

**NASTAVNO-NAUČNOM VEĆU  
TEHNOLOŠKO-METALURŠKOG FAKULTETA  
UNIVERZITETA U BEOGRADU**

Na sednici Nastavno-naučnog veća Tehnološko-metalurškog fakulteta u Beogradu održanoj 03.02.2022. godine, odlukom br. 35/10, imenovani smo za članove Komisije za podnošenje izveštaja o ispunjenosti uslova za reizbor u naučno-istraživačko zvanje **NAUČNI SARADNIK** kandidata dr Radoslave Pravilović (rođene Stojanović), diplomiranog inženjera tehnologije, u skladu sa Zakonom o naučnoistraživačkoj delatnosti i Pravilnikom o postupku i načinu vrednovanja, i kvantitativnom iskazivanju naučnoistraživačkog rezultata istraživača i saglasno statutu Tehnološko-metalurškog fakulteta Univerziteta u Beogradu. Posle pregledanog materijala koji je dostavljen komisiji i uvida u dosadašnji rad dr Radoslave Pravilović, Komisija podnosi sledeći:

**IZVEŠTAJ**

**1. BIOGRAFSKI PODACI O KANDIDATU**

Kandidat **Radoslava Pravilović** (devojačko Stojanović), diplomirani inženjer tehnologije, rođena je 17.03.1982. godine u Smederevu. Osnovnu školu „Dr Jovan Cvijić“ završila je u Smederevu, kao i Gimnaziju (prirodno-matematički smer), a za uspehe tokom školovanja nagrađena je Vukovom diplomom. Studije na Tehnološko-metalurškom fakultetu u Beogradu započela je školske 2001/2002. godine, a diplomirala na smeru Hemijsko inženjerstvo 2006. godine sa prosečnom ocenom 9,22. Diplomski rad pod nazivom „Određivanje otpora prenosu mase pri difuziji lidokain-hidrohlorida iz mikročestica“ odbranila je sa ocenom 10,00 pod mentorstvom dr Srđana Pejanovića.

Školske 2006/2007. godine upisala je doktorske studije na smeru Biohemijsko inženjerstvo pod mentorstvom dr Branka Bugarskog, red. prof, i položila sve ispite predviđene planom i programom doktorskih studija sa prosečnom ocenom 10,00, uključujući i završni ispit. Doktorsku tezu pod naslovom „Difuzija polifenolnih jedinjenja iz mikročestica dobijenih različitim tehnikama inkapsulacije“ odbranila je u junu 2016. godine na Tehnološko-metalurškom fakultetu u Beogradu.

Školske 2017/2018. godine je ponovo upisala doktorske studije na Tehnološko-metalurškom fakultetu na smeru Hemijsko inženjerstvo pod mentorstvom dr Nikole Nikačevića, red. prof. Položila je sve predviđene ispite na doktorskim studijama, kao i završni ispit sa prosečnom ocenom 10,00.

Od januara 2007. do februara 2011. godine bila je stipendista Ministarstva za nauku i tehnološki razvoj Republike Srbije u okviru projekta osnovnih istraživanja pod nazivom „Interakcija imobilisanih ćelija, tkiva i biološki aktivnih molekula u bioreaktorskim sistemima“ (broj projekta OI142075).

Naučno-istraživački rad Radoslave Pravilović je započeo 2007. godine kada je kao istraživač-stipendista uključena u istraživanja projekta Ministarstva za nauku i tehnološki razvoj Republike Srbije u okviru projekta osnovnih istraživanja pod nazivom „Interakcija imobilisanih ćelija, tkiva i biološki aktivnih molekula u bioreaktorskim sistemima“ (broj projekta OI142075). Od februara 2011. do danas dr Radoslava Pravilović je zaposlena na Tehnološko-metalurškom fakultetu u Beogradu, i to najpre u zvanju istraživač-pripravnik, zatim istraživač saradnik (od 2012.), pa naučni saradnik (od juna 2017.), a od 1. marta 2018. u zvanju asistent. Bila je angažovana na projektu integralnih i interdisciplinarnih istraživanja iz oblasti poljoprivrede i hrane: „Razvoj novih inkapsulacionih i enzimskih tehnologija za proizvodnju biokatalizatora i biološki aktivnih komponenata hrane u cilju povećanja njene konkurentnosti, kvaliteta i bezbednosti“, Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije (broj projekta III 46010) od 2011. do 2019. godine. Pored ovoga, učestvovala je i na dva međunarodna Eureka projekta (sa

Republikom Slovenijom, broj projekata E!4486 i E!6750), kao i na dva bilateralna projekta iz programa naučne i tehnološke saradnje Republike Srbije i drugih zemalja i to kao istraživač na projektu (bilateralni projekti sa Republikom Slovenijom i Republikom Hrvatskom). Od januara 2022. je angažovana na projektu Fonda za nauku IDEJE pod nazivom: „Prebiotics for functional food and bioactive cosmetics produced in intensified enzymatic processes“ (PrIntPrEnzy).

Radoslava Pravilović od školske 2007/2008. godine do danas učestvuje u nastavi u izvođenju računskih vežbi iz nekoliko predmeta pri katedri za Hemijsko inženjerstvo na Tehnološko-metalurškom fakultetu („Osnovi automatskog upravljanja“, „Modelovanje i simulacija procesa“, „Programiranje“, „Sistemi automatskog upravljanja procesima“, „Merenje i upravljanje procesima“, „Upravljanje procesima u farmaceutskoj industriji“), kao i u izvođenju eksperimentalnih vežbi („HI laboratorija“ i „Tehnološke operacije“). Učestvovala je u eksperimentalnom radu i obradi rezultata nekoliko završnih i master radova studenata na Katedri za hemijsko inženjerstvo.

Dr Radoslava Pravilović je u svom dosadašnjem radu publikovala 35 bibliografskih jedinica uključujući i doktorsku disertaciju. Do sticanja zvanja naučnog saradnika, ima objavljene radove u časopisima međunarodnog značaja (M21a – jedan rad, M21 - jedan rad, M22 - jedan rad, M23 - tri rada), saopštenja sa skupova međunarodnog značaja štampana u celini (M33 - jedanaest saopštenja), saopštenja sa skupova međunarodnog značaja štampana u izvodu (M34 - sedam saopštenja), saopštenja sa skupova nacionalnog značaja štampana u celini (M63 - jedno saopštenje), saopštenja sa skupova nacionalnog značaja štampana u izvodu (M64 - tri saopštenja), a nakon sticanja zvanja naučnog saradnika, objavila je jedno poglavlje u knjigama međunarodnog značaja (M13), zatim radove u časopisima međunarodnog značaja (M22 - jedan rad, M23 - jedan rad), rad u vrhunskom časopisu nacionalnog značaja (M51 – jedan rad) i saopštenja sa skupova međunarodnog značaja štampana u celini (M33 - dva saopštenja).

## 2. NAUČNOISTRAŽIVAČKI RAD

Naučno-istraživački rad dr Radoslava Pravilović je započela 2007. god. kada je kao istraživač stipendista uključena u istraživanja projekta Ministarstva. Od 2011. godine dr Radoslava Pravilović je zaposlena na Tehnološko-metalurškom fakultetu u Beogradu i to najpre u zvanju istraživač pripravnik (od 2011.), zatim u zvanju istraživač saradnik (od 2012.), pa u zvanju naučni saradnik (od 2017.), a od 1. marta 2018. u zvanju asistent.

Od 2007. godine do danas dr Radoslava Pravilović je učestvovala u tri nacionalna projekta (jedan iz oblasti integrisanih i interdisciplinarnih istraživanja, jedan iz osnovnih istraživanja, i jedan projekat Fonda za nauku IDEJE). Nacionalni projekti na kojima je učestvovala su sledeći:

- Istraživač na IDEJA projektu pod nazivom „Prebiotics for functional food and bioactive cosmetics produced in intensified enzymatic processes“, Fond za nauku 2022-2024;
- Istraživač na projektu III46010 pod nazivom „Razvoj novih inkapsulacionih i enzimskih tehnologija za proizvodnju biokatalizatora i biološki aktivnih komponenata hrane u cilju povećanja njene konkurentnosti, kvaliteta i bezbednosti“, MNRS 2011-2019;
- Stipendista na projektu OI142075 pod nazivom „Interakcija imobilisanih ćelija, tkiva i biološki aktivnih molekula u bioreaktorskim sistemima“, MNRS 2007-2011.

Dr Radoslava Pravilović je učestvovala i na četiri međunarodna projekta (dva Eureka projekta i dva bilateralna projekta). Međunarodni projekti na kojima je učestvovala su sledeći:

- Istraživač na bilateralnom projektu između Republike Srbije i Republike Slovenije „Adding value to biodiesel production – intensified conversion of glycerol to hydrogen and value-added bio-additives, 2020-2021;

- Istraživač na bilateralnom projektu između Republike Srbije i Republike Hrvatske „Encapsulation of lemon balm (*Melissa officinalis*) and mountain germander (*Teucrium montanum*) extracts in emulsions and liposomes in order to obtain functional nutritional supplements”, 2019-2021;
- Istraživač na projektu Eureka E!6750 „*Development of enzyme processes for production of egg white protein hydrolysates*”, 2011-2014;
- Istraživač na projektu Eureka E!4486 „*Research and Development of Blood-Derived Hemoglobin for Animal Usage*”, 2008-2011.

U toku svog naučno-istraživačkog rada dr Radoslava Pravilović je sticala iskustva radeći i u nekoliko laboratorija u zemlji i u inostranstvu i to: u Institutu za medicinska istraživanja (IMI) Beograd, Srbija (2010-2012; gostujući istraživač); na Prehrambeno-biotehnološkom fakultetu u Zagrebu u laboratoriji za tehnologiju ugljenih hidrata i konditorskih proizvoda (2008-2010 i 2019-2021; gostujući istraživač u okviru bilateralnog projekta Republike Srbije i Republike Hrvatske).

Dr Radoslava Pravilović se u toku dosadašnjeg naučnoistraživačkog rada prvenstveno bavila prenosom mase u heterogenim sistemima, kao i dizajnom sistema za kontrolisano otpuštanje farmaceutskih aktivnih komponenti. U okviru teme njene doktorske disertacije i radova koji su iz nje proizašli, optimizovan je proces inkapsulacije polifenolnih jedinjenja u mikročestice na bazi hidrogelova i fosfolipida. Antioksidansi, posebno polifenoli, imaju niz pozitivnih efekata na ljudsko zdravlje, te je sve veća potreba za prirodnim izvorima antioksidanasa. Međutim, polifenoli imaju neprijatan, gorak ukus, te se kroz hranu i piće ne unose u dovoljnim količinama. Inkapsulacijom se maskira ukus polifenola i istovremeno se oni prevode iz tečnih ekstrakata u čvrste formulacije, koje se onda mogu koristiti kao aditivi u prehrambenim proizvodima. Hidrogel mikročestice su dobijene metodom elektrostatičke ekstruzije, koja je pogodna za dobijanje čestica željenih dimenzija. Za dobijanje lipozoma je korišćena prolipozomna metoda, koja je jednostavna i brza, te posebno pogodna za primenu u prehrambenoj i farmaceutskoj tehnologiji. Pored toga, bavila se karakterisanjem dobijenih čestica, kao i ispitivanjem antioksidativne aktivnosti polifenolnih jedinjenja. Takođe, veliki deo istraživanja obuhvatio je difuziju polifenolnih jedinjenja iz alginatnih i fosfolipidnih čestica. Kandidatkinja se bavila određivanjem otpora prenosu mase koji se javljaju zbog prisustva membrane, odn. nosača pri otpuštanju polifenola iz mikročestica. Takođe je ispitivan uticaj površinski aktivnih molekula na brzinu difuzije polifenolnih jedinjenja iz lipozoma. Ostali pravci istraživanja, čiji rezultati nisu direktno vezani za temu doktorske disertacije kandidata, usmereni su ka izolovanju hemoglobina i eritrocitnih membrana iz otpadne klanične krvi.

Takođe, u saradnji sa kolegama sa Katedre za Biohemijsko inženjerstvo i biotehnologiju, dr Radoslava Pravilović se bavila razvijanjem kinetičkih modela sinteze prebiotskih oligosaharida (galakto-oligosaharida (GOS) i frukto-oligosaharida (FOS)). Prebiotici su nesvarljivi sastojci u životnim namirnicama i podstiču proliferaciju i aktivnost korisnih bakterija mikrobiote creva, dok sa druge strane vrše inhibiciju rasta loših bakterija onemogućavajući njihovu adheziju na zidove creva. Proizvodnja pomenutih oligosaharida predstavlja spor biohemijski proces koji se, kao takav, tradicionalno odvija u šaržnim reaktorima. Zbog pozitivnog dejstva na imunitet pojedinca, sve je veće interesovanje za ovim jedinjenjima pa se javlja potreba za povećanjem kapaciteta i intenzifikacijom proizvodnje. Značaj prelaska sa šaržnog na kontinualni tip reaktora ogleda se u povećanju selektivnosti i produktivnosti, manjim dimenzijama reaktora, lakšoj kontroli reakcije i samog procesa, kao i manjem štetnom uticaju na okolinu, jer bi nastajala manja količina otpada, došlo bi do smanjene potrošnje energije, gubitaka u vremenu, operativnih i investicionih troškova. Dr Radoslava Pravilović se takođe bavi intenzifikacijom procesa dobijanja prebiotika u inovativnim reaktorima specijalnih konstrukcija, kao i optimizacijom dizajna i radnih uslova kontinualnog procesa proizvodnje. Za intenzifikaciju procesa, neophodno je obezbediti adekvatne uslove za kontinualno izvođenje ovih reakcija koje zahtevaju dobro mešanje i veliko vreme zadržavanja što se ne može postići unutar klasičnih cevni reaktora. Jedno od rešenja mogu biti novi tipovi reaktori sa pregradama i oscilatornim tokom fluida. U ovim reaktorima prisustvo pregrada uzrokuje formiranje vrtloga pri relativno malim brzinama strujanja, što doprinosi boljem mešanju, a samim tim i poboljšanju prenosa

toplote i mase. Strujanje je približno klipno i javljaju se niži smicajni naponi u odnosu na klasične reaktore sa mešanjem, što ove reaktore čini pogodnim za primenu u biohemijskoj industriji.

### 3. BIBLIOGRAFIJA

#### 3.1 Spisak objavljenih radova pre izbora u zvanje naučni saradnik

##### 3.1.1. Rad u međunarodnom časopisu izuzetne vrednosti (M21a)

1. Belščak-Cvitanović A., **Stojanović R.**, Manojlović V., Komes D., Juranović-Cindrić I., Nedović V., Bugarski B., (2011) Encapsulation of polyphenolic antioxidants from medicinal plant extracts in alginate-chitosan system enhanced with ascorbic acid by electrostatic extrusion, *Food Research International*, 44(4), 1094-1101, ISSN: 0963-9969, *IF(2011)=3.150*, doi: 10.1016/j.foodres.2011.03.030.

##### 3.1.2. Rad u vrhunskim međunarodnim časopisima (M21)

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##### 3.1.3. Rad u istaknutom međunarodnom časopisu (M22)

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##### 3.1.5. Saopštenje sa međunarodnog skupa štampano u celini (M33)

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### 3.1.6. Saopštenje sa međunarodnog skupa štampano u izvodu (M34)

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6. Milanovic J., **Stojanovic R.**, Levic S., Samardzic D., Zuidam K.-J., Bugarski B. (2008) Production of Carnuba wax microbeads by melt dispersion technique. In: *Proceedings of COST865 Spring Workshop on Bioencapsulation Sciences to Applications*, 25<sup>th</sup> -26<sup>th</sup> April, Ljubljana, Slovenia, p.14. The Organizers: COST865, University of Ljubljana, Slovenia, prof. Bojana Boh, <http://impascience.eu/COST865/Ljubljana/>.

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### 3.1.7. Saopštenje sa skupa nacionalnog značaja štampano u celini (M63)

1. Isailović B, Kostić I., Trifković K., **Stojanović R.**, Zarić M., Đorđević V., Bugarski B. (2012) Difuzija resveratrola iz lipidnih mikročestica dobijenih različitim tehnikama. Prva konferencija mladih hemičara Srbije, Zbornik radova, Klub mladih hemičara Srbije, Srpsko hemijsko društvo, Beograd 19. – 20. oktobar, 2012, urednici, I. Osenica, A. Dekanski, ISBN 978-86-7132-051-1, pp. 115-119.

### **3.1.8. Saopštenje sa skupa nacionalnog značaja štampano u izvodu (M64)**

1. Pjanović R., Bošković-Vragolović N., **Stojanović R.**, Garić-Grulović R., Jaćimovski D., Bugarski B., Pejanović S. (2015) Difuzija kofeina iz lipidozoma modifikovanih površinski aktivnim komponentama, 52. savetovanje Srpskog hemijskog društva, Novi Sad, 29-30. maj 2015, Book of abstracts, pag. 46.
2. Radunović V., **Stojanović R.**, Bošković-Vragolović N., Garić-Grulović R., Bugarski B., Pjanović R. (2012) Uticaj sastava membrane na brzinu otpuštanja polifenola iz lipozoma, L savetovanje Srpskog hemijskog društva / *50th SCS Meeting*, Book of abstracts, Beograd, 14. i 15. jun 2012, pag. 51, ISBN: 978-86-7132-048-1.
3. Pjanović R., **Stojanović R.**, Šajber M., Veljković J., Bošković-Vragolović N., Pejanović S. (2008) Difuzija lidokain-hidrohlorida iz lipidnih mikročestica, Naučno-stručni skup: Čistije tehnologije i novi materijali - put u održivi razvoj, Knjiga izvoda radova, str.33, Beograd.

### **3.1.9. Odbranjena doktorska teza (M71)**

1. **Radoslava N. Privilović** „Difuzija polifenolnih jedinjenja iz mikročestica dobijenih različitim tehnikama inkapsulacije“, Beograd, 29. jun 2016.

### **Učešće u projektima, studijama, elaboratima i sl. sa privredom; učešće u projektima finansiranim od strane nadležnog Ministarstva**

#### ***Učešće u međunarodnim naučnim projektima***

1. Istraživač na projektu Eureka E!6750 „*Development of enzyme processes for production of egg white protein hydrolysates*“, 2011-2014;
2. Istraživač na projektu Eureka E!4486 „*Research and Development of Blood-Derived Hemoglobin for Animal Usage*“, 2008-2011.

#### ***Učešće u projektima finansiranim od strane nadležnog Ministarstva***

1. Stipendista na projektu OI142075 pod nazivom „Interakcija imobilisanih ćelija, tkiva i biološki aktivnih molekula u biorektorskim sistemima“, MNRS 2007-2011;
2. Istraživač na projektu III46010 pod nazivom „Razvoj novih inkapsulacionih i enzimskih tehnologija za proizvodnju biokatalizatora i biološki aktivnih komponenata hrane u cilju povećanja njene konkurentnosti, kvaliteta i bezbednosti“, MNRS 2011-2019;

### **Aktivnosti u obrazovanju društvene zajednice**

#### ***Predavanja za učenike osnovnih, srednjih škola ili odgovarajućih građanskih organizacija***

1. Bukara K., Kostić I., Ilić V., **Privilović R.**, Đorđević V., Bugarski B. (2014) Otpadna klanična krv: Novi izvor biološki aktivnih supstanci i biomaterijala, 11. Međunarodni sajam zaštite životne sredine i prirodnih resursa "ECOFAIR 2014", Beograd, 13.-16. oktobra 2014. godine, Štand TMFa.

### **3.2. Spisak objavljenih radova posle izbora u zvanje naučni saradnik (2017 - 2021)**

Klasifikacija naučnoistraživačkih rezultata prema adekvatnim kategorijama nakon podnošenja molbe za reizbor u zvanje Naučni saradnik, izvršena je prema Pravilniku o sticanju istraživačkih i naučnih zvanja (Sl. glasnik RS, broj 159 od 30.12.2020.).

Od izbora u zvanje naučni saradnik do trenutka podnošenja Izveštaja, dr Radoslava N. Privilović je publikovala radove sledećih kategorija: 1xM13, 1xM22; 1xM23, 1xM51 i 2xM33.

### **3.2.1. Monografska studija/poglavlje u knjizi M11 ili rad u tematskom zborniku vodećeg međunarodnog značaja (M13)**

1. Balanč B., Trifković K., **Pravilović R.**, Đorđević V., Lević S., Bugarski B., Nedović V. (2018) Lipid nanocarriers for phytochemical delivery in foods, Ch 16, 28 pages. In: Nanotechnology Applications in the Food Industry, Eds. V Ravishankar Rai, Jamuna A Bai. CRC Press, ISBN:9781498784832.357-385, <https://www.taylorfrancis.com/books/e/9780429488870/chapters/10.1201/9780429488870-16>.

### **3.2.2. Rad u istaknutom međunarodnom časopisu (M22)**

1. **Pravilović R.**, Balanč B., Đorđević V., Bošković-Vragolović N., Bugarski B., Pjanović R. (2019) Diffusion of polyphenols from alginate, alginate/chitosan, and alginate/inulin particles. *Journal of Food Process Engineering*, 42(4):e13043, ISSN: 0145-8876, *IF(2020)=2.356*. doi: 10.1111/jfpe.13043.

### **3.2.3. Rad u međunarodnom časopisu (M23)**

1. **Pravilović R.**, Balanč B., Trifković K., Đorđević V., Bošković-Vragolović N., Bugarski B., Pjanović R. (2017) Comparative effects of Span 20 and Span 40 on liposomes release properties, *International Journal of Food Engineering*, 13(12), ISSN: 2194-5764, *IF(2018)=0.951*. doi: 10.1515/ijfe-2017-0339.

### **3.2.4. Saopštenje sa međunarodnog skupa štampano u celini (M33)**

1. R. Pjanović, **R. Pravilović**, K. Banković, M. Milivojević, D. Šeremet, D. Komes (2020) Nanoparticles niosomes as a vectors for delivery of hydrophilic compounds, 9th International Scientific Conference on Defensive Technologies: "OTEH 2020", pp. 513-517, 15-16. October 2020, Belgrade, Serbia.

2. A. Jovanović, B. Balanč, **R. Pravilović**, A. Ota, N. Poklar Ulrih, V. Nedović, B. Bugarski (2017) Influence of cholesterol on liposomal membrane fluidity, liposome size and zeta potential, *V International Congress: „Engineering, Environment and Materials in Processing Industry, CD proceedings (H-29)*, pp. 1501-1514, 15.-17. March, 2017, Jahorina, Bosnia and Herzegovina. doi: 10.7251/EEMSR15011502J.

### **3.2.5. Rad u vrhunskom časopisu nacionalnog značaja (M51)**

1. Balanč B., Trifković K., **Pravilović R.**, Đorđević V., Marković S., Nedović V., Bugarski B. (2017) Encapsulation of resveratrol in spherical particles of food grade hydrogels. *Food & Feed research*, 44 (1) 23-29, DOI: 10.5937/FFR1707023B (ISSN 2217-5369).

### **Učešće u projektima, studijama, elaboratima i sl. sa privredom; učešće u projektima finansiranim od strane nadležnog Ministarstva**

#### ***Učešće u međunarodnim naučnim projektima***

1. Istraživač na bilateralnom projektu između Republike Srbije i Republike Slovenije „Adding value to biodiesel production – intensified conversion of glycerol to hydrogen and value-added bio-additives, 2020-2021;
2. Istraživač na bilateralnom projektu između Republike Srbije i Republike Hrvatske „Encapsulation of lemon balm (*Melissa officinalis*) and mountain germander (*Teucrium montanum*) extracts in emulsions and liposomes in order to obtain functional nutritional supplements”, 2019-2021.

#### ***Učešće u projektima finansiranim od strane nadležnog Ministarstva***

1. Istraživač na IDEJA projektu pod nazivom „Prebiotics for functional food and bioactive cosmetics produced in intensified enzymatic processes“, Fond za nauku 2022-2024.



2. Istraživač na projektu III46010 pod nazivom „Razvoj novih inkapsulacionih i enzimskih tehnologija za proizvodnju biokatalizatora i biološki aktivnih komponenata hrane u cilju povećanja njene konkurentnosti, kvaliteta i bezbednosti”, MNRS 2011-2019.

Kvantitativni prikaz rezultata za ukupni naučni opus

Do izbora u zvanje naučni saradnik	Nakon izbora u zvanje naučni saradnik	Ukupan naučni opus
	M13: 1×7=7	M13: 1×7=7
M21a: 1×10=10		M21a: 1×10=10
M21: 1×8=8		M21: 1×8=8
M22: 1×5=5	M22: 1×5=5	M22: 2×5=10
M23: 3×3=9	M23:1×3=3	M23: 4×3=12
M33: 8×1=8, 2×0,833=1,666*, 1×0,714=0,714*	M33: 2×1=2	M33: 10×1=10, 2×0,833=1,666*, 1×0,714=0,714*
M34: 6×0,5=3, 1×0,357=0,357*		M34: 6×0,5=3, 1×0,357=0,357*
	M51: 1×2=2	M51: 1×2=2
M63: 1×0,5=0,5		M63: 1×0,5=0,5
M64: 3×0,2=0,6		M64: 3×0,2=0,6
M71: 1×6=6		M71: 1×6=6
<b>Ukupno: 52,8</b>	<b>Ukupno: 19</b>	<b>Ukupno: 71,8</b>

\*Korigovan broj poena prema Prilogu 1 prema broju autora.

#### 4. ANALIZA PUBLIKOVANIH RADOVA

Značajno mesto u istraživačkoj aktivnosti kandidata zauzima ispitivanje i karakterisanje različitih tehnika za inkapsulaciju biološki aktivnih komponenata. Optimizovan je proces inkapsulacije polifenolnih jedinjenja u mikročestice na bazi hidrogelova i fosfolipida (publikacije 3.1.1.1, 3.1.2.1, 3.2.2.1, 3.2.3.1, 3.1.4.1, 3.1.5.6, 3.1.5.8, 3.1.6.4, 3.1.5.9, 3.1.6.1. i 3.2.4.2.). Antioksidansi, posebno polifenoli, imaju niz pozitivnih efekata na ljudsko zdravlje, te je sve veća potreba za prirodnim izvorima antioksidanasa. Međutim, polifenoli imaju neprijatan, gorak ukus, te se kroz hranu i piće ne unose u dovoljnim količinama. Inkapsulacijom se maskira ukus polifenola i istovremeno se oni prevode iz tečnih ekstrakata u čvrste formulacije, koje se onda mogu koristiti kao aditivi u prehrambenim proizvodima. Hidrogel mikročestice su dobijene metodom elektrostatičke ekstruzije, koja je pogodna za dobijanje čestica željenih dimenzija. Pored toga, bavila se karakterisanjem dobijenih čestica, kao i ispitivanjem antioksidativne aktivnosti polifenolnih jedinjenja (publikacije 3.1.1.1, 3.1.2.1, 3.1.6.1, 3.1.5.2, 3.1.6.4, 3.1.5.9. i 3.1.6.3.).

Veliki broj radova dr Radoslave Pravilović bavi se prenosom mase u heterogenim sistemima, kao i dizajnom sistema za kontrolisano otpuštanje farmaceutski aktivnih komponenti i prenosom mase u ovim sistemima. U radovima 2.1.4.1, 3.2.2.1, 3.2.3.1, 3.1.4.3, 3.1.8.1, 3.1.8.2. i 3.1.8.3. ispitivana je difuzija polifenolnih jedinjenja i lekova iz hidrogelova i lipozoma. Predložen je model difuzije i na osnovu predloženog modela određeni su koeficijenti difuzije, kao i otpori prenosu mase, na osnovu kojih je moguće projektovati sisteme za kontrolisano otpuštanje lekova. U radovima 2.1.4.1. 3.2.3.1. i 3.1.8.2. ispitivan je uticaj modifikacije membrane lipozoma površinski aktivnim materijama na brzinu difuzije aktivne komponente. U radu 3.2.4.2. su prikazane nanočestice lipozoma, kao nosači za hidrofilne komponente. U radovima 3.2.5.1. i 3.1.7.1. prikazani su rezultati ispitivanja difuzije resveratrola iz lipidnih mikročestica dobijenih različitim tehnikama inkapsulacije.

Dr Radoslava Pravilović je uspešno radila na optimizaciji postupaka za izolovanje hemoglobina iz eritrocita poreklom iz otpadne klanične goveđe krvi sa ciljem dobijanja preparata hemskog gvožđa za

prevenciju anemije kod životinja i ljudi (publikacije 3.1.3.1, 3.1.4.2, 3.1.5.3, 3.1.5.4, 3.1.5.5, 3.1.5.7. i 3.1.6.2.). Dobijeni rezultati su pokazali da goveđi eritrociti imaju povećanu osmotsku osetljivost u odnosu na humane eritrocite, a da je optimalan puferski sistem za izvođenje njihove kontrolisane hemolize 35 mM natrijumfosfatni/NaCl pufer pH 7,2–7,4. Kontrolisana hemoliza sa optimizovanim puferskim sistemom je izvedena u membranskom reaktorskom sistemu i ostvaren je prinos hemoglobina od 83±12% (publikacija 3.1.3.1.).

Osim istraživačkih publikacija dr Radoslava Pravilović je učestvovala i u pisanju poglavlja čija tematika se odnosi na sisteme za inkapsulaciju koji mogu da se primene u prehrambenoj industriji (publikacija 3.2.1.1.).

## 5. CITIRANOST RADOVA KANDIDATA (bez autocitata) PREMA BAZI SCOPUS

Ukupna citiranost radova dr Radoslave Pravilović iznosi 297 sa autocitatima i 289 bez autocitata, izvor Scopus, pristup 8.2.2022. Vrednost h-indeksa iznosi 4.

Citirani su sledeći radovi:

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  3. Luong P.H., Nguyen T.C., Nguyen T.C., Pham T.D., Tran D.M.T., Ly T.N.L., Vu Q.T., Tran T.K.N., Thai H. (2021) Preparation and Assessment of Some Characteristics of Nanoparticles Based on Sodium Alginate, Chitosan, and Camellia chrysantha Polyphenols, *International Journal of Polymer Science*, Open Access, Volume 2021, Article number 5581177.
- **Pravilović R., Balanč B., Trifković K., Đorđević V., Bošković-Vragolović N., Bugarski B., Pjanović R. (2017) Comparative effects of Span 20 and Span 40 on liposomes release properties, *International Journal of Food Engineering*, 13(12), ISSN: 2194-5764, IF(2018)=0.951. doi: 10.1515/ijfe-2017-0339.**
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1. Luo W.-C., O'Reilly Beringhs A., Kim R., Zhang W., Patel S.M., Bogner R.H., Lu X. (2021) Impact of formulation on the quality and stability of freeze-dried nanoparticles, *European Journal of Pharmaceutics and Biopharmaceutics*, Volume 169, Pages 256 – 267.
  2. Olatunde O.O., Benjakul S., Vongkamjan K., Amnuakit T. (2020) Influence of stabilising agents on the properties of liposomal encapsulated ethanolic coconut husk extract, *International Journal of Food Science and Technology*, Volume 55, Issue 2, Pages 702 – 711.
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2. Castro-Muñoz R., García-Depraect O., León-Becerril E., Cassano A., Conidi C., Fíla V. (2021) Recovery of protein-based compounds from meat by-products by membrane-assisted separations: a review, *Journal of Chemical Technology and Biotechnology*, Volume 96, Issue 11, Pages 3025 – 3042.
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4. Stančić A.Z., Drvenica I.T., Obradović H.N., Bugarski B.M., Ilić V.L., Bugarski D.S. (2020) Native bovine hemoglobin reduces differentiation capacity of mesenchymal stromal cells in vitro, *International Journal of Biological Macromolecules*, Volume 144, Pages 909 – 920.
5. Drvenica I.T., Stančić A.Z., Bugarski B.M., Pajic-Lijaković I., Maslovarić I., Ilić V.L. (2020) Erythrocyte membranes: Unique constituent of biological/hybrid drug delivery systems, *Journal of Stem Cells*, Volume 15, Issue 1, Pages 31 – 65.
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## 6. ELEMENTI ZA KVALITATIVNU OCENU NAUČNOG DOPRINOSA KANDIDATA I MINIMALNI KVANTITATIVNI USLOVI ZA IZBOR

### 6.1. Pokazatelji uspeha u naučnom radu

Pokazatelji uspeha u naučnom radu koji kvalifikuju dr Radoslavu N. Pravičević za reizbor u zvanje naučni saradnik su:

- dosadašnje iskustvo u istraživanjima u okviru tri naučno-istraživačka projekta Republike Srbije, kao i četiri međunarodna projekta;

- autor je ili koautor jednog poglavlja u knjigama vodećeg međunarodnog značaja (nakon izbora u poslednje zvanje), osam naučnih radova štampanih u celini u međunarodnim naučnim časopisima (dva nakon izbora u poslednje zvanje), jedan rad u nacionalnim časopisima (nakon izbora u poslednje zvanje), dvadeset saopštenja sa međunarodnih skupova (dva nakon izbora u poslednje zvanje) i četiri saopštenja sa nacionalnih skupova.

## 6.2. Angažovanost u razvoju uslova za naučni rad, obrazovanju i formiranju naučnih kadrova

### Pre sticanja zvanja naučnog saradnika, 2017. godine:

Tokom realizacije naučnih projekata dr Radoslava Pravilović je aktivno učestvovala u realizaciji naučne saradnje Tehnološko-metalurškog fakulteta sa drugim institucijama, u zemlji i inostranstvu. Pored intenzivne saradnje sa kolegama sa Poljoprivrednog fakulteta u Beogradu i Instituta za medicinska istraživanja, koja traje od samog početka naučno-istraživačkog rada dr Radoslave Pravilović, ona je više puta boravila na Prehrambeno-biotehnološkom fakultetu u Zagrebu kao gostujući istraživač.

Dr Radoslava N. Pravilović je učestvovala u realizaciji dva naučnoistraživačka projekta Ministarstva za nauku i tehnološki razvoj, kao i dva međunarodna projekta (Eureka projekat E!6750 „Development of enzyme processes for production of egg white protein hydrolysates”, 2011-2014; Eureka projekat E!4486 „Research and Development of Blood-Derived Hemoglobin for Animal Usage”, 2008-2011.).

Dr Radoslava N. Pravilović je učestvovala u izradi nekoliko završnih, diplomskih i master radova studenata Tehnološko-metalurškog fakulteta, na katedri za Hemijsko inženjerstvo. Radoslava Pravilović je učestvovala u izvođenju računskih vežbi iz predmeta Osnovi automatskog upravljanja i Modelovanje i simulacija procesa, kao i u izvođenju eksperimentalnih vežbi iz predmeta Tehnološke operacije i HI laboratorija.

### Nakon sticanja zvanja naučnog saradnika, 2017. godine:

Učešće na dva naučnoistraživačka projekta Ministarstva za nauku i tehnološki razvoj, kao i dva međunarodna projekta (bilateralni projekat između Republike Srbije i Republike Slovenije „Adding value to biodiesel production – intensified conversion of glycerol to hydrogen and value-added bio-additives, 2020-2021. i bilateralni projekat između Republike Srbije i Republike Hrvatske „Encapsulation of lemon balm (*Melissa officinalis*) and mountain germander (*Teucrium montanum*) extracts in emulsions and liposomes in order to obtain functional nutritional supplements”, 2019-2021).

Dr Radoslava N. Pravilović je pored učešća u realizaciji naučno-istraživačkih projekata učestvovala i na izradi više završnih i master radova, kao i doktorskih disertacija.

Dr Radoslava N. Pravilović učestvuje u nastavi u izvođenju računskih vežbi iz nekoliko predmeta pri katedri za Hemijsko inženjerstvo na Tehnološko-metalurškom fakultetu („Osnovi automatskog upravljanja“, „Modelovanje i simulacija procesa“, „Programiranje“, „Sistemi automatskog upravljanja procesima“, „Merenje i upravljanje procesima“, „Upravljanje procesima u farmaceutskoj industriji“).

## 6.3. Organizacija naučnog rada

U toku svoje naučne i istraživačke karijere dr Radoslava Pravilović je učestvovala u više nacionalnih i međunarodnih projekata.

Nacionalni projekti na kojima je učestvovala su sledeći:

- Istraživač na IDEJA projektu pod nazivom „Prebiotics for functional food and bioactive cosmetics produced in intensified enzymatic processes“, Fond za nauku 2022-2024;
- Istraživač na projektu III46010 pod nazivom „Razvoj novih inkapsulacionih i enzimskih tehnologija za proizvodnju biokatalizatora i biološki aktivnih komponenata hrane u cilju povećanja njene konkurentnosti, kvaliteta i bezbednosti“, MNRS 2011-2019;
- Stipendista na projektu OI142075 pod nazivom „Interakcija imobilisanih ćelija, tkiva i biološki aktivnih molekula u bioreaktorskim sistemima“, MNRS 2007-2011.

Međunarodni projekti na kojima je učestvovala su sledeći:

- Istraživač na bilateralnom projektu između Republike Srbije i Republike Slovenije „Adding value to biodiesel production – intensified conversion of glycerol to hydrogen and value-added bio-additives, 2020-2021;

- Istraživač na bilateralnom projektu između Republike Srbije i Republike Hrvatske „Encapsulation of lemon balm (*Melissa officinalis*) and mountain germander (*Teucrium montanum*) extracts in emulsions and liposomes in order to obtain functional nutritional supplements”, 2019-2021;
- Istraživač na projektu Eureka E!6750 „*Development of enzyme processes for production of egg white protein hydrolysates*”, 2011-2014;
- Istraživač na projektu Eureka E!4486 „*Research and Development of Blood-Derived Hemoglobin for Animal Usage*”, 2008-2011.

## **6.4. Kvalitet naučnih rezultata**

### **6.4.1. Uticajnost, pozitivna citiranost, ugled i uticajnost publikacija u kojima su kandidatovi radovi objavljeni**

Dr Radoslava Pravilović, dipl. inž. tehnologije, u svom dosadašnjem radu pokazala je visok stepen samostalnosti u osmišljavanju i realizaciji istraživanja, kao i obradi i interpretaciji dobijenih rezultata. Rezultati njenih istraživanja značajno su doprineli realizaciji projekta, a iz njih je proisteklo više naučnih radova koji su publikovani u vrhunskim međunarodnim i domaćim časopisima.

Prema izvoru *Scopus*, h-index dr Radoslave Pravilović je 4, a citiranost 297, odnosno 289 bez autocitata svih autora na dan 8.2.2022.

U svom dosadašnjem naučno-istraživačkom radu dr Radoslava N. Pravilović je, kao autor ili koautor, do sada objavila jedno poglavlje u knjigama međunarodnog značaja kategorije M13 renomiranih izdavača (*CRC Press*), jedan rad u međunarodnom časopisu izuzetne vrednosti (M21a), jedan rad u međunarodnom časopisu (M21), dva rada u istaknutim međunarodnim časopisima (M22), četiri rada u međunarodnim časopisima (M23) i jedan rad u vrhunskom časopisu nacionalnog značaja (M51).

### **6.4.2. Efektivan broj radova i broj radova normiran na osnovu broja koautora, ukupan broj kandidatovih radova, udeo samostalnih i koautorskih radova u njemu, kandidatov doprinos u koautorskim radovima**

Dr Radoslava N. Pravilović je u dosadašnjem naučno-istraživačkom radu publikovala 35 bibliografskih jedinica, uključujući i doktorsku disertaciju i to: 1 poglavlje u knjizi međunarodnog značaja (M13), 8 radova objavljenih u časopisima međunarodnog značaja (1 rad u međunarodnom časopisu izuzetnih vrednosti M21a, 1 rad u vrhunskim međunarodnim časopisima M21, 2 rad u istaknutim međunarodnim časopisima M22, 4 rada u međunarodnim časopisima M23), 1 rad u vrhunskom časopisu nacionalnog značaja M51, 24 saopštenja na skupovima međunarodnog i nacionalnog značaja (M30 i M60).

Od 35 bibliografskih jedinica, dr Radoslava Pravilović je prvi autor na šest bibliografskih jedinica sledećim redosledom 1×M21, 2×M22, 3×M23 i 1×M71. Od prethodnog izbora u zvanje prvi autor je na 2 bibliografske jedinice i to 1×M22 i 1×M23. Prosečan broj autora po radu za ukupno navedenu bibliografiju iznosi 6,66.

### **6.4.3. Stepen samostalnosti u naučnoistraživačkom radu i uloga u realizaciji radova u naučnim centrima u zemlji i inostranstvu**

Radoslava N. Pravilović je tokom dosadašnjeg naučno-istraživačkog rada pokazala visok stepen samostalnosti u idejama, kreiranju i realizaciji eksperimenata, obradi rezultata i pisanju naučnih radova, koji se u najvećem broju odnose na inkapsulaciju aktivnih komponenti u hidrogel i fosfolipidnim mikročesticama, ali i izolovanje hemoglobina iz eritrocitnih membrana. Rezultate svojih istraživanja je sistematski analizirala i publikovala u uticajnim međunarodnim časopisima. Uz to dr Radoslava Pravilović boravila je u nekoliko laboratorija u zemlji i inostranstvu, kao što su: laboratorija Instituta za medicinska istraživanja u Beogradu (2011.-2012.) i laboratorija Prehrambeno-biotehnološkog fakulteta Univerziteta u Zagrebu (2010, 2020-2021.).

## 6.5. Kvantitativna ocena naučnih rezultata

Sumarni pregled objavljenih radova i koeficijenata naučne kompetentnosti dr Radoslave Pravilović za period 2017-2021. godine, koji ulazi u evaluaciju prilikom reizbora u zvanje Naučni saradnik prikazan je u Tabeli:

Pregled broja radova i koeficijenata naučne kompetentnosti od prethodnog izbora u zvanje (period 2017-2021. godine):

Grupa rezultata	Vrsta rezultata	Vrednost (bod)	Broj radova u kategoriji	Zbir
M10	Monografska studija/poglavlje u knjizi M11 ili rad u tematskom zborniku vodećeg međunarodnog značaja, M13	7	1	7
M20	Rad u istaknutom međunarodnom časopisu, M22	5	1	5
	Rad u međunarodnom časopisu	3	1	3
M30	Radovi saopšteni na skupovima međunarodnog značaja štampani u celini, M33	1	2	2
M50	Rad u vrhunskom časopisu nacionalnog značaja, M51	2	1	2
<b>Ukupno</b>			<b>6</b>	<b>19</b>

Uslov za reizbor u zvanje Naučni saradnik za tehničko-tehnološke i biotehničke nauke, koji propisuje Pravilnik o sticanju istraživačkih i naučnih zvanja (Sl. glasnik RS, broj 159 od 30.12.2020.) u članu 35, je da kandidat mora da u periodu od pet godina ispuni minimalne kvantitativne rezultate potrebne za izbor u naučno zvanje naučni saradnik.

Minimalni kvantitativni zahtevi za reizbor u naučno zvanje Naučni saradnik za tehničko-tehnološke i biotehničke nauke

Minimalni kvantitativni zahtevi za sticanje zvanja naučni saradnik	Minimalno potrebno	Ostvareno
<b>Ukupno</b>	16	19
<b>M10+M20+M31+M32+M33+M41+M42+M51+M80+M90+M100</b>	9	19
<b>M21+M22+M23</b>	5	8



## ZAKLJUČAK

Na osnovu detaljne analize dosadašnjeg naučno-istraživačkog rada i ostvarenih rezultata dr **Radoslave N. Pravičović**, Komisija smatra da ona ispunjava sve potrebne uslove za **reizbor** u zvanje **NAUČNI SARADNIK** i predlaže Nastavno-naučnom veću Tehnološko-metalurškog fakulteta Univerziteta u Beogradu da ovaj izveštaj prihvati i isti prosledi odgovarajućoj komisiji Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije na konačno usvajanje.

U Beogradu, 17. februara 2022. godine.

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