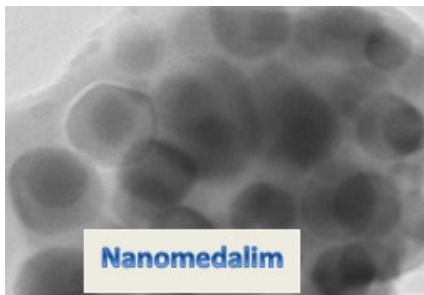


NANOMATERIALS AND APPLICATIONS IN ENVIRONMENTAL AND FOOD ANALYSIS

Contact details

Name	Nanomaterials and application in environmental and food analysis
Acronym	Nanomedalim
Logo	
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Gas chromatograph G3950A INTUVO, Agilent 2019



Liquid chromatograph HPLC YL 9100, 2016

Areas of expertise

Synthesis and characterisation of nanoparticles embedded in silica, polyvinilalcohol and PVA-SiO₂ matrix

- Synthesis of MFe₂O₄, M¹_xM²_{1-x}Fe₂O₄ and M¹_xM²_{1-x}M³_yFe₂O₄ (M, M¹, M², M³ = Ag⁺, Na⁺, Co²⁺, Mn²⁺, Zn²⁺, Cu²⁺, Ni²⁺, Cd²⁺, Ca²⁺, La³⁺) oxidic system nanoparticles nonembedded and embedded in silica, PVA and PVA-SiO₂
- Structural (TG-DTG-DTA-MS, XRD, FT-IR, Mossbauer, BET, porosity), morphological (TEM; SEM, AFM) and magnetic (VSM, M_s, M_r, H_c, K) characterization of ferrite-based nanocomposites.
- Photocatalytic and coloristic applications of ferritic nanomaterials embedded in silica matrices.

Environmental chemistry. Mathematical modelling of environmental data;

- Assessment of soil pollution due to microelements content; transfer of microelements from soil to plant, study of the influence of ionic exchange processes on microelements transfer in the soil-plant system; QSPR/QSAR studies
- Air quality analysis and monitoring; air pollutant and their spatial and temporal distribution; analysis of wet air deposition
- Analysis of physico-chemical parameters of water; assessment of the water quality in water reservoirs, lakes, groundwater, glacial lakes and drinking water supply network, assessment of the impact of anthropogenic activities on water quality parameters, chemical modelling of groundwater quality in the aquifer; heavy metal pollution index, human health risk assessment; water quality index; mathematical modelling of environmental data; drawing the pollution map.

Physico-chemical and sensory characterization of food

- Assesment of hydrolysis and oxidation processes in animal fats; monitoring of chemical parameters during storage
- Increasing the oxidative stability of alimentary fat by the addition of antioxidants;
- Analysis of Volatile Compounds, Composition, and Thermal Behaviour of solids foods;
- Chromatographic analysis of food components and environmental pollutants by HPLC and gas chromatography.

Team

Assoc. prof. dr. habil. eng Thomas Dippong, Assoc. prof. dr. Cristina Mihali, Assoc prof dr. Zoița Berinde, Lecturer dr. eng. Claudia Butean, Lecturer dr. eng. Flavia Pop

Representative projects

CLAMROUA, "Clean Air Management in the Romania - Ukraine Transboundary Area", European Union, Hungary-Slovakia-Romania-Ukraine, ENPI- Cross-border Cooperation Program project,

<http://www.territorialcooperation.eu/frontpage/show/20419> (2013-2015)

POIM project 118881- Participatory management of the Natura 2000 sites Pricop-Huta-Certeze, Tisa Superior and of the protected natural area Ronișoara Forest. 2020-2022, <https://www.heidenroslein.ro/arhive/1446>

Infrastructure

Gas chromatograph INTUVO, Agilent 2019

HPLC YL INSTRUMENT 9100 , produced in 2016

Spectrophotometer Perkin Elmer, produced 2014

WTW pH-meter, produced 2014

Significant results

The most representative publications of the past 5 years:

1. **T. Dippong**, O. Cadar, I.G. Deac, I. Petean, E.A. Levei, D. Simedru, Influence of La³⁺ substitution on the structure, morphology and magnetic properties of CoLa_xFe_{2-x}O₄@SiO₂ nanocomposites. *Journal of Alloys and Compounds*. 976 (2024) 172998. FI=6.2 (Q1)
2. **T. Dippong**, R.A. Mereu, Effect of La³⁺ on thermal, structural and morphological properties of Zn–Co ferrite spinel-based pigments. *Ceramics International* (2024), DOI: 10.1016/j.ceramint.2023.12.343. FI=5.2 (Q1)
3. **T. Dippong**, I. Petean, I.G. Deac, E.A. Levei, O. Cadar, Effect of Ca²⁺ doping and annealing temperature on the structure, morphology and magnetic behavior of Ca_xCo_{1-x}Fe₂O₄/SiO₂ nanocomposites. *Results in Physics* 56 (2024) 107306. FI=5.3 (Q1)
4. **T. Dippong**, **C. Mihali**, M. Marian, O. Mare Rosca, M-A. Resz, Correlations between chemical, hydrological and biotic factors in rivers from the protected area of Tisa Superioară, Romania. *Process Safety and Environmental Protection* 176 (2023) 40–55. FI=7.2 (Q1)
5. **T. Dippong**, E.A. Levei, O. Cadar, Correlation between structure, morphology and magnetic properties in Zn_xCo_{0.8-x}Ni_{0.2}Fe₂O₄@SiO₂ (0.1÷0.7) nanocomposites. *Journal of Alloys and Compounds*. 24 (2023) 330. FI=6.2 (Q1)
6. **F. Pop**, C.A.Semeniuc, M. Dan, **T. Dippong**, Impact of different processing methods and thermal behaviour on quality characteristics of soybean and sesame oils. *JTAC*. (2023) DOI: 10.1007/s10973-023-12852-4. FI – 4.4 (Q1).
7. **T. Dippong**, M.A. Hoaghia, M. Senila Appraisal of heavy metal pollution in alluvial aquifers. Study case on the protected area of Ronișoara Forest, Romania. *Ecological Indicators*, 143 (2022) 109347, FI – 6.9 (Q1).
8. **T. Dippong**, D.M. Lazar, P. Palade, I. Petean, G. Borodi, O. Cadar, The effect of cation distribution and heat treatment temperature on the structural, surface, morphological and magnetic properties of Mn_xCo_{1-x}Fe₂O₄@SiO₂ nanocomposites. *Journal of Alloys and Compounds*, 895 (2022) 162715, FI – 6.371 (Q1).
9. A. Dumuta, Z. Vosgan, **C. Mihali**, L. Giurgiulescu, M. Kovacs, R. Sugar, L. Mihalescu, The influence of unconventional ultrasonic pasteurization on the characteristics of curds obtained from goat milk with the low cholesterol content, *Ultrasonics Sonochemistry*, 89 (2022), 106155, FI-8.4 (Q1)
10. **T. Dippong**, E.A. Levei, D. Toloman, L. Barbu Tudoran, O. Cadar, Investigation on the formation, structural and photocatalytic properties of mixed Mn-Zn ferrites nanoparticles embedded in SiO₂ matrix. *Journal of Analytical and Applied Pyrolysis*. 158 (2021) 105281, FI – 6.437 (Q1)
11. **T. Dippong**, I.G. Deac, M.D. Lazar, I. Petean, E.A. Levei, G. Borodi, O. Cadar, Effect of heat-treatment temperature and zinc addition on magnetocrystallographic and surface properties of manganese nanoferrite prepared by an ecofriendly sol–gel synthesis, *Journal of Materials Research and Technology*. 15 (2021) 6528-6540, FI – 6.267 (Q1).
12. **T. Dippong**, **C. Mihali**, Z. Vosgan, A. Daniel, A. Dumuta, Thermal behavior of different cocoa powder varieties and their physicochemical, phytochemical and microbiological characteristics, *Journal of Thermal Analysis and Calorimetry*, 143 (2021) 4217-4228, FI – 4.755 (Q1)
13. **T. Dippong**, E.A. Levei, F. Goga, O. Cadar, Influence of Mn²⁺ substitution with Co²⁺ on structural, morphological and coloristic properties of MnFe₂O₄/SiO₂ nanocomposites. *Mater Characterization*, 172 (2021) 110835, FI - 4.537 (Q1).
14. **T. Dippong**, M-A. Hoaghia, **C. Mihali**, E. Cical, M. Calugaru, Human health risk assessment of some bottled waters from Romania, *Environmental Pollution*, 267 (2020) 115409, FI – 10.366 (Q1).
15. **T. Dippong**, A.E. Levei, C. Lengauer, A. Daniel, D. Toloman, O. Cadar, Investigation of thermal, structural, morphological and photocatalytic properties of Cu_xCo_{1-x}Fe₂O₄ (0≤x≤1) nanoparticles embedded in SiO₂ matrix. *Materials Characterization*, 163 (2020) 110268, FI – 4.342 (Q1).
16. **T. Dippong**, I.G. Deac, O. Cadar, E.A. Levei, I. Petean, Impact of Cu²⁺ substitution by Co²⁺ on the structural and magnetic properties of CuFe₂O₄ synthesized by sol-gel route. *Materials Charact.* 163 (2020) 110248, FI – 4.342 (Q1).

Products and technologies:

1. Obtaining of MFe₂O₄, M¹_xM²_{1-x}Fe₂O₄ and M¹_xM²_{1-x}M³_yFe₂O₄ (M, M¹, M², M³ = Ag⁺, Na⁺, Co²⁺, Mn²⁺, Zn²⁺, Cu²⁺, Ni²⁺, Cd²⁺, Ca²⁺, La³⁺) oxidic system nanoparticles embedded in silica, PVA and PVA-SiO₂ matrix with structural, morphological, magnetic, coloristic and photocatalytic activities.
2. Studies on the impact of anthropogenic activities on water quality parameters, chemical modelling of groundwater quality in the aquifer, Modelling seasonal variation of physico-chemical parameters in the drinking water supply network.
3. The use of CG-MS, CG-FID and HPLC techniques in the analysis of chemical compounds in food
4. Analysis of caffeine and methylxanthine derivatives in food, beverages and pharmaceutical products.
5. Thermal behaviour and metal composition of solid foods.
6. Chemical composition of volatile compounds and fatty acids in spices
7. The effect of antioxidant character on food quality
8. Method of determination of the microelements transfer factors from soil to plant and water.

The offer addressed to the economic environment Research & development	Depollution solution using nanotechnology Determination of soil characteristics related to the transfer process of the pollutant elements from soil to plants; Quantifying the impact of microelements in soil on the plants grown in areas with historical anthropogenic pollution and comparison with unpolluted reference areas; Studies on air pollution sources. Develop the "Action Plan for Good Air Quality Maintenance in Maramures County"
Consulting	Modelling the traceability of microelements on the food chain soil-plant-food-human. Human health risk assessment in areas polluted with microelements.
Training	Training on the nanoparticles synthesis and their application in environment and food analysis, Training on the negative effects of microelements on human health, measures of minimizing the risk to health. Training on liquid chromatography analysis