


## CENTER OF SCIENTIFIC RESEARCH OF ENVIRONMENT, FOOD AND HEALTH SAFETY- PHYSICAL-CHEMICAL ANALYSIS

### Contact details

Name	Center Of Scientific Research Of Environment, Food And Health Safety-Physical-Chemical Analysis
Acronym	CCESMAS
Logo	
Site	<a href="http://chimie-biologie.ubm.ro/cercetare.html">http://chimie-biologie.ubm.ro/cercetare.html</a>
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### Areas of expertise

**I. Food safety and security:** • Traceability of contaminants along of food chain › Intelligent and active packages for food  
**II. Environment:** • Environment monitoring; Recovery of valuable metals (Au, Ag, Cu, Zn) from different wastes;  
**II. Science of material:** • Nanomaterials: preparation, characterization and applications in depollution, recovery of metals, self cleaning  
**IV. Chemometry:** • Statistically processing the experimental data; • Mathematical modelling of experimental data

### Team and key skills

**Prof. Dr. Eng. Anca Mihaly Cozmuta** – Food control and expertise; traceability of contaminants along of food chain; food packaging;  
**Assoc. Prof. Dr. Camelia Nicula** – Biochemistry analysis (sugars, proteins, lipids, enzymes) in different matrices  
**Lecturer Dr. Anca Peter** – Nanotechnologies based on TiO<sub>2</sub> (obtaining, characterization, practical applications)  
**Assoc. Prof. Dr. Eng. Leonard Mihaly Cozmuta** – Recovery of valuable metals from wastes; rehabilitation of polluted areas; statistically processing the experimental data, mathematical modelling of experimental data

### Infrastructure

- 1. Perkin Elmer atomic Absorbtion Spectrometer Aanalyst 800** with flame and graphite oven; lamps: Au, Ag, Pt, Cu, Zn, Ca, Mg, Na, K, Mn, Ni, Fe, Co, Cr, Ni, Li.
- 2. Analyzer TOC Skalar Primacs solides; Analizor TOC Skalar Primacs liquids** – analysis of organic and total carbon in samples
- 3. IR spectrometer FT-IR Perkin Elmer BXII** – range 7800 – 100 cm<sup>-1</sup>
- 4. Vegetation room MLR-351**
- 5. Berghof MWS2 oven speed wave 5.2 microwave oven** – dissintegration of environment, food, pharmaceutical and cosmetics samples
- 6. Ultrapure water system BARNSTEAD EASYpure RoDi:** inverse osmoses and UV oxidation (water resistivity 18,2 Mohm•cm; bacteria: less than 1 CFU/ml, TOC ≤ 5 ppb)
- 7. Kjeldahl disintegration and solvent extractions systems** – Velp Scientifica
- 8. UV reactor with lamp and solution recirculation:** range: 190 - 1100 nm; th spectral band wide: 0.5 - 4 nm; deuteriumm and wolfram halide lamps
- 9. Perkin Elmer Lambda 35 spectrometer** for liquid, solids, powders and paste samples analysis

## Development strategy

- Participation to national and international financing competitions for partnerships establishing with other research teams and purchasing of modern analysis equipment
- Publication of scientific results in high rank journals
- The selection of undergraduate and master students with a solid theoretical knowledge in our fields of research and their training for research

## Representative projects

### NATIONAL RESEARCH PROJECTS

**“Rehabilitation of tailings ponds by application of amendments and cultivation of vegetal species with high adaptability to the heavy metals – RIVAM”**; <http://chimie-biologie.ubm.ro/RIVAM/>

**Coordinator of consortium:** Associate professor dr. Leonard Mihaly Cozmuta- North University of Baia Mare, Romania

**Members:** assoc.prof. dr. Camelia (Varga) Nicula, prof.dr. Anca Mihaly Cozmuta, lecturer dr. Anca Peter, etc.

**Range:** 2008-2011

**Funding source:** CNMP - PNCDI 2

**Partners:** University of Oradea, Agricultural Research Institute of Livada, Satu Mare

**Budget:** 1,900,000 RON

**“Bioaccumulation of heavy metals in soil-vegetables-human chain – BIOMEG”**; [http://chimie-biologie.ubm.ro / biomeg/index.html](http://chimie-biologie.ubm.ro/biomeg/index.html)

**Coordinator of consortium:** Assoc.prof. dr. Camelia (Varga) Nicula – North University of Baia Mare

**Members:** assoc.prof. dr. Leonard Mihaly Cozmuta, prof.dr. Anca Mihaly Cozmuta, lecturer dr. Anca Peter, etc.

**Range:** 2008-2011

**Funding source:** CNMP- PNCDI 2

**Partners:** University of Oradea, Agricultural Research Institute of Livada, Satu Mare, Medical Faculty of Brasov

**Budget:** 1,900, 000 RON

**“Integrated application of databases for adopting and restructuring of protection natural and artificial factors in zootechnic farms –AIBD”**

**Director of project for North University of Baia Mare team:** prof.dr.ing. Anca Mihaly Cozmuta

**Members:** assoc. prof. dr. Leonard Mihaly Cozmuta, assoc.prof. dr. Camelia Varga, etc.

**Range:** 2005-2008

**Funding source:** CALIST Program

**Partners:** USAMV Cluj Napoca (coordinator of consortium), North University of Baia Mare, Gent University (Belgium), Science Academy of Moldova Republic –Zoology Institute

**Budget:** 100, 000 RON for NUBM

**“Designing the hazards charts and environment assessment in mining areas of Maramures and Satu Mare counties using GIS – SIG”**

**Director of project for North University of Baia Mare team:** prof.dr.ing. Anca Mihaly Cozmuta

**Members:** assoc.prof. Leonard Mihaly Cozmuta, assoc. prof. dr. Camelia Nicula

**Range:** 2005-2008

**Funding source:** CNCSIS-Romania

**Partners:** Romanian Institute of Geography (coordinator of consortium), ICIA Cluj Napoca, Geoproiect Bucharest, North University of Baia Mare, FSM Cluj Napoca

**Budget:** 190,000 RON for NUBM

### INTERNATIONAL RESEARCH PROJECTS

**“Smart functions of packages containing nano-structured materials in food preservation – SMARTPACK” – 7-065 / 26.09.2012;**

**Coordinator:** lecturer dr. Anca Peter

**Members:** Leonard Mihaly Cozmuta, Anca Mihaly Cozmuta, Camelia Nicula

**Range:** 2012-2015

**Funding source:** MNT-ERANET (2011) Micro-Nano-Technologies

**Partners:** ICA-Bucuresti-Romania, Babes Bolyai University-Cluj Napoca-Romania, SC L&G Consulting SA -Romania, Warsaw University of Technology – Poland

**Budget:** 530.000 euro

**“Developing of a biophysical system based on zeolites-microorganisms-vegetal species for ecoremediation of tailing ponds coming from gold-silver preparation industry–ZEMIP”-82AS/19.08.2008;**[http://chimie-biologie.ubm.ro /zemip/](http://chimie-biologie.ubm.ro/zemip/)

**Coordinator:** assoc.prof. dr.ing. Leonard Mihaly Cozmuta NUBM-Romania

**Members:** Anca Mihaly Cozmuta, Camelia Nicula, Anca Peter  
**Range:** 2009-2011  
**Partners:** North University of Baia Mare, University of Johannesburg – South Africa  
**Budget:** 230990 RON

### SERVICES CONTRACTS

**Analyzing and physically-chemically characterization of liquid and solid samples-DAC,** 39./16.05.2012-2014  
**Coordinator of contract:** assoc. prof. dr. ing. Leonard Mihaly Cozmuta  
**Members:** prof.dr.Anca Mihaly Cozmuta, lecturer dr. Anca Peter, assoc.prof.dr. Camelia Nicula  
**Partners:** CCESMAS, National Center for Expertise of Products- LAREX

### Significant results

#### PUBLISHED PAPERS IN ISI QUOTATION JOURNALS

1. Anca Peter, Leonard Mihaly-Cozmuta, Anca Mihaly-Cozmuta, and Camelia Nicula, Photocatalytic Efficiency of Zeolite-Based TiO<sub>2</sub> Composites for Reduction of Cu (II): Kinetic Models, International Journal of Applied Ceramic Technology, 1–14 (2013) DOI:10.1111/ijac.12046.
2. Anca Peter, Leonard Mihaly-Cozmuta, Anca Mihaly-Cozmuta, Camelia Nicula, Lucian Barbu Tudoran, Lucian Baia, Efficiency of Cu/TiO<sub>2</sub> to Remove Salicylic Acid by Photocatalytic Decomposition: kinetic modeling, Materials Technology, (2013), No. MTE259, DOI:10.1179/175355713Y.0000000121, under publication.
3. A. Peter, L. Mihaly-Cozmuta, A. Mihaly-Cozmuta, C. Nicula, E. Indrea, H. Tutu - Calcium- and ammonium ion-modification of zeolite amendments affects the metal-uptake of Hieracium piloselloides in a dose-dependent way, Journal of Environmental Monitoring, 2012, 14, 2807-2814
4. A. Mihaly Cozmuta, L. Bretan, L. Mihaly Cozmuta, C. Nicula, A. Peter- *Lead traceability along soil-melliferous flora-bee family-apiary products Chain*, Journal of Environmental Monitoring, 2012, 14, 1622-1630
5. A. Peter, E. Indrea, A. Mihaly-Cozmuta, L. Mihaly-Cozmuta, C. Nicula et al. - *Dual efficiency of nano-structured TiO<sub>2</sub>/zeolyte systems in removal of copper (II) and lead (II) ions from aqueous solution under visible light*, AIP Conf. Proc. 1425, 139 (2012); doi: 10.1063/1.3681986
6. L. Mihaly Cozmuta, A. Mihaly Cozmuta, A. Peter, C. Nicula, E. Bakatula Nsimba, H. Tutu - *The influence of pH on the adsorption of lead by Na-clinoptilolite: kinetic and equilibrium studies*, Water SA, Aprilie 2012, vol.38(2), 269-278
7. A. Peter, C. Nicula, A. Mihaly Cozmuta, L. Mihaly Cozmuta - *Chemical and sensory changes of different dairy products during storage in packages containing nano-crystallized TiO<sub>2</sub>*, International Journal of Food Science and Technology, 47, 1448–1456
8. A. Peter, C. Nicula, A. Mihaly-Cozmuta, L. Mihaly-Cozmuta, E. Indrea, V. Danciu, H. Tutu, E. Bakatula Nsimba- *Efficiency of amendments based on zeolite and bentonite in reducing the accumulation of heavy metals in tomato organs (Lycopersicum esculentum) grown in polluted soils*, African Journal of Agricultural Research, 6(21), 5010-5023, 2011
9. A. Peter, M. Marian, C. Nicula, A. Mihaly Cozmuta, L. Mihaly Cozmuta et al. - *THE SORPTIVE PERFORMANCE OF MICROORGANISMS-ZEOLITE SYSTEMS TO REMOVE Cu<sup>2+</sup>, Zn<sup>2+</sup>, Cd<sup>2+</sup>, Fe<sup>2+</sup> AND Pb<sup>2+</sup>*, Revue Roumanie de Chimie, 56 (9), 847-852, 2011
10. Peter A.; Baia L.; Baia M.; et al., *Porous Au-TiO<sub>2</sub> aerogels nanoarchitectures for photodegradation processes*, JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 5 Pages: 1071-1077  
Published: MAY 2010

### The offer addressed to the economic environment

Research & development in core areas	<ul style="list-style-type: none"> <li>• Pollution monitoring;</li> <li>• Rehabilitation of polluted areas;</li> <li>• Physical-chemical control and expertise of food;</li> <li>• Food packaging;</li> <li>• Nanomaterials: preparation, characterization, applications</li> </ul>
Research & development in applied fields	<ul style="list-style-type: none"> <li>• Recovery of valuable metals (Au, Ag, Cu) from wastes;</li> <li>• Waste waters treatment;</li> <li>• Application of nanomaterials in environment deppolution, food industry, self-cleaning materials;</li> <li>• Intelligent and active food packages</li> </ul>
Consulting	<ul style="list-style-type: none"> <li>• Technologies for remediation of polluted soils;</li> <li>• Technologies for recovery of valuable metals from wastes (Cu, Au, Ag);</li> <li>• Food packaging; Food safety;</li> </ul>
Applied engineering services	<ul style="list-style-type: none"> <li>• Technologies for remediation of polluted soils;</li> <li>• Technologies for recovery of valuable metals from wastes (Cu, Au, Ag);</li> <li>• Physical-chemical analysis of solid and liquid samples;</li> <li>• Analysis of mineral elements in different matrices</li> </ul>
Training	<ul style="list-style-type: none"> <li>• Operation of analysis equipment (FTIR, TOC, Analyst Perkin Elmer 800)</li> <li>Statistically processing of experimental data</li> </ul>



Fig.1. Environmental Test Chamber

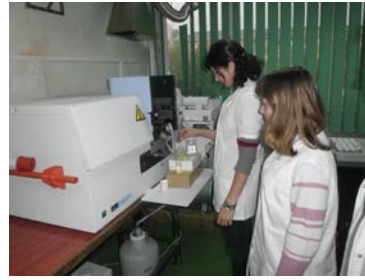


Fig. 2. Atomic absorption Spectrometer AAnalyst 800 (Perkin Elmer)

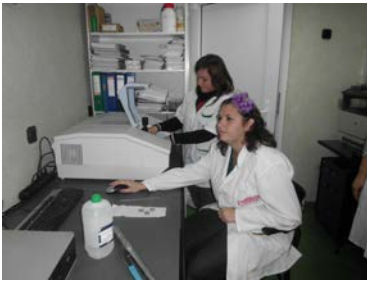


Fig. 3. FTIR BX2



Fig. 4. UV reactor