucocorticoid receptor. Synthesis of these compounds will be presented in detail.

1. Kim, I. *et al., Carcinogenesis*, **28**, (2007) 940.
2. Deuschle, U. *et al., PLoS ONE*, **7**, (2012) e43044 .

Zahvalnica: *Ovaj rad je finansiran od strane Ministarstva prosvete, nauke i tehnološkog razvoja (Projekat ON172021).*

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BOOK OF ABSTRACTS

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Poster prezentacije

Perpetual struggle of doped carbon quantum dots surface chemistry with environmental contamination

J.R. Prekodravac[1,], B. Vasiljević[1], D. Mijin[2], B. Todorović Marković[1]*

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Industrialization today leads to a significant increase in the number of phenols, pesticides, paints, solvents and other organic pollutants with potentially carcinogenic effect in natural resources. One of the major problems is water pollution from the textile industry causing significant quantities of organic dyes released daily into the environment without special treatment [1]. The presented study reports an efficient and simple method for the green microwave-assisted production of doped carbon quantum dots (CQD) from glucose as carbon precursor (Figure 1) and their fight against water pollution.

Bottom-up MW synthesis

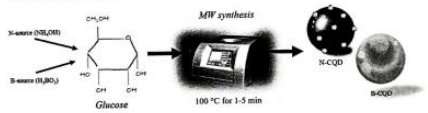

Figure 1. The illustration of the MW assisted synthesis of N-CQD and B-CQD from glucose.

The resulting N-CQD and B-CQD were negatively charged particles with a spherical shape. The good water dispersion properties of doped-CQDs came from oxygen-containing surface functional groups in the form of hydroxyl, carbonyl and carboxyl groups. The outcome of doped-CQDs surface chemistry towards a specific organic water contaminants removal efficiency was examined through the photocatalytic activity of selected photocatalysts.

A new type of carbon nanomaterials known as CQD, have exceptional physicochemical and optical features, tuneable photoluminescence and strong light absorption [2,3]. In addition to these characteristics, the variety of precursors and preparation techniques, along with the opportunity to modify the surface and dope the CQD to alter their properties, make them interesting candidates for a variety of applications [4–7].

Photocatalytic activity of N-CQD and B-CQD photocatalysts towards Rose Bengal (RB) removal efficiency was investigated under neutral pH, room temperature and constant pollutant (0.03 mM) and photocatalysts (0.2 mg/mL) concentration. Reaction in the dark