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RECTORATUL

## Universitatea Babeş-Bolyai Competiția Excelenței 2010

### Dosar individual

**Notă: Toate datele se referă la perioada 2005-2009**

<b>Nume, prenume, grad did.</b>	<b>CONF. DR. ING. MONICA IOANA TOSA</b>
<b>Facultatea, Catedra</b>	Chimie si inginerie chimica, Catedra de biochimie si inginerie biochimica
<b>Domeniul științific</b>	Știința și Ingineria Mediului
<b>Adresa paginii web personale</b>	<a href="http://www.chem.ubbcluj.ro/catedre/biochimie-inginerie.html">http://www.chem.ubbcluj.ro/catedre/biochimie-inginerie.html</a>
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### Criteriaul I – Output

**1. Articole științifice publicate în reviste indexate ISI (cu menționare factorului de impact în cazul celor cotate)**

Titlu	Autori	Revista	Factor impact
NIR surface enhanced Raman spectroscopy and bands assignment by DFT calculations of non-natural $\beta$ -amino acids	Iliescu, T., Maniu, D., Chiș, V., Irimie, F. D., Paizs, Cs., Toșa, M.	Chemical Physics <b>2005</b> , 310, 189-199.	1.961
Experimental and quantum chemical study on the vibrational spectroscopy of N-methylphenothiazines: Part 1	Endredi, Henrietta; Billes, Ferenc; Tosa, Monica; Majdik, Cornelia; Irimie, Florin Dan.	Spectrochimica Acta, Part A: Molecular and Biomolecular Spectroscopy <b>2006</b> , 63A(2), 349-360.	1.510
Inhibition of Histidine Ammonia-Lyase by Heteroaryl-alanines and Acrylates.	Katona, A., Toșa, M. I., Paizs, Cs., Rétey, J	Chemistry and Biodiversity <b>2006</b> , 3, 502-508.	1.659
Chemoenzymatic preparation of enantiopure L-benzofuranyl- and L-benzo[b]thiophenyl alanines	Podea, P., Toșa, M. I., Paizs, Cs., Irimie, F. D.	Tetrahedron: Asymmetry <b>2008</b> , 19, 500-511.	2.796
Lipase-catalyzed kinetic resolution of racemic 1-heteroarylethanol—experimental and QM/MM study	Toșa, M. I., Pilbák, S., Moldovan, P., Paizs, Cs., Szatzker, G., Szakács, Gy., Novák, L., Irimie, F. D., Poppe, L.	Tetrahedron: Asymmetry <b>2008</b> , 19, 1844-1852.	2.796
Chemoenzymatic synthesis of (R)- and (S)-1-heteroarylethanol.	Toșa, M. I., Podea, P., Paizs, Cs., Irimie, F. D.	Tetrahedron: Asymmetry <b>2008</b> , 19, 2068-2071.	2.796
Baker's yeast-mediated synthesis of (R)- and (S)-heteroaryl-ethane-1,2-diols	Podea, P., Paizs, Cs., Toșa, M. I., Irimie, F.	Tetrahedron: Asymmetry <b>2008</b> , 19, 1959-1964.	2.796
Enzyme-catalyzed synthesis of (R)- and (S)-3-heteroaryl-3-hydroxypropanoic acids and their	Brem J., Paizs Cs., Toșa M. I., Vass E., Irimie F. D.	Tetrahedron: Asymmetry <b>2009</b> , 20, 489-496.	2.796

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Formyl- and acetylandols: Billes, F., Podea, P.V., Spectrochimica acta. Part 1.51  
vibrational spectroscopy of an Mohammed-Ziegler, I., A, Molecular and  
expectably pharmacologically active Toşa, M., Mikosch, H., biomolecular spectroscopy  
compound family. Irimie, D.F. **2009**, 74 (5), 1031-1045  
New ways for old structures Irimie, F.D., Paizs, C., *Studia Universitatis* 0  
Tosa, M., Podea, P. *Babes-Bolyai Chemia*  
**2009**, 4 (1), 7-16

## 6. Cărți științifice publicate în edituri naționale acreditate

1. Toşa Monica-Ioana, Paizs Csaba, Irimie Florin-Dan, *Bioprocese pentru obținerea medicamentelor și intermediarilor*. Editura Napoca Star, Cluj-Napoca 2007, ISBN 978-973-647-531-5, 215 pag
2. Irimie Florin Dan, Paizs Csaba, Toşa Monica *Biotransformări în sinteza organică. Aspecte Fundamentale*. Editura Napoca Star, Cluj-Napoca 2006, ISBN 978-973-647-467-5, 180 pag
3. Moldovan Paula, Toşa Monica Ioana, Leţ Daniela, Majdik Cornelia, Paizs Csaba, Irimie Florin Dan *Aplicații pentru laboratorul de biochimie* Editura Napoca Star, Cluj Napoca 2006, ISBN 978-973-647-464-4, 153 pag.

## Criteriaul II – Prestigiu profesional

### 1. Citări ale articolelor ISI listate la Criteriaul I

Enzyme-catalyzed synthesis of (R)- and (S)-3-heteroaryl-3-hydroxy-propanoic acids and their derivatives, *Tetrahedron Asymmetry* 2009, 20 (4), pp. 489-496

1. Synthesis of a core carbon framework of cyanosporasides A and B, Aburano, D., Inagaki, F., Tomonaga, S., Mukai, C., *Journal of Organic Chemistry* 2009, 74 (15), pp. 5590-5594

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1. Chiral spiroaminoborate ester as a highly enantioselective and efficient catalyst for the borane reduction of furyl, thiophene, chroman, and thiochroman-containing ketones, Stepanenko, V., De Jesús, M., Correa, W., Bermúdez, L., Vázquez, C., Guzmán, I., Ortiz-Marciales, M. *Tetrahedron Asymmetry* 2009, 20 (23), pp. 2659-2665
2. Stereoselective chemoenzymatic synthesis of enantiopure 1-(Heteroaryl)ethanamines by lipase-Catalysed kinetic resolutions, Alatorre-Santamaria, S., Gotor-Fernandez, V., Gotor, V. *European Journal of Organic Chemistry* 2009, (15), pp. 2533-2538

Baker's yeast-mediated synthesis of (R)- and (S)-heteroaryl-ethane-1,2-diols, *Tetrahedron Asymmetry* 2008, 19 (16), pp. 1959-1964

1. New ways for old structures, Irimie, F.D., Paizs, C., Tosa, M., Podea, P. *Studia Universitatis Babes-Bolyai Chemia* 2009, 4 (1), pp. 7-16
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3. New ways for old structures, Irimie, F.D., Paizs, C., Tosa, M., Podea, P. *Studia Universitatis Babes-Bolyai Chemia* 2009, 4 (1), pp. 7-16
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5. Surface-enhanced Raman scattering and DFT computational studies of a benzotriazole derivative , Li, M.-Y., Liao, Q., Zhang, M., Ai, X.-C., Li, F.-Y. *Journal of Molecular Structure* 2008, 888 (1-3), pp. 2-6
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11. Ab initio, DFT vibrational calculations and SERRS study of Rhodamine 123 adsorbed on colloidal silver particles , Sarkar, J., Chowdhury, J., Pal, P., Talapatra, G.B. *Vibrational Spectroscopy* 2006, 41 (1), pp. 90-96
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2. New ways for old structures, Irimie, F.D., Paizs, C., Tosa, M., Podea, P. *Studia Universitatis Babes-Bolyai Chemia* 2009, 4 (1), pp. 7-16
3. Chemoenzymatic method to enantiopure Sulphur heterocyclic  $\beta$ -hydroxy nitriles, Turcu, M.C., Perkiö, P., Kanerva, L.T. *Arkivoc* 2009 (3), pp. 251-263
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#### 10. Participări la programe/granturi finanțate din sursă națională (se menționează și valoarea)

Nr.	Titlu	Funcție
1	<i>Sinteza enzimatică a unor amino- și hidroxiacizi heterociclici nenaturali.</i>	membru 2006-2008
	<i>Metoda noua de separare a compusilor enantiopuri utilizand anticorpi selectivi (2004-2006), Contract CERES 532/2004</i>	membru 2003-2005
	<i>Metodologie biocatalitica de obtinere selectiva a unor sintoni chirali pentru sinteza de compusi cu activitate biologica (2003-2005), Contract Ceres 189/2003</i>	membru 2003-2005
	<i>Metodologie biocatalitica de obtinere selectiva a unor sintoni chirali pentru sinteza de compusi cu activitate biologica (2003-2005), Contract Ceres 189/2003</i>	membru 2003-2005
	<i>Model experimental bioreactor-extractor pentru obtinerea enzimatica a unor compusi anti-sida (2003-2005), Contract Ceres 1990/2003</i>	membru 2003-2005
	<i>Model experimental bioreactor-extractor pentru obtinerea enzimatica a unor compusi anti-sida (2003-2005), Contract Ceres 1990/2003</i>	membru 2003-2005
	<i>Investigarea mecanismului de actiune al histidin- si fenilalanin-amoniac liazelor, CNCSIS Idei II</i>	membru 2009-2011
	<i>Tehnologie de transesterificare enzimatica destinata obtinerii de biocarburanti de generatia a 2-a PNCD II</i>	membru 2008-2010
	<i>Tehnologie de transesterificare enzimatica destinata obtinerii de biocarburanti de generatia a 2-a PNCD II</i>	membru 2008-2010
	<i>Substitute de sange pe baza de metaloproteine: strategii pentru combaterea stresului oxidativ si a celui nitroziv Idei</i>	Membru, 2007-2010

#### 15. Conferințe invitate internaționale

- Moldovan, P., Paizs, Cs., Tosa M., Majdik, C., Daniela Let, D., Florin Dan Irimie, F. D. (2006): *Dynamic enzymatic resolution of some non-proteinogenic amino acids*, 1<sup>st</sup> European Chemistry Congress, 27-31 August, Budapest, Hungary 546.
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- Majdik, C., Toşa, M., Moldovan, P., Pénczes, A., Let, D., Paizs, Cs., Irimie, F. D. (2006): *Application of immobilization techniques for heavy metals biosorption with Saccharomyces cerevisiae cells*, 33<sup>rd</sup> International Conference of Slovak Society of Chemical Engineering, Tatranske Matliare, Slovakia, 22-26 May, 2006, 230.
- Moldovan, P., Paizs, Cs., Tosa M., Majdik, C., Daniela Let, D., Florin Dan Irimie, F. D. (2006): *Dynamic enzymatic resolution of some non-proteinogenic amino acids*, 33<sup>rd</sup> International Conference of Slovak Society of Chemical Engineering, Tatranske Matliare, Slovakia, 22-26 May, 2006, 229.
- Irimie, F.D., Paizs, Cs., Tosa, M.I., Majdik, C. (2006): *Selectivity of biocatalysts. Applications in organic synthesis*. 33<sup>rd</sup> International Conference of Slovak Society of Chemical Engineering, Tatranske Matliare, Slovakia, 22- 26 May, 2006, 231.

### III. Realizare remarcabilă

(Descrieți într-o manieră cât mai accesibilă (în maximum 1 pagină) cea mai importantă realizare științifică/tehnică/artistică din ultimii 5 ani și impactul acesteia.)

Industria medicamentelor este un domeniu fierbinte al activității umane, prin faptul că oferă mijloace de menținere a stării de sănătate prin prevenirea sau vindecarea unor boli, respectiv prin atenuarea simptomelor anumitor maladii. Utilizarea biocatalizei în industria farmaceutică este deja un fapt obișnuit, explicabil prin avantajele pe care aceasta le oferă variantelor clasice chimice.

Obiectivul major al activității de cercetare desfășurate de mine în ultimii 5 ani l-a reprezentat utilizarea metodelor biocatalitice în obținerea medicamentelor chirale în stare înaltă de puritate optică (a eutomerilor) sau a unor intermediari chirali necesari sintezei acestora.

Disponibilitatea comercială a unui număr mare de enzime a permis efectuarea unor biotransformări înalt selective atât prin utilizarea catalizei celulare, cât și a enzimelor liofilizate sau imobilizate în clasa unor derivați heterociclici cu structura fenotiazinică (alcooli, esteri, hidroxiacizi, derivați S-oxidici).

Dotarea laboratoarelor catedrei cu aparatură performantă de analize a purității (UV-VIS, cromatografie), inclusiv a purității optice (polarimetrie, HPLC și GC chiral), a permis efectuarea unor studii complexe de optimizare a proceselor studiate (la scară analitică) și elaborarea unor metodologii sintetice la nivel preparativ.

Impactul științific al rezultatelor obținute este reflectat de publicarea lor în reviste științifice cotate ISI.

Data:

18 martie 2010

**Certific validitatea datelor prezentate**

Sef de catedră,

Semnătura: